414 Nicollet Mall
Minneapolis, MN 55401

PUBLIC DOCUMENTS
NOT-PUBLIC DATA HAS BEEN REDACTED

February 1, 2024

—Via Electronic Filing—

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

RE: 2024-2040 UPPER MIDWEST INTEGRATED RESOURCE PLAN
DOCKET NO. E002/RP-24-67

Dear Mr. Seuffert:

Northern States Power Company, doing business as Xcel Energy, is pleased to submit this 2024-2040 Upper Midwest Integrated Resource Plan (2024 Plan) to the Minnesota Public Utilities Commission. The 2024 Plan identifies the resources we will need to reliably serve our customers over the next 15 years and charts a path toward achieving Minnesota's newly enacted "100 by 2040" law.

The Company's Preferred Plan is designed to build upon the substantial progress already made through prior resource plans, and we are grateful to all of our stakeholders and the Commission for their input, leadership, and collaboration as we continue to transition to a cleaner—and ultimately carbon-free—energy future. In our 2019 Plan, the Commission approved a number of key decisions in what promises to be an historic transformation of our energy system to one that will be dramatically cleaner, while remaining safe, affordable, and reliable for our customers. As the Commission directed in that proceeding, we will retire all of our baseload coal units in the coming years, replacing them with thousands of megawatts (MWs) of new renewable resources, supported by firm dispatchable resources to ensure reliability.

It's worth pausing to reflect on the progress we have already made together. Among other things, it includes the construction of multiple gigawatts of new wind resources across our region; the ongoing construction of the largest solar farm in the Midwest at our Sherco site; and the recent decommissioning of our Sherco 2 coal plant, which is the first in the series of carefully planned coal retirements that will occur throughout the 2020s. As a result of these and other achievements, our total energy mix in 2023 was 63 percent carbon-free.

In this 2024 Plan, we are proposing a Preferred Plan that will allow us to take the next step in decarbonizing our system while maintaining critical reliability and affordability for our customers at less than a one percent average annual increase in rates—less than half the national average. Key elements of that plan include:

- Extending the lives of both our nuclear plants—over 1,700 MWs of carbon-free baseload generation—into the 2050s;
- Adding nearly 10,000 MWs of renewable resources and over 2,100 MWs of energy storage to our system by 2040;
- Supporting the integration of nearly 6,000 MWs of demand-side resources, including energy efficiency, demand response, and distributed solar, on our distribution system by 2040; and
- Adding the necessary firm dispatchable resources to ensure reliability and facilitate renewable integration while generating less than 5 percent of the energy on our system.

The State of Minnesota and Xcel Energy have led the clean energy transition for decades, and this plan continues that leadership. We share the state's vision to deliver 100 percent clean energy in Minnesota by 2040, and we are well-positioned and steadfast in our commitment to achieving that target.

We look forward to discussing our 2024 Plan with the Commission, stakeholders, and the community.

Request for Protection of Confidential Information

The Company recognizes and supports the need for transparency in review of our 2024 Plan. We also take seriously our responsibility to maintain the security of the information and systems involved in the delivery of safe, reliable energy to our customers.

Appendix D1: 2023 Inertial Floor Study Report

Appendix D1 is marked as "Not-Public" and is provided with Critical Energy Infrastructure Information (CEII) redacted. The appendix contains contingency information related to or proposed to critical electric infrastructure, the incapacity or destruction of which would negatively affect national security, economic security, public health or safety, or any combination of such matters. Xcel Energy protects CEII as confidential Security Information as defined by Minn. Stat. § 13.37(1)(a),

as its disclosure would be likely to substantially jeopardize the security of vital system information, and property against trespass, or physical injury or otherwise cause financial harm from its disclosure. Xcel Energy maintains this information as a confidential pursuant to Minn. Rule 7829.0500, subp 2.

Appendix E: Load and Distributed Energy Resource Forecasting

Appendix E is marked "Not-Public" as a portion of Section VI.E. contains information designated as Trade Secret data pursuant to Minn. Stat. § 13.37(1)(b). The information contains sensitive forecasted production and load location data that derives an independent economic value from not being generally known or readily ascertainable by others who could obtain a financial advantage from their use. Thus, Xcel Energy maintains this information as a trade secret pursuant to Minn. Rule 7829.0500, subp 2.

Appendix F: EnCompass Modeling Assumptions and Inputs

Appendix F is marked "Not-Public" as Table F-14: Nuclear Leave Behind Costs contains information designated as Trade Secret pursuant to Minn. Stat. § 13.37, subd. 1(b). Table F-14 includes cost data that could provide an unfair economic advantage to other persons considering constructing projects or performing upgrades in the vicinity of the Company's nuclear plants. This information derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use. Thus, Xcel Energy maintains this information as a trade secret pursuant to Minn. Rule 7829.0500, subp 2.

Appendix M1: Nuclear Leave Behind Study Report

Appendix M1 is marked as "Not-Public" and is provided with Critical Energy Infrastructure Information (CEII) redacted. The appendix contains contingency information related to or proposed to critical electric infrastructure, the incapacity or destruction of which would negatively affect national security, economic security, public health or safety, or any combination of such matters. Xcel Energy protects CEII as confidential Security Information as defined by Minn. Stat. § 13.37(1)(a), as its disclosure would be likely to substantially jeopardize the security of vital system information, and property against trespass, or physical injury or otherwise cause financial harm from its disclosure. Xcel Energy maintains this information as a confidential pursuant to Minn. Rule 7829.0500, subp 2.

Appendix N1: 2021 REO-RES-SES Report
Appendix N2: 2022 REO-RES-SES Report

Appendices N1 and N2 are marked as "Not-Public" as certain portions of Attachment A to the reports are designated as Trade Secret information pursuant

to Minn. Stat. § 13.37, subd. 1(b). In particular, the information pertains to specific Commission-approved Purchase Power Agreements (PPAs), the terms of which require the information be protected as not-public. Other information marked as Trade Secret relates to specific production from specific customer facilities. Xcel Energy protects this information as private customer data pursuant to the Minnesota Data Practices Act and a trade secret pursuant to Minn. Stat. § 13.37, subd. 1(b), as it derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by other persons who can obtain economic value from its disclosure or use. Thus, Xcel Energy maintains this information as a trade secret pursuant to Minn. Rule 7829.0500, subp 2.

Appendix T: MISO Grid Congestion

Attachment T is marked "Not-Public" as portions of the appendix contain data designated as Trade Secret pursuant to Minn. Stat. §13.37(1)(b). The information includes wind facility curtailment and congestion costs Xcel Energy treats as confidential pursuant to purchase power agreements with facility owners. This information has independent economic value from not being generally known to, and not being readily ascertainable by, other parties who could obtain economic value from its disclosure or use. Thus, Xcel Energy maintains this information as a trade secret pursuant to Minn. Rule 7829.0500, subp 2.

Copies of the filing will be served on Commission staff, the Department of Commerce, and the Office of the Attorney General – Residential Utilities Division. We will also provide a copy to the Minnesota Environmental Quality Board. Interested parties will be able to obtain copies from our web site at xcelenergy.com/UpperMidwestEnergyPlan.

Please contact Bria Shea at (612) 330-6064 or bria.e.shea@xcelenergy.com if you have any questions regarding this filing.

Sincerely,

/s/

RYAN LONG
PRESIDENT
NORTHERN STATES POWER COMPANY

Enclosures
c: Service Lists

REQUIRED INFORMATION

I. SUMMARY OF FILING

A one-paragraph summary is attached to this filing pursuant to Minn. R. 7829.1300, subp. 1.

II. SERVICE ON OTHER PARTIES

Pursuant to Minn. Stat. § 216.17, subd. 3, we have electronically filed this document with the Commission. Pursuant to Minn. Rule 7843.0300, subp. 5, we have served copies of this filing on the Department of Commerce, Office of the Attorney General, Minnesota Environmental Quality Board and parties on the enclosed service lists.

III. GENERAL FILING INFORMATION

Pursuant to Minn. R. 7829.1300, subp. 3, the Company provides the following information.

A. Name, Address, and Telephone Number of Utility

Northern States Power Company doing business as:
Xcel Energy
414 Nicollet Mall
Minneapolis, MN 55401
(612) 330-5500

B. Name, Address, and Telephone Number of Utility Attorney

Ian M. Dobson
Lead Assistant General Counsel
Xcel Energy
414 Nicollet Mall, 401 – 8th Floor
Minneapolis, MN 55401
(612) 330-7641

C. Date of Filing and Proposed Effective Date of Rate Factors

The date of this filing is February 1, 2024. The Company is not proposing rate factors in this filing.

D. Statute Controlling Schedule for Processing the Filing

Minn. Stat. § 216B.2422 governs the Company's submission of a resource plan periodically in accordance with rules adopted by the Commission.

E. Utility Employee Responsible for Filing

Bria E. Shea
Regional Vice President, Regulatory Policy
Xcel Energy
414 Nicollet Mall, 401 – 7th Floor
Minneapolis, MN 55401
(612) 330-6064

IV. MISCELLANEOUS INFORMATION

Pursuant to Minn. R. 7829.0700, the Company requests that the following persons be placed on the Commission's official service list for this proceeding:

Ian M. Dobson
Lead Assistant General Counsel
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ian.m.dobson@xcelenergy.commailto:

Christine Schwartz
Regulatory Administrator
Xcel Energy
414 Nicollet Mall, 401 – 7th Floor
Minneapolis, MN 55401
regulatory.records@xcelenergy.com

Any information requests in this proceeding should be submitted to Christine Schwartz at the Regulatory Records email address above.

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

Katie Sieben	Chair
Joseph K. Sullivan	Commissioner
Hwikwon Ham	Commissioner
Valerie Means	Commissioner
John Tuma	Commissioner

IN THE MATTER OF XCEL ENERGY'S 2024-2040 UPPER MIDWEST INTEGRATED RESOURCE PLAN	Docket No. E002/RP-24-67

XCEL ENERGY'S INTEGRATED RESOURCE PLAN SUMMARY OF PROPOSAL

SUMMARY

On February 1, 2024, Northern States Power Company, doing business as Xcel Energy, submitted to the Minnesota Public Utilities Commission its 2024-2040 Upper Midwest Integrated Resource Plan (2024 Plan).

The 2024 Plan builds on the strong foundation of cost-effective carbon reduction that we have been working toward since the Commission approved our 2019 Plan. The 2024 Plan identifies the resources we will need to reliably serve our customers over the next 15 years and charts a path toward achieving Minnesota's newly enacted "100 by 2040" law. It is comprised of a portfolio of forward-looking projects and resources designed to continue providing safe, reliable, and affordable service to our customers while continuing our ambitious carbon-reduction strategy, even as we forecast significant increases in customer load from electrification and other sources.

Copies of the filing will be served on Commission staff, the Department of Commerce, and the Office of the Attorney General – Residential Utilities Division. We will also provide a copy to the Minnesota Environmental Quality Board. Interested parties will be able to obtain copies from our web site at xcelenergy.com/UpperMidwestEnergyPlan.

Xcel Energy®

UPPER MIDWEST INTEGRATED RESOURCE PLAN 2024-2040

NORTHERN STATES POWER COMPANY
MPUC DOCKET NO. E002/RP-24-67
FEBRUARY 1, 2024

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2024-2040 UPPER MIDWEST INTEGRATED RESOURCE PLAN

CHAPTER 1 - EXECUTIVE SUMMARY

I. INTRODUCTION

Northern States Power Company, a Minnesota Corporation, doing business as Xcel Energy (the Company), is pleased to present this 2024-2040 Upper Midwest Integrated Resource Plan. Our plan will allow the Company to continue providing safe, reliable, and affordable service to our customers while further accelerating our ambitious carbon-reduction strategy, even as we forecast significant increases in customer load from electrification and other sources. Specifically, the Company's Preferred Plan (the 2024 Plan or Preferred Plan) in this proceeding is designed to achieve the following:

- Greater carbon emissions reductions by 2030 than projected in our last plan, and compliance with Minnesota's new "100 x 2040" law;
- $464 million in Present Value of Revenue Requirements (PVRR) savings by 2040;
- $785 million in Present Value of Societal Cost (PVSC) savings by 2040 and over $1 billion by 2050;
- Sufficient firm dispatchable resource additions to ensure reliability; and
- Less than a one percent average annual increase in rates based on generic market pricing of new generation.

These benefits build off the progress made in our last resource plan (2019 Plan). In that proceeding, the Commission approved a number of key decisions in what promises to be a historic transformation of our energy system to one that will be dramatically cleaner, while remaining affordable and reliable for our customers. As the Commission directed, we are working to close all of our baseload coal units in the coming years, replacing them with thousands of megawatts (MWs) of new renewable resources, supported by firm dispatchable resources to ensure reliability. Toward that end, we have already made great progress on our carbon emission reduction efforts to date thanks to the support from and alignment with the Commission, the Legislature, and Governor Walz and his administration.

Following Commission approval of the 2019 Plan, the Company has taken a number of steps needed to transform our energy system into one that will provide cleaner energy to our customers, while remaining safe, reliable, and affordable. Several notable accomplishments since approval of the 2019 Plan include the following:

- The closure of Sherco Unit 2 at the end of 2023, the first of our four remaining coal units that we intend to close by the end of 2030;
- Commission approval of our Certificate of Need for additional dry cask storage at our Monticello Nuclear Generating Plant, which will allow that facility to continue providing carbon-free, reliable baseload power through 2040;
- Commission approval and the start of construction for Sherco Solar, which will add 710 MWs of solar generation to our system and fill the valuable interconnection rights made available by the closure of Sherco Unit 2; and
- Commission approval of a first of its kind long-duration energy storage pilot project that will test a new 10 MW iron-air storage technology that will provide up to 100 hours of storage capability.

The Company has also initiated proceedings to construct transmission lines for replacement generation at both Sherco (the Minnesota Energy Connection) and King (the King Gen-Tie), which will allow for the cost-effective integration of thousands of megawatts of additional renewable resources on our existing system. We have also initiated a bidding process to obtain the first 1,200 MWs of new wind energy that will utilize the Minnesota Energy Connection and preserve our valuable interconnection rights when Sherco Units 1 and 3 permanently close.

The 2024 Plan builds on these achievements and actions and increases the pace of our carbon-reduction efforts even further, while continuing to ensure our system maintains robust reliability. Under our 2024 Plan, our modeling in this IRP shows potential reduction of carbon emissions by 88 percent by 2030, as compared to 2005 levels—up from a goal of 80 percent emissions reduction in our 2019 Plan.[1] In addition, our 2024 Plan positions the Company to comply with Minnesota's newly enacted "100 x 2040" law,[2] which requires utilities to generate an amount of carbon-free electricity equivalent to their Minnesota retail sales by 2040. Finally, we continue to plan on generating 100 percent carbon-free energy by 2050, consistent with the industry-leading commitment we made in 2018.

[1] We note these are only modeled results and that our actual emissions reductions over time likely will differ from the modeling. One notable example is that, consistent with prior IRPs, this carbon reduction forecast is based on modeling that dispatches units to optimize PVSC. While we have not historically applied a carbon cost adder across our generation fleet when offering our units in the MISO market (which would mimic such modeling results), we are open to further consideration of our dispatch strategy as we manage the transition of our resources.
[2] Codified as Minn. Stat. § 216B.1691 Subd. 2g.

While some of the resources included in our near-term and long-term plan have naturally changed from our 2019 Plan given the passage of time, the overall direction is the same. Our five-year action plan is expected to see 3,200 MWs of wind resources added to our system and over 1,000 MWs of distributed solar and community solar gardens, consistent with newly-passed state law. We will have new opportunities to maximize the value of these and other intermittent resources as we project adding 600 MWs of stand-alone storage during this time. Also, we plan to achieve an average annual level of 780 gigawatt hours (GWh) of energy efficiency as ordered at the conclusion of the 2019 Plan, using a combination of utility-sponsored programs and growth of "naturally occurring" savings.

As we add these clean and low-cost intermittent and short-duration resources to replace our retiring baseload coal, we are increasingly focused on ensuring that our system remains reliable, so that we can deliver the power our customers' demand at all times and responsibly meet the State's carbon reduction goals. Our focus on reliability is particularly important because, at the same time we are planning to retire our entire coal fleet (over 2,000 MWs of baseload generation), we also have nearly 1,700 MWs of power purchase agreements (PPAs) with other capacity resources set to expire between 2025 and 2028. This need to ensure an adequate low-carbon power supply during this transition drives several of the additions we are proposing. First, we plan to extend the lives of existing facilities. We plan to extend the lives of both of our nuclear plants into the early 2050s to match 20-year life-extensions we are working to obtain from the Nuclear Regulatory Commission. This will ensure that the Company continues to have available more than 1,700 MWs of carbon-free baseload power into the foreseeable future. We are also planning to extend the lives of our Company owned Refuse Derived Fuel (RDF) waste to energy generating facilities. Second, to ensure our system remains reliable through this transition, our modeling analysis shows that we need to add over 2,200 MWs of firm peaking capacity—emergency resources intended to operate only at times of peak demand, some of which could be extensions of existing PPAs—during our five-year action plan.

Collectively, these changes will result in a resource mix that continues to be diverse but that will rely much more heavily on carbon-free resources going forward, as shown in Figures 1-1 and 1-2 below.

Figure 1-1: NSP System 2024 and 2040 Preferred Plan Capacity Mix

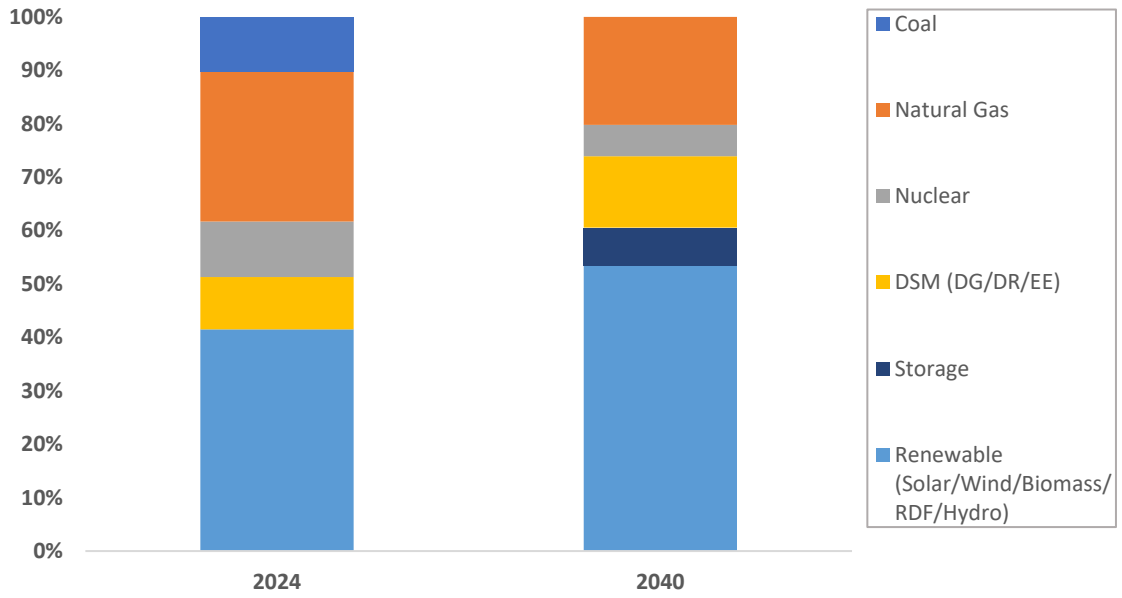
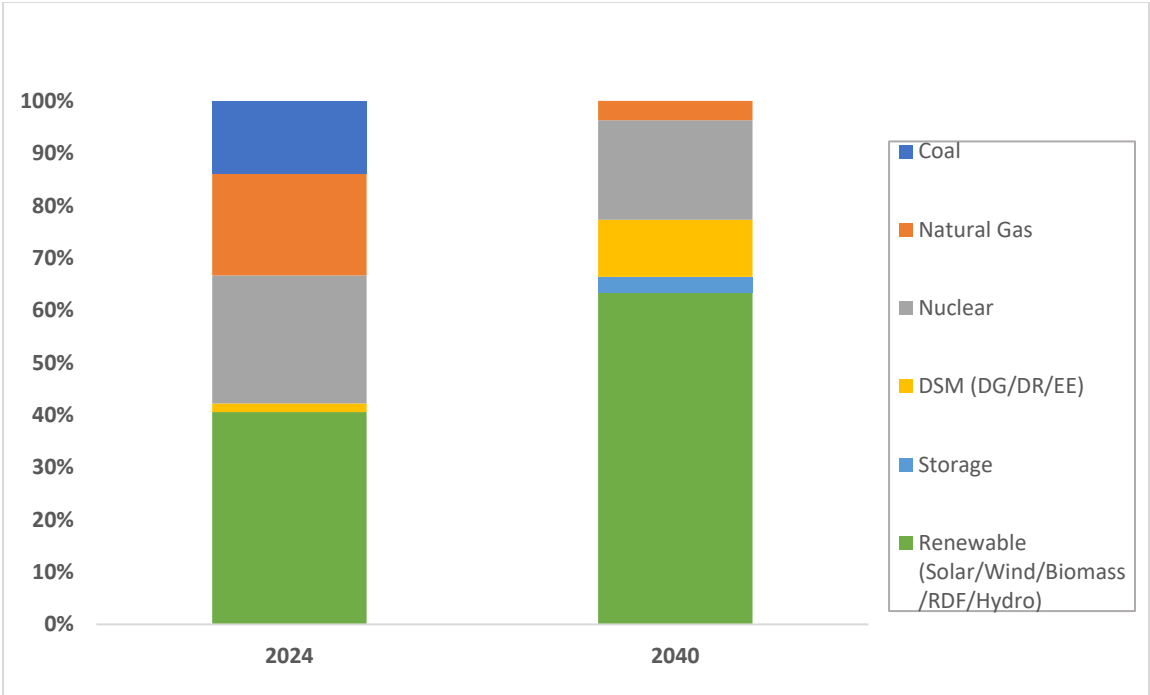


Figure 1-2: NSP System 2024 and 2040 Preferred Plan Energy Mix[3]



[3] These results are based on the modeled dispatch of resources added pursuant to our Preferred Plan. We note that the market dispatch of resources will ultimately determine the energy mix of the Preferred Plan.

Our 2024 Plan is also impacted by and consistent with state and federal energy policy, which are increasingly incentivizing utilities to accelerate their carbon-reduction strategies. As referred to above, this past year, the State of Minnesota passed the groundbreaking "100 x 2040" law, which requires that, by 2040, utilities generate or procure an amount of carbon-free energy equivalent to their Minnesota load. Likewise, the State also passed a new law requiring that at least three percent of the Company's retail sales be generated by new distributed solar generating systems. As discussed in greater detail below, we developed our 2024 Plan to ensure compliance with these and other applicable laws.

Changes in federal policy also make increasing investments in renewable resources more cost effective, and our 2024 Plan reflects this change. The Inflation Reduction Act (IRA) provides for enhanced tax incentives for new clean energy projects, making our planned renewable additions more affordable for our customers. In addition, the EPA's proposed "Good Neighbor Plan" would increase the per mega-watt hour (MWh) cost of operating carbon-emitting resources. The combination of these policies, in addition to the new State statutes reflected above, support a more rapid transition of our system to a clean energy future, consistent with the plan we lay out here.

Our 2024 Plan provides substantial economic benefits for our customers and communities. As noted above, our 2024 Plan results in $464 million in PVRR savings by 2040; $785 million in PVSC savings by 2040 and over $1 billion in PVSC by 2050. Our 2024 Plan leverages $5.7 billion in IRA tax credits through incremental renewable additions over the course of the planning period. Finally, our 2024 Plan is designed to exceed 80 percent reduction in carbon emissions (with actual results up to 88 percent by 2030) leading to continued carbon reductions while leading to less than a one percent average annual increase in rates.

Our 2024 Plan reflects a careful balancing of State and Federal policy, Commission guidance, and stakeholder input. Although there is still significant work to do to fully decarbonize our system, including developing and integrating new technologies such as standalone storage, this plan represents another critical step in that direction. We are examining advanced technologies such as new battery chemistries, advanced nuclear reactors and hydrogen, which may contribute further to our clean energy objectives. As new technologies mature, we will include them in our resource planning analyses. We are charting a path to decrease our carbon emissions even more than we had planned just a few years ago, in a responsible way that ensures our customers will have the power they need, when they need it, at an affordable cost.

II. 2024-2040 UPPER MIDWEST RESOURCE PLAN

Our 2019 Plan set us on an ambitious path to decarbonize our energy system, primarily by retiring all of our coal units in the next six years and replacing the bulk of the energy those plants provide with renewable resources. In bringing forward the 2024 Plan, we are accelerating our path toward decarbonization while remaining focused on ensuring that the core needs of our customers and stakeholders are met during this dynamic period of transition and growth. Our customers demand and deserve reliable electric service at affordable rates, and they—along with our regulators, stakeholders, and communities—have increasingly demanded that this service be provided by clean resources. In addition, our customers are beginning to use the electric service we provide to meet different needs. The growth of transportation and other beneficial electrification, along with other potential electric load increases, presents new challenges and opportunities as we plan to meet our customers' needs.

We believe that the robust planning process we have used to develop our 2024 Plan results in a portfolio that can serve the accelerating growth in energy demand in a way that is sustainable, reliable, and cost-effective. Our 2024 Plan relies on longstanding technologies with which we are deeply familiar, while integrating new and emerging technologies such as energy storage that can enhance the benefits of our system resources. We also continue our strategy of implementing a phased-in transition to a cleaner future, in which renewables and renewable-supporting resources are added over time—albeit on an ambitious but achievable timeline. This allows us to maintain the reliability of our system during this transition, while providing us with the flexibility to respond to changing market dynamics, technology advancements, and evolving regulatory policies.

Below, we discuss the major priorities and considerations we faced in developing our 2024 Plan and the overall resource mix we propose.

A. Planning Priorities and Characteristics

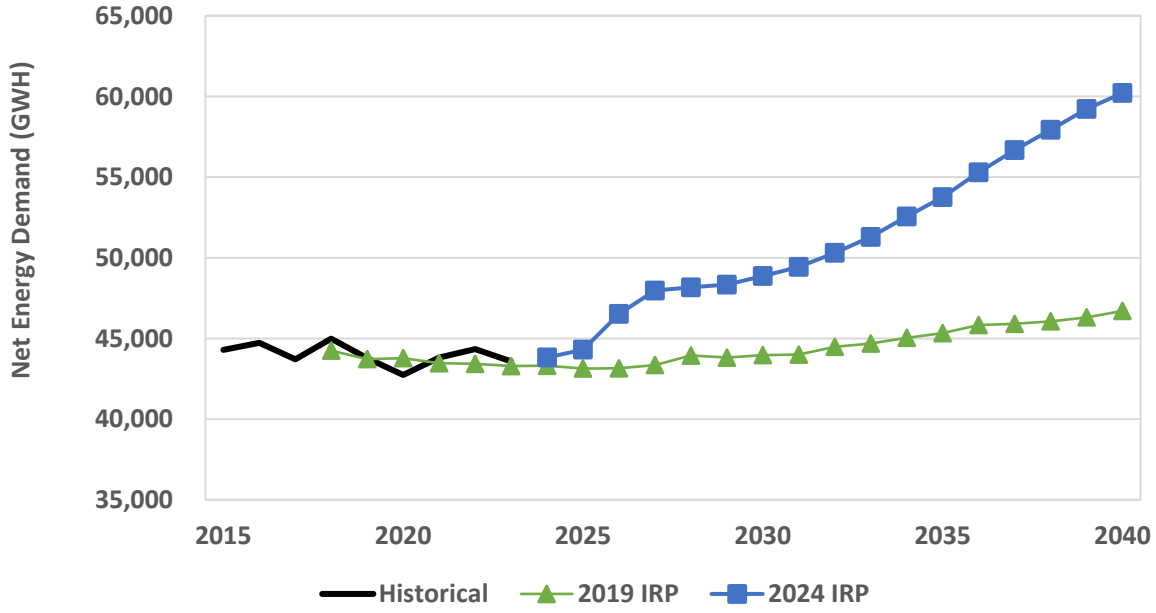
1. Load Growth

The last several decades of our industry can be characterized as a period of relatively flat annual growth for electric consumption. Conservation programs offered by utilities, coupled with efficiency gains in appliances and other naturally occurring energy savings from our customers, provided a significant offset to the energy growth attributable to new customer additions. For instance, after adjusting for weather,

electric energy requirements of our system increased at an average of only 0.2 percent from 2019 to 2022. As a result, while utilities have needed to plan for some growth, the amount of that growth was quite small.

We now, however, anticipate that this period of ultra-slow consumption growth is ending, and we expect to see the demand for our service increase at a greater pace. While further improvements in energy efficiency and demand response capabilities will continue to provide substantial value to our customers, we anticipate that emerging uses of electricity will result in greater consumption growth than we have needed to plan for in the recent past. Specifically, our base case forecasts now anticipate average annual growth rates of 1.8 percent in our peak demand, and 2 percent for our energy forecast over the 2024-2040 planning period. This is a marked divergence from what we have anticipated in the past, as demonstrated in the Figure 1-3 below:

Figure 1-3: Forecasted Net Energy Requirements After Energy Efficiency Adjustments (GWh)



The primary factors leading to this increased growth in our forecast are new anticipated load coming from large new data centers and accelerating adoption of electric vehicles. Other forms of beneficial electrification, such as the emerging transition in space and water heating from fossil sources to electricity, will provide additional sources of new growth.

Despite our projections for accelerating growth, we anticipate decarbonizing our energy system even faster than we thought just a few years ago. This means that we can better support the decarbonization of the other industries, such as transportation and space and water heating, that we project will drive our growing sales through electrification.

2. Reliability

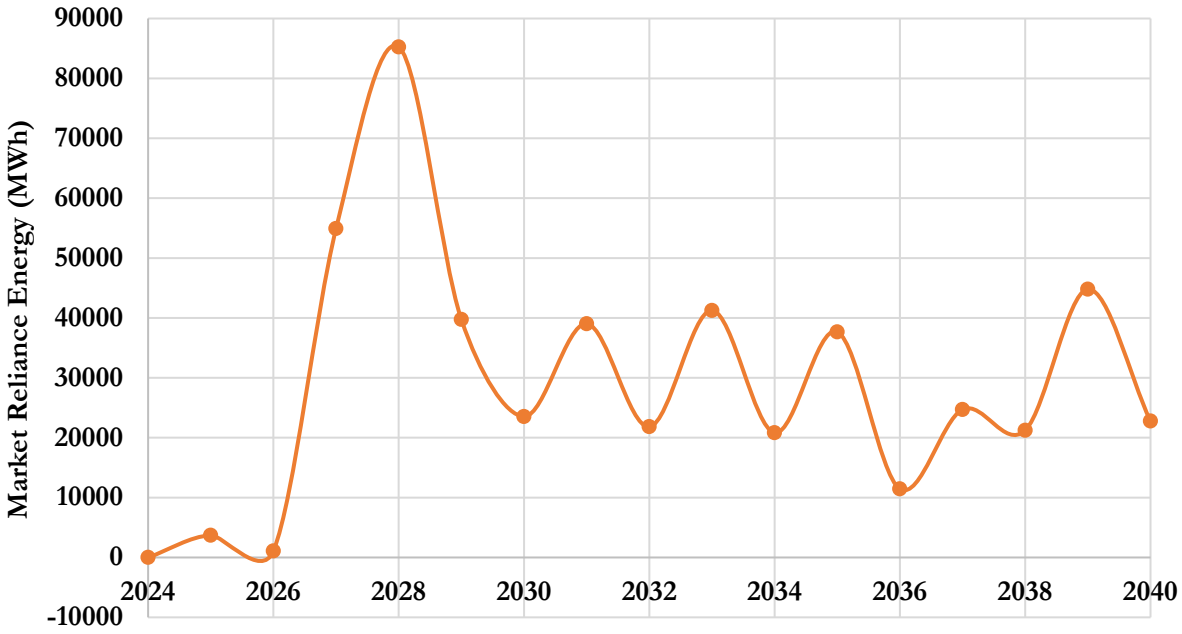
The anticipated increase in the growth of electricity consumption discussed above comes amid renewed attention to the reliability of the electric system. The foundational service we provide to our customers is safe and reliable electricity, and we must be prepared to meet our customers' energy demands twenty-four hours a day, 365 days a year. The closing of our (and other utilities') baseload coal units and the substantial additions of intermittent renewable resources has and will continue to provide many benefits to our customers and communities. At the same time, however, it also means that we must develop our plans thoughtfully to ensure that we continue to have the resources to meet our customers' needs at all times.

As the resource mix in the region has changed, there is also less excess capacity in the MISO footprint. In fact, MISO's 2022-23 Planning Resource Auction (PRA) resulted in a capacity shortfall for the MISO North/Central Regions, leading to the price of capacity clearing at the Cost of New Entry (CONE). As a result of these developments, among other things, MISO has changed its reliability construct to a seasonal Resource Adequacy (RA) construct with capacity requirements for each season. This new seasonal RA construct establishes planning reserve margin (PRM) and resource capacity contributions for each season (spring, summer, fall, winter). Additional changes to the RA construct are also under consideration and will impact the resources needed in the MISO region to meet reliability requirements. These changes are intended to ensure that MISO's members maintain adequate supplies of generation at all times. This is especially important for us, since our Upper Midwest system constitutes approximately half of the load in MISO Zone 1 and approximately seven percent of the load in the entire MISO footprint from Manitoba to Louisiana, making our system a major part of the broader MISO market.

The planning process we used to develop our 2024 Plan reflects and responds to these changes and the need for additional focus on ensuring an adequate resource mix. In past resource plans, our modeling analysis allowed a portion of our resource needs to be fulfilled by the MISO market. When we performed the same analysis for the 2024 Plan, however, the models produced an expansion plan that would be unable to serve our load during a significant number of hours each year. This reflects the

changing resource mix on our system. To illustrate this point, the orange line in the Figure 1-4 below shows the expected market reliance , which represents the total MWh in each year in which the Market Access Optimization expansion plan resources are unable to serve our load and must rely on the market purchases.

Figure 1-4: Market Access Optimization
Expected Market Reliance



This analysis demonstrates that an overreliance on the market creates substantial risk of high prices and, possibly, that sufficient resources simply will not be available when they are needed.

To address this risk while continuing to optimize the cost-effectiveness of our fleet, we used a modified analysis to develop our 2024 Plan, and we did not allow our model to rely on the MISO market when optimizing our capacity expansion plan. We did, however, set those capacity obligations using MISO's coincident peak and PRM, and we allowed the model to benefit from access to the MISO market to dispatch of resources to serve our customers. This two-step analysis results in an expansion plan that takes advantage of the potential cost savings of participating in the MISO market, while not being reliant on the MISO market to meet our resource needs. In addition, by continuing to plan to MISO's coincident peak and PRM, our analytical approach ensures that we are not adding resources that are not necessary to meet our customers' needs.

In addition to planning our resource additions to limit reliance on MISO market purchases, we have taken steps to further refine our energy adequacy analysis. We conducted an energy adequacy back casting analysis to ensure our system has the reliable energy it needs to serve all customers at every hour of every day. We used historical data on scenarios, including our Preferred Plan and Market Access Optimization sensitivity discussed above, which was developed assuming 2,300 MW of hourly market access.[4] The analysis allowed us to assess the capacity and energy adequacy of our plans. We evaluated these plans on six different measures:

1. Native Capacity Shortfall: Hours of insufficient system capacity in each year.
2. Average Shortfall Intensity: Average Shortfall in MW during the shortfall events in each year.
3. Longest Shortfall Event: Longest duration in hours of the shortfall events in each year.
4. Peak Capacity Shortfall: Peak capacity shortfall in MW of the capacity shortfall events in each year.
5. MISO Market Reliance Hours: Total number of hours the plan is reliant on the market to serve load.
6. MISO Market Reliance Energy: Total amount of MWh the plan is reliant on the market to serve load.

The Preferred Plan performs well across all of these energy adequacy metrics. There are only two hours of native capacity shortfall in 2030 across the seven historic years tested and applied to our Preferred Plan, resulting in limited dependence on the market. There are also only four hours across the seven historical test years where the Preferred Plan requires market purchases in order to meet load serving needs. In contrast, the Market Access Optimization sensitivity showed significant vulnerabilities across the energy adequacy metrics, supporting our approach in the Preferred Plan to ensuring reliability.

3. Cost-Effectiveness

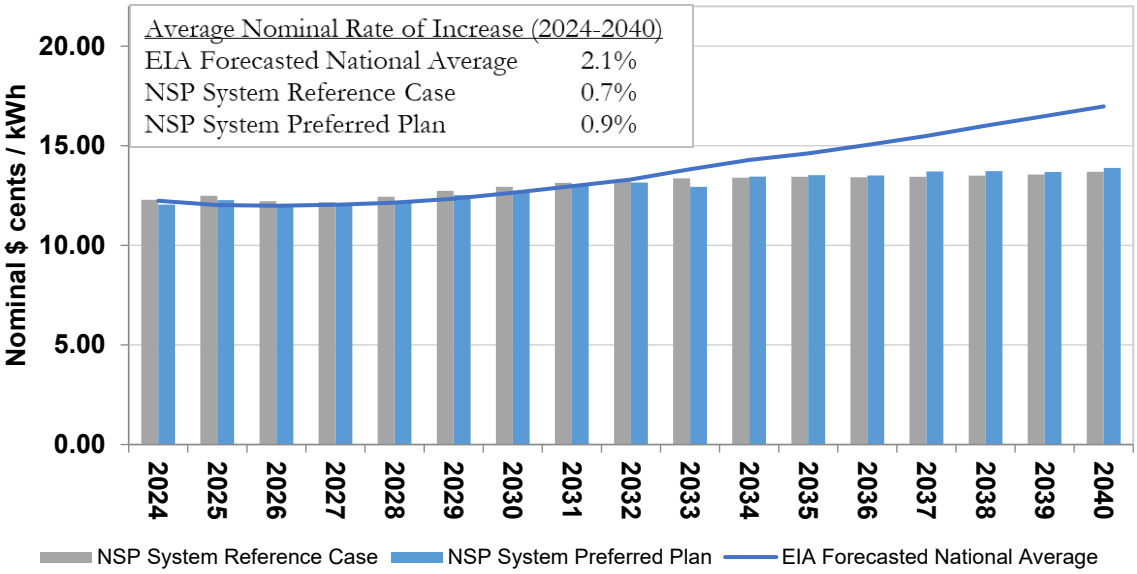
We understand the importance of keeping the cost of our service reasonable for our customers. Some of our customers truly struggle to afford their energy bills. We have developed and continue to improve upon a variety of programs designed to target and

[4] As discussed in Appendix D: Energy Adequacy Analysis, which also analyzed the Reference Case and Low Load Scenario.

assist those individuals. But regardless of whether our service is affordable for an individual or business, all of our customers rightfully expect that their energy bills will not be more than is necessary to meet their needs and public policy goals.

Our average residential customer's electricity bill has remained below the national average, and our goal continues to be that our customers will experience average annual bill increases that are below the rate of inflation. Our Preferred Plan remains broadly in line with these goals. In fact, our Preferred Plan achieves a higher level of carbon reductions than the approved 2019 Plan for a customer cost of less than one percent compound annual growth rate over the planning period. Figure 1-5 below shows the relative cost growth of our Preferred Plan in comparison to the national average:

Figure 1-5: Preferred Plan Average Rate Impact for the NSP System



* *Notes: National energy cost forecast from Energy Information Administration (EIA) Annual Energy Outlook 2023, Table Energy Supply, Disposition, Prices and Emissions – Reference Case. End use prices, all sector average.*[5] The Preferred Plan and Reference Plan lines include the costs of Solar Rewards*Community.

The low cost forecast to implement our Preferred Plan is aided by additional policy incentives that will benefit our customers. In particular, the passage of the Inflation Reduction Act (IRA) unlocked a projected $5.7 billion in additional federal tax incentives for our Preferred Plan's utility-scale renewable and storage resource

[5] *See* U.S. Energy Information Administration - EIA - Independent Statistics and Analysis The EIA's Annual Energy Outlook was published in 2023.

additions. We recognize additional cost savings from the IRA for our existing renewable and nuclear resources. The value of these tax benefits were incorporated in our modeling, lowering the levelized cost of these resources significantly. These tax benefits will have a meaningful impact for our customers, since our Preferred Plan includes additions of 3,200 MWs of additional wind generation, 400 MWs of additional utility-scale solar generation, and 600 MWs of standalone storage through 2030.

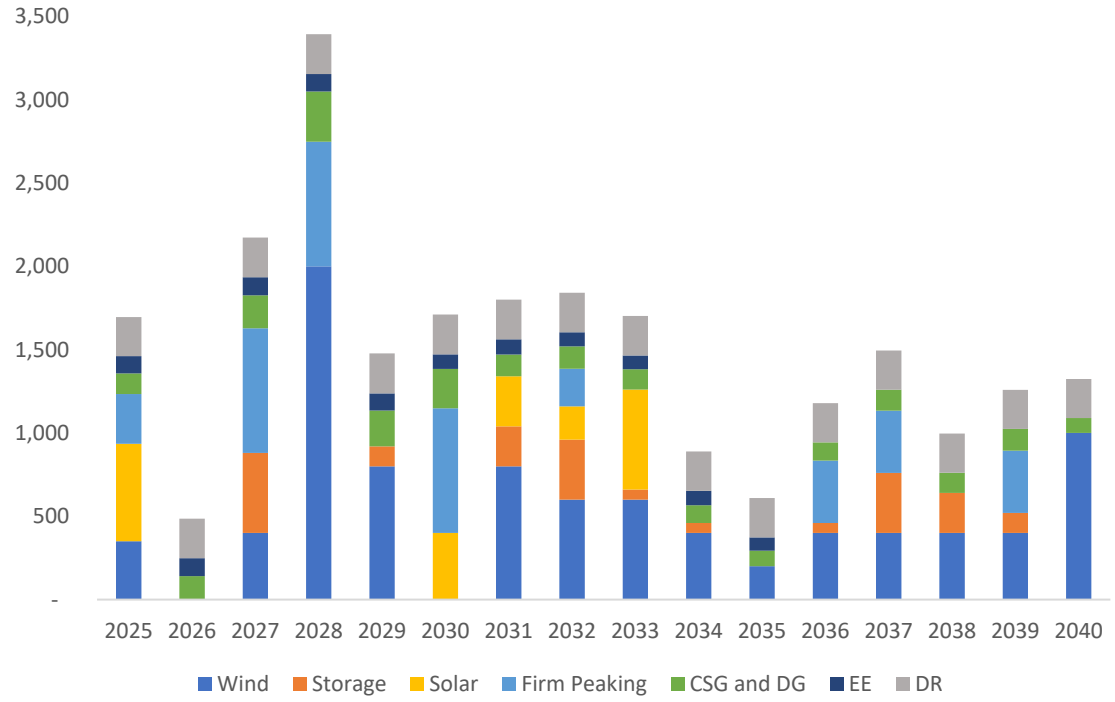
B. Proposed Resource Mix

Our Preferred Plan continues our strategy of transitioning our resource fleet to more sustainable energy sources while preserving our fundamental commitment to maintaining safe, reliable, and affordable service. Our proposed resource mix maintains the path approved in our 2019 Plan to retire all of our remaining coal generators by the end of 2030 – a reduction of approximately 2,400 MWs of baseload units. In that same time, 1,700 MWs of PPAs, the majority of which are for natural gas generation, are set to expire between 2025 and 2028.

To replace these resources and meet our customers' needs, we developed a diverse generation portfolio that relies predominantly on renewable and carbon-free resources, supported by necessary firm dispatchable resources, which are designed to operate only 5-10 percent of the year, to ensure reliability. By the end of 2030, we will add approximately 4,300 MWs of new wind and solar facilities—including the additions from community solar gardens and distributed solar, along with 600 MWs of standalone storage to optimize our system. The limited amount of carbon generation that remains on our system will largely be seldom-used peaking units that are needed to support the substantial increase in intermittent renewables.

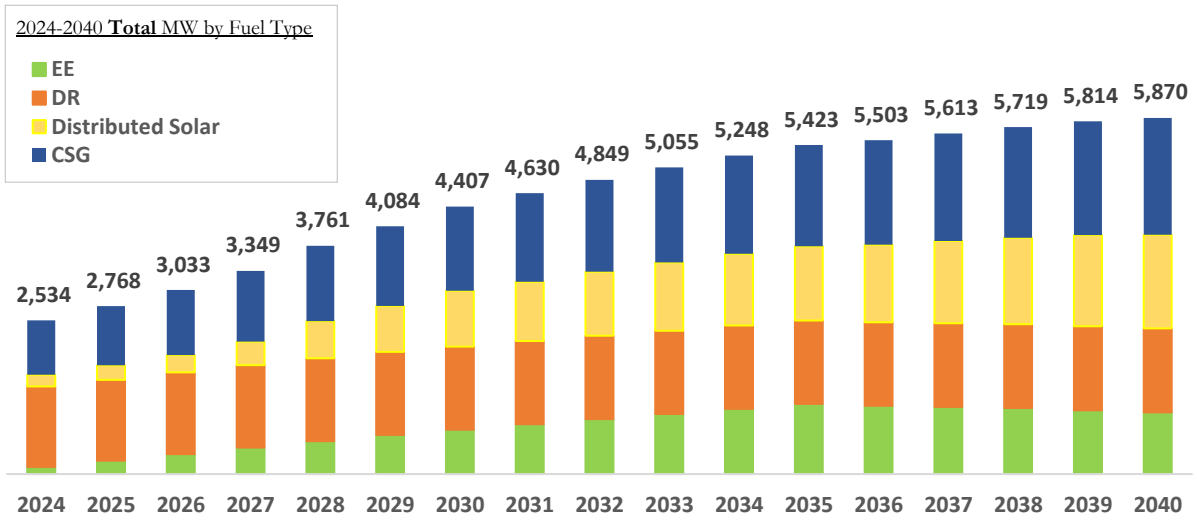
Our Preferred Plan is set forth below in Figures 1-6 and 1-7 below:

Figure 1-6: 2024-2040 Preferred Plan Resource Additions (MW)



	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Wind	350	0	400	2,000	800	0	800	600	600	400	200	400	400	400	400	1,000
Storage	0	0	480	0	120	0	240	360	60	60	0	60	360	240	120	0
Solar	585	0	0	0	0	400	300	200	600	0	0	0	0	0	0	0
Firm Peaking	298	0	748	748	0	748	0	225	0	0	0	374	374	0	374	0
CSG and DG	124	140	198	301	215	237	131	134	123	106	94	110	125	121	130	90
EE	103	108	108	105	103	87	91	85	82	86	80	0	0	0	0	0
DR	234	237	238	239	239	239	238	237	237	236	236	235	235	235	234	234

Figure 1-7 Preferred Plan Cumulative Capacity for Demand Side Resources and Community Solar Gardens (MW)



Our Preferred Plan is consistent with the path the Commission ordered in our last case. Specifically, we continue to plan to retire all of our coal units by 2030, with Sherco Unit 1 retiring in 2026, King retiring in 2028, and Sherco Unit 3 retiring in 2030. The closing of these facilities will open valuable interconnection rights, which we will use to add thousands of MWs of wind, solar, and standalone storage. We will also add substantial amounts of new wind generation and standalone storage that do not reuse these interconnection rights. In total, we envision adding nearly 10,000 MWs of utility-scale renewable energy and over 2,000 MWs of standalone storage during the entire planning period. In addition, we anticipate the capacity of community solar gardens and standalone distributed solar on our system will more than triple over the course of our planning period—growing from under 1,100 MWs of capacity in 2024 to nearly 3,500 MWs by 2040. The majority of this growth is the result of new legislation that requires at least three percent of the Company's total retail electric sales to be generated from distributed solar.

Our modeling shows that replacing these baseload coal units with this level of renewable additions will also require supporting resources that can operate for long durations. Our analysis demonstrates two steps that we must take to cost-effectively maintain a reliable system during this transition. First, our modeling shows that we will need to add a substantial amount of firm dispatchable capacity over the life of our plan. In addition to integrating our new renewables, these resources are needed to replace the 1,700 MWs of firm dispatchable PPAs that we will lose over the next few years. We have modeled these firm dispatchable additions as combustion turbine

resources that are relatively low-cost to build, do not operate for much of the year, and in the future, could run at least partially on clean fuels like hydrogen. Second, we plan to extend the lives of our nuclear and RDF generating facilities. Specifically, we will extend operation of the two Prairie Island Generating Plant units for 20 years past the current license expirations, to 2053/2054, and extend operation of the Monticello Nuclear Generating Plant to 2050, which aligns with our Subsequent License Renewal application pending at the Nuclear Regulatory Commission. Additionally, we are extending the lives of our RDF plants, recognizing the value they provide to their local communities. Extending these resources are vital for our system because, with the loss of our coal fleet, our nuclear and RDF facilities constitute the only remaining baseload units on our system. If we did not extend these resources, our EnCompass modeling results show that we would need to build or acquire more than 4,600 MWs of incremental generation and storage capacity, including almost 900 MWs of additional peaking resources for the planning period.

III. CONCLUSION

We are pleased to present this 2024 Plan, which capitalizes on recent federal and state policy changes to reduce our carbon emissions more aggressively than we had previously planned. We will continue to eliminate coal, add renewables, and expand our EE and DR programs. By also adding stand-alone storage and firm dispatchable resources, we will continue to maintain a diverse fleet of resources that is cost-effective for our customers and continuing to ensure that our system is reliable. For these reasons, and those discussed throughout this filing, we believe our Preferred Plan is in the public interest and should be approved by the Commission.

CHAPTER 2 – PLANNING LANDSCAPE

I. INTRODUCTION

The Company's Preferred Plan (the 2024 Plan or Preferred Plan) continues to chart the path toward achieving some of the most ambitious carbon reduction goals of any utility in the United States by focusing on reliable, responsible decarbonization of our system. The 2024 Plan digs deeper than previous plans in the impacts and challenges of carbon-reduction on the reliability of our system, analyzing numerous assumptions to identify the plan that best meets our obligations and goals, while still ensuring that we can meet customer needs at all times.

In this Chapter, we discuss some of the key internal and external market contexts that affect how we have developed, and plan to execute on, our 2024 Plan. Specifically in this section we examine:

- Market Constructs & Renewable Integration
- Jurisdictional Updates
- Federal Incentives & Environmental Regulations
- Community & Employee Considerations
- Customer Preferences
- Supply & Technology Trends

Each of these factors affected how we developed our 2024 Plan. However, a few factors stand out above others as being particularly influential in this 2024 Plan cycle: namely, market constructs and state and federal policy. Our regional system operator's new seasonal construct allows for more precise planning and resource allocation based on each season. It also introduces new levels of complexity and concern about reliability that our 2024 Plan is tailored to address. State and federal policy has also changed significantly since 2019. In Minnesota in particular, the cost of carbon, the distributed solar and renewable energy standards, and the new carbon-free energy standard each influenced our 2024 Plan's design. The same is true of federal law, which created both significant financial incentives for renewables along with new areas of uncertainty related to the Clean Air Act.

These and other factors all affect how we developed the 2024 Plan presented in this filing—and the issues we anticipate encountering as we pursue our goals to lead the clean energy transition while ensuring reliable and affordable grid services.

II. MARKET CONSTRUCTS AND RENEWABLE INTEGRATION

The Company's Upper Midwest system is part of the Midcontinent Independent System Operator (MISO) market. MISO's primary responsibilities are overseeing wholesale energy markets in the member region and planning for bulk system reliability (i.e. transmission planning, generator interconnection, and ensuring sufficient reserve margins). MISO's operations thus affect how we conduct resource planning. Here we focus on system reliability constructs and renewable integration challenges that impact how we designed our 2024 Plan.

A. New Resource Adequacy Construct

MISO's resource adequacy construct has historically been centered on an annual planning reserve margin (PRM) based on a summer peak. This approach was based on the assumption that resource needs and availability were relatively stable throughout the year, and consistently peaking in the early evening in summer months when air conditioning use is highest. However, recognizing the increasing variability in reliability needs and resource availability throughout the year, the Federal Energy Regulatory Commission (FERC) approved MISO's proposal to move to seasonal resource adequacy requirements. This new MISO construct began with the 2023 – 2024 planning year, which spans from June 1, 2023, through May 31, 2024, and will also be in place for subsequent planning years. The planned seasons are: (1) Summer: June through August; (2) Fall: September through November; (3) Winter: December through February; and (4) Spring: March through May.

This new construct is designed to address increases in emergency events that occur year-round, driven by factors including generation retirements, reliance on intermittent resources, seasonal variations, outages resulting from extreme weather events, and declining excess reserve margins. By planning for resource adequacy on a seasonal basis, utilities can better prepare for seasonal variations in demand and supply, leading to improved reliability of the power system.

Our 2024 Plan has incorporated the seasonal construct into the planning process and modeling, allowing for more precise planning and resource allocation based on the specific needs and resource availability of each season. Modeling tools have been adjusted, and our models have become more complex because they now have to ensure sufficient capacity across all four seasons as opposed to a single year. We have also adjusted our long-term planning assumptions because our models use trends or averages from several years of data in order to accurately predict what will happen in the future. However, we only have one year of data for existing generation assets

under the seasonal construct to use when figuring out how much capacity we will need for each season. Appendix F: EnCompass Modeling Assumptions and Inputs discusses our short- and long-term capacity accreditation assumptions in more detail.

Overall, MISO's seasonal resource adequacy construct adds complexity to resource modeling but also provides a more detailed and potentially more reliable approach to ensuring grid reliability throughout the year.

B. MISO Reforms on the Horizon

MISO is actively engaged in developing and refining additional reforms to improve resource adequacy and reliability of the electric power grid. Two reforms of note—Reliability-Based Demand Curve (RBDC) and Direct Loss of Load (DLOL)—aim to better align the value of reliability, provide investment signals for future resource needs and ensure stability in resource adequacy modeling, while considering the impacts on load serving entities and various resource classes.

Due to the growth of variable, energy-limited resources in the MISO footprint, along with changing weather impacts and operational practices, MISO determined that its existing accreditation methods for resources require further evaluation to ensure that the accredited capacity value reflects the capability and availability of the resource during periods of highest reliability risk. In response, MISO has developed a proposal that contains a new two-step process for accreditation. At a high level, MISO's proposal calculates accreditation based on modeled and historical performance of resources during tight margin hours. More specifically, the first step in the process determines how resources receive capacity credit at a class level and the second step contains a process for class-level megawatts to be allocated amongst specific resources. The class-level step utilizes a DLOL method which averages the availability of each resource during loss-of-load hours within the Loss-of-Load Expectation model and aggregates by resource class. The second step of the proposed process allocates each resource class level megawatts (determined by the DLOL method) among the individual resources in the class using the individual resources' performance during tight margin hours based on the prior three years of operational experience.

MISO's proposal would add significant complexity to the resource adequacy construct. Based on initial information provided by MISO, the proposed approach is likely to decrease the accreditation granted to resources but may also decrease the reserve margin in certain seasons due to the increased focus on tight margin hours which can occur outside peak demand periods.

MISO and stakeholders have continued to discuss in the Resource Adequacy Subcommittee details related to MISO's proposal as well as information that will be needed to integrate MISO's proposed changes into member resource planning processes. MISO is planning to file the proposal with FERC in the first quarter of 2024. MISO has proposed implementation in the 2028/2029 Planning Year.

The RBDC is a proposed design for MISO's Planning Resource Auction (PRA). It aims to reflect the reliability value of capacity and produce more efficient and stable capacity prices. Historically, the MISO region has maintained reserves significantly exceeding the required reserve margins. However, as experienced in the 2022-23 PRA, excess reserves can no longer be expected. MISO's proposed RBDC endeavors to address the limitations associated with the use of a vertical demand curve to clear the PRA. The RBDC proposal is currently under consideration by FERC. Pending FERC approval, the RBDC reform is expected to be implemented in PY 2025-2026.

The RBDC has not been approved by FERC and the proposed DLOL accreditation reform has not been filed with FERC. Chapter 5: Economic Modeling Framework, discusses a special reliability study evaluating a higher PRM as an RBDC opt-out proxy and Appendix D: Energy Adequacy Analysis includes the assumptions used in our analysis for future capacity accreditation.

C. Renewable Integration Challenges

The challenges of integrating new clean generation into the system continue due to delayed interconnection studies and limited open transmission availability. The MISO Generator Interconnection Process is designed to allow generators reliable, non-discriminatory access to the electric transmission system, in a timely manner, while maintaining transmission system reliability. Recently, as the number of proposed projects in MISO has expanded significantly, this process has seen significant delays.

Delay impacts are particularly evident in the Definitive Planning Process, where MISO undertakes generation interconnection studies. Current studies are several months to years behind due to the considerable number of projects in the queue, and due to a generator interconnection process, that allows late withdrawals from the queue. With the intention of addressing some limitations in processing generation interconnection queues, FERC issued Order 2023 in July of 2023,[1] which is discussed in more detail in Appendix L: System Planning Integration.

[1] https://www.ferc.gov/news-events/news/fact-sheet-improvements-generator-interconnection-procedures-and-agreements.

In response to direction from FERC and in recognition of the challenges described above, MISO is beginning to undertake several actions that could serve to mitigate challenges to bringing new, clean resources online. Appendix L discusses these potentially helpful initiatives in more detail, which could allow generation owners to leverage existing interconnection agreements to maximize utilization and fit renewable additions into the existing open spaces on the grid. As such, the Company is engaging in Long Range Transmission Projects and looking for ways to preserve and reutilize interconnection rights we already have, which influenced the location, size, and type of resources proposed in our 2024 Plan.

III. JURISDICTIONAL UPDATES

Our integrated Upper Midwest system provides service on a multi-jurisdictional basis to 1.8 million customers across five states, and we have historically planned this system as an integrated whole. Each resource on the Upper Midwest bulk energy system—whether generation or transmission—is developed in consideration of the whole system, to take advantage of the economies of scale available through integrated system planning. In the next section, we explain how differing policies in our multi state service territories is impacting our resource planning process.

A. New Carbon-Free Energy Requirements

In December 2018, the Company announced our goal to reduce carbon dioxide (CO_2) emissions 80 percent by 2030 below 2005 levels companywide, and to serve customers with 100 percent carbon-free electricity by 2050. Since the Company made this announcement, we have seen multiple states across our Upper Midwest service territory adopt similar carbon free goals.

In particular, in 2023, the Minnesota Legislature amended the requirements set forth in Minn. Stat. § 216B.1691 to include additional milestones for renewable energy as well as creating new carbon-free energy standards (see Minn. Laws 2023, chp. 7). The new legislation requires utilities to generate or procure carbon-free energy equivalent to 100 percent of their Minnesota retail sales by 2040. The law also requires utilities to achieve interim carbon-free energy standards of 80 percent by 2030 and 90 percent by 2035, and a renewable energy standard of 55 percent by 2035. Based on our current understanding of the law, our 2024 Plan is modeled to meet the requirements of this new legislation, as set forth in more detail in Appendix N: Standard Obligations. The details of how the carbon-free standards are calculated will be important in informing the implementation of these state policies. To that end, the Minnesota

Commission has opened an Investigation docket[2] into the Carbon-Free Standard. Parties and the Commission will weigh in on a number of topics in that docket over the next couple of years, including clarification of new and amended terms such as carbon-free, partial compliance, and environmental justice areas. Determining the appropriate calculation methodology will help ensure that utilities are on track to meet their targets and that progress can be accurately measured and reported. The Company's current compliance efforts, including how we are applying those terms to its system in this 2024 Plan, are also documented in Appendix N.

Further, as discussed below, this move towards carbon-free energy requirements is not exclusive to Minnesota; other states we serve are moving towards similar goals. We will continue to track those developments.

B. Minnesota

In addition to the new carbon-free goal, Minnesota has seen other significant legislative developments since our 2019 Plan that impact how we conduct our resource planning, such as the updated cost of carbon and how Distributed Energy Resources (DER) are addressed.

1. Cost of Carbon

A recent Commission Order Addressing Environmental and Regulatory Costs (Environmental and Regulatory Costs Order)[3] requires utilities to continue to analyze potential resources under a range of assumptions about environmental values and future regulatory costs, including the five modeling scenarios previously outlined in 2020, and altered the cost range utilities must apply to any fossil generation resource. Additionally, pursuant to Minn. Stat. § 216B.2422, Subd. 3, the Commission provisionally adopted and applied the cost of greenhouse gas emissions valuations presented in the United States Environmental Protection Agency's (EPA) November 2023 Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advance.[4] Consistent with the Commission's Order, our 2024 Plan includes sensitivities addressing these valuations, which is discussed in detail in Appendix K: Environmental Regulations Review and Appendix F.

[2] Docket No. E999/CI-23-151.
[3] Order in Docket Nos. E-999CI-07-1199, E-999/DI-22-236, E-999/CI-14-463, December 19, 2023, Order Point 2.
[4] Available at: https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf.

2. Distributed Energy Resources

In another recent development, Minnesota's distributed solar energy standard was amended at subdivision 2h of Minn. Stat. § 216B.1691. This amendment mandates that at least three percent of the Company's retail electric sales in Minnesota be generated from qualifying solar energy generating systems. To be counted towards this standard, the solar generating system must have a capacity of 10 megawatts or less, be connected to the distribution system, be located in our Minnesota service territory, and be constructed or procured after August 1, 2023. Additionally, subdivision 7 now sets an annual capacity limit on community solar gardens, which decreases over time, from 100 megawatts in 2024, 2025, and 2026, to 60 megawatts in 2031 and each year thereafter. To-date, community solar gardens still make up the clear majority of the DER on our system in the Upper Midwest. DERs are also coming onto our grid, in the form of electric transportation options—enabling not only flexible load opportunities but also broader economy-wide emissions reduction.

Minnesota's Energy Conservation and Optimization Act (ECO Act) has also impacted how we approach DER in the 2024 Plan. The ECO Act changed how we approach demand side management by broadening the approaches a utility may take in achieving energy efficiency (EE) and demand response (DR). In particular, it allows for inclusion of both traditional DR efforts aiming to reduce peak reduction during hot summer days as well as non-traditional efforts to shift load based on the time of day. These efforts are part of our 2024 Plan, as set forth in Appendix J: Distributed Energy Resources.

Our 2024 Plan is substantially dependent on forecasted customer load, which incorporates our best estimates about customer adoption of DER and robust statistical forecasting methods. Our Integrated Distribution Plan and grid modernization efforts help us leverage DER and new load to enable more flexible demand management, improve reliability and enable better decision-making about large-scale investments. That said, it is difficult to predict new technologies, the pace of their adoption, and thus how the DER landscape could affect our generation needs in the future. Our 2024 Plan modeling includes various sensitivities to account for these uncertainties related to the impact of DER, as set forth in Appendix J. However, we still often do not have visibility into which technologies, and at what pace, customers will adopt and thus, how that changing load will affect our grid needs in the future.

C. Wisconsin

In Wisconsin, the Company is subject to a Renewable Portfolio Standard (RPS) equal to 12.89 percent of its three-year average in-state retail energy sales. In 2022, excluding renewable energy used for voluntary renewable programs, NSPW provided 44.05 percent of its retail energy sales from RPS-eligible renewable-based energy sources, therefore exceeding the state's 2022 RPS requirements.[5]

In May 2023, the State's Governor issued a Clean Energy Plan that includes a 100 percent carbon reduction goal for the state's electric sector that is broadly consistent with our objectives to reduce emissions 80 percent from 2005 levels by 2030, and 100 percent by 2050. Therefore, the Clean Energy Plan should not impact our 2024 Plan. The Governor's climate goals have not yet resulted in additional mandates for the electric sector. Similarly, the Company continues to engage with Public Service Commission of Wisconsin (PSCW) staff and interested stakeholder as several investigatory proceedings move forward. For instance, the PSCW has opened investigation to evaluate the impact of MISO's proposed reliability-based demand curve and capacity accreditation reforms (Docket 5-EI-161), a Roadmap to Zero Carbon (Docket 5-EI-158), and an evaluation of net energy metering programs (Docket 5-EI-157). None of these proceedings have resulted in Commission orders requiring utility action as of January 2024.

D. Michigan

In Michigan, the Company is subject to a Renewable Energy Standard (RES) equal to 15 percent of retail sales through 2029, pursuant to Michigan Public Act 235 of 2023.[6] The new legislation increased the RES to 50 percent for the period 2030-2034 and 60 percent for 2035 and beyond. In addition, the legislation establishes a Clean Energy Standard (CES) requiring 80 percent of retail electricity from qualifying resources during the period 2035-2039 and 100 percent in 2040 and beyond. We do not yet know the details of how compliance with the legislation will be calculated, but based on our current calculations, our Preferred Plan is modeled to be ahead of schedule on both RES and CES requirements through 2040 by nature of our 80 percent by 2030 carbon reduction plan.

[5] *See* Docket 5-RF-*NSPW Renewable Portfolio Compliance Plan for CY 2022. Northern States Power Company, a Wisconsin Corporation*.
[6] Act No. 235. Public Acts of 2023. Enrolled Senate Bill No. 271. 2023-PA-0235.pdf (mi.gov)

E. South Dakota

In South Dakota, the Company faces challenges to its decarbonization goals. For example, it has historically faced challenges in cost recovery for certain resources. The South Dakota Public Utilities Commission suspended the fuel clause adjustment in 2016 to investigate disputed resource costs. A Settlement Stipulation approved in 2017 resolved the recovery of cost associated with the Aurora solar resource and several biomass resources. The Settlement required proxy prices for the remaining disputed resources, including the Marshall and North Star solar Power Purchase Agreements (PPAs),C-BED PPAs, and Renewable Development Fund PPAs. The Company currently recovers costs associated with these resources based on a proxy price.[7]

More recently, the South Dakota Commission disagreed with the Company's plans to retire the King and Sherco 3 units in 2028 and 2030, respectively. In June of 2023, the South Dakota Commission approved a rate case settlement that assumes the current depreciable lives of King and Sherco 3 in June 2037 and December 2034. In opposing the Company's request for accelerated depreciation of those units, Commission Staff specifically cited the impact those retirements would have on MISO's seasonal resource adequacy construct and the Company's ability to provide reliable electricity.[8] The South Dakota Commission reiterated its reliability concerns over early plant closures in a January 4, 2024 letter to the Company.

F. North Dakota

As part of the 2021 North Dakota legislative session, the North Dakota Legislature enacted Senate Bill (SB) No. 2313, which added new sections regarding integrated resource planning to Chapter 49-05 of the North Dakota Century Code (NDCC). To further guide the process of resource planning and provide clarification on the implementation of SB 2313, Section 69-09-12 of the North Dakota Administrative Code was enacted effective January 1, 2023. With this new legislation and administrative rules, the North Dakota Commission has new oversight into utility resource planning; historically, the Commission did not have a formal vehicle to review resource acquisitions outside an advance determination of prudence proceeding.

The new resource planning legislation and rules re-emphasizes that a North Dakota preferred resource plan may not select resources based on externalities representing

[7] Docket EL18-004. https://puc.sd.gov/Dockets/Electric/2018/EL18-004.aspx.
[8] Docket EL22-017. https://puc.sd.gov/Dockets/Electric/2022/EL22-017.aspx.

environmental costs or future environmental laws or regulations that have not yet been enacted. The preferred plan must instead describe and select resources representing the least-cost plan for providing reliable service to ratepayers, consistent with North Dakota energy policy. Additional rules regarding resource plan filings are found at 69-09-12 of the North Dakota Administrative Code, which requires that:

- The resource plan must provide a North Dakota preferred plan,
- Except as otherwise required by law or by order of the commission, the North Dakota preferred plan may not select resources based on a carbon cost, greenhouse gas reduction goals, renewable energy standards, emissions goal, or other externalities,
- The resource plan must include reliability and resource adequacy assessments using quantitative metrics, and
- The resource plan must include information on how the electric public utility intends to reconcile potential jurisdictional differences in resource selection.

As noted in our comments in Case No. PU-22-163 via a June 16, 2022 letter to the North Dakota Commission, the new planning process should be beneficial for all parties:

> Xcel Energy plans and operates an integrated Upper Midwest system that serves customers in five states. While we believe the integrated system provides benefits to our customers across the states we serve, in some instances we have procured resources that have not been accepted in all jurisdictions. We are hopeful that a North Dakota resource planning process will not only provide the Commission with information about our future plans, but also provide a forum to better identify and address Commission concerns in advance of resource acquisition decisions. Our resource plans provide a critical guide to achieving Company goals, procuring resources, and meeting our customers' needs safely and reliably.

We plan on filing our North Dakota Resource Plan with the Minnesota Commission and providing updates on how that proceeding progresses. The resource planning process in North Dakota may identify jurisdictional differences that could pose a challenge to the implementation of our Preferred Plan. We will engage with both the North Dakota and Minnesota Commissions to address these differences.

IV. FEDERAL INCENTIVES AND ENVIRONMENTAL REGULATIONS

In addition to state policy, federal incentives, such as the Inflation Reduction Act (IRA), and environmental regulations, such as the EPA's New Source Performance Standards 111(b) and (d) and Good Neighbor Plan, are impacting utility resource planning by incentivizing clean energy and increasing the cost of emitting resources. As described below, the IRA, with its substantial funding for clean energy, is accelerating the transition towards renewable power generation and advancing policy goals such as decreasing energy burdens for low-income consumers. EPA 111(b) and (d), and the Good Neighbor Plan, on the other hand will potentially increase the cost of operating emitting resources, thereby incentivizing the shift towards cleaner energy sources.

A. Inflation Reduction Act

The IRA was signed into law on August 16, 2022, and includes an estimated $369 billion in energy and climate spending. The IRA puts the United States on track to reduce emissions 32-42 percent below 2005 levels by 2030 through grant and loan programs, tax credits and emissions fees that touch nearly every corner of the economy. Of particular interest for this 2024 Plan, the IRA contains roughly $161 billion in clean electricity tax credits, $37 billion in clean fuel and vehicle tax credits, and $27 billion in building efficiency, electrification, transmission, and Department of Energy (DOE) grants and loans.

The IRA provides the opportunity to transfer production tax credits (PTCs) and investment tax credits (ITCs) to unrelated taxpayers for cash. Eligible credits include clean energy PTCs and ITCs earned after 2022, including PTCs from projects placed in service before 2022. However, tax credits carrying forward from years prior to 2022 are not eligible for transferability. Consideration paid in exchange for transferred tax credits cannot be included in gross income and is not deductible by the transferee. In addition to transferability, the IRA expands the availability of tax incentives across a wider variety of technologies.

The IRA presents significant opportunity to accelerate the growth of renewable and carbon-free power generation and the reduction of greenhouse-gas emissions while mitigating rate impacts. For example, for this 2024 Plan, we project anticipated benefits totaling over $5.7 billion stemming from the IRA tax credits for new renewable additions in the Preferred Plan over the course of the planning period. We will also recognize additional savings from our existing renewable and nuclear

generation. In addition to these incentives, the IRA provides significant opportunities to advance policy goals such as decreasing energy burdens for low-income consumers; supporting communities affected by the energy transition; promoting environmental justice; increasing diversity, equity, and inclusion in the energy sector; and fostering workforce development.

More detail concerning the IRA can be found in Appendix U: Inflation Reduction Act, including a discussion of how our 2024 Plan leverages the IRA's significant incentives and resulted in significant estimated savings for our customers in our 2024 Plan.

B. EPA New Source Performance Standards (NSPS) 111(b) and (d)

On May 11, 2023 the EPA released a four-part proposal under their Clean Air Act authorities to regulate CO2 emissions from the power sector. The proposal included:

1) Repeal of the Affordable Clean Energy rule;
2) Regulations for new natural gas generating units pursuant to Clean Air Act section 111(b), hereafter referred to as 111(b);
3) Regulations for existing natural gas generation pursuant to Clean Air Act section 111(d), hereafter referred to as 111(d); and
4) Regulations for existing coal generation pursuant to section 111(d).

Since the rule is in a proposed state and has not yet been finalized, it is uncertain how the rule will ultimately impact operation of our facilities. We have taken into consideration the potential impacts of this rule for our 2024 Plan through a sensitivity analysis, recognizing potential impacts on existing gas Combined Cycle units and PPAs, as detailed in Appendix K.

C. Good Neighbor Plan

The "Good Neighbor" provision of the Clean Air Act for the 2015 Ozone National Ambient Air Quality Standards (NAAQS) addresses the interstate transport of air pollution, ensuring that one state's pollution does not interfere with the air quality in other, downwind states.

On February 13, 2023, the EPA finalized a rule that partially approved and partially disapproved the State Implementation (SIP) submissions from Minnesota and Wisconsin. This led to the creation of a Federal Implementation Plan (FIP), which included Minnesota and Wisconsin in the Group 3 ozone nitrogen oxides (NOx) allowance trading program, starting with the 2023 Ozone NOx season (May-September 2023). On April 14, 2023, an industry coalition, including Northern States Power-MN, filed

a petition for review of the partial disapproval of Minnesota's SIP. On July 5, 2023, the 8th Circuit granted a Stay of the SIP Disapproval for Minnesota, which effectively stayed the Good Neighbor Plan requirements. This means that the Good Neighbor Plan is not in effect for Minnesota during the litigation and its future depends on the outcome.

In Wisconsin, the Good Neighbor Plan applied to sources from August 4 – September 30, 2023, and will apply in future ozone seasons. NSPW will comply through operational changes and the potential purchase of allowances.

How these regulations have been incorporated into our 2024 Plan modeling based upon estimated allowance allocations through 2029, and how market dynamics could impact costs are further discussed in Appendix F and Appendix K.

V. COMMUNITY & EMPLOYEE CONSIDERATIONS

We know that our planning and decarbonization goals impact the communities we work in and serve. The Company has made significant efforts to engage and elicit community and stakeholder feedback and incorporate that feedback into how we do business. We are also committed to transitioning our system while proactively working with the communities where plants are located and the employees who work in those plants.

A. Equity Considerations

The Company has taken a number of interrelated actions to enhance equitable outcomes and broaden participation in energy decision-making by the communities we serve. We recognize voices of minority, low-income, and protected populations are often not present in conversations regarding grid planning and resource allocation and that marginalized groups need to access, participate in, and benefit from energy markets regardless of ability, race, or socioeconomic status. To that end, we have established an Equity Stakeholder Advisory Group (ESAG), engaged in community outreach, and plan to form an Environmental Justice Advisory Board (EJAB) to advise the Company on incorporating equity into our core business efforts. Although our equity work does not directly impact the size, timing, and type of generation resources that are the focus of our 2024 Plan, our community engagement more broadly impacts and informs how we provide service to our customers. This community engagement has included, for example, outreach to ESAG; interested stakeholders including state and local governmental representatives, the Clean Energy Organizations, developers, and business representatives, among others, the Prairie

Island Indian Community; and communities regarding remediation efforts at the Allen S. King and Sherburne County Generating Plants. More information on this outreach can be found in Appendix P and P1: 2023 Sherco Remediation Report, Appendix Q and Q1: 2023 King Remediation Report, Appendix R: Equity, and Appendix S: Stakeholder Engagement Summary.

Ultimately, we remain committed to considering environmental justice (EJ) in our energy, climate, and environmental initiatives, and to providing meaningful opportunities for impacted communities to participate in the process. As further detailed in Appendix R, we have incorporated EJ into our work through: our efforts with ESAG and the future formation of EJAB, the development of a Workforce Diversification Plan, our Request for Proposals process, the development of supplier diversity goals, our corporate giving and community involvement efforts, Electric Vehicle programs, our Energy Conservation and Optimization plans, our Natural Gas Innovation Act programs, federal initiatives such as the IRA and Investment and Infrastructure Jobs Act, our Resilient Minneapolis Project, and Tribal outreach efforts. We continue to evaluate and look for other ways we can incorporate equity into our efforts.

B. Employee Considerations

As we move forward with our carbon reduction goals, we are cognizant that phasing out our legacy generation assets has a significant impact not only on our energy mix, but on the economies of communities where those plants are located and the employees who work in those plants. For our coal facilities, the plants are prominent places of employment and contributors to the property tax base in the community. This is why we have and continue to make efforts to spur economic development in locations where our current units will eventually be phased out.

For example, since we proposed to retire the Sherco coal units in Becker, Minnesota, we have worked extensively with local units of government, community stakeholders, and the State to draw new development to the site to support the local economy. This includes working with the City of Becker and Sherburne County to attract new economic development to the Becker area that meets the needs of both the community and the Company. This effort led to the approval of the sale of 348 acres of land at Sherco to Elk River Technologies for the development of a data center, on April 6, 2023. The Company expects that similar outcomes in 2024, will bring more economic opportunities and tax revenues to the community.

Relatedly, we participated in a study overseen by Center for Energy and Environment (CEE) that examined the impacts of the large baseload generation plants in Minnesota on host communities. The other participants in the study included the Coalition of Utility Cities, Minnesota Power, and the Prairie Island Indian Community. The study resulted in four main findings:

1) Power plant closures will undoubtedly have a strong economic and financial impact on the communities that host them, and potentially, other Minnesota communities as well.
2) Host communities are currently pursuing a variety of strategies to plan and prepare for power plant closures and the economic transition that they will require. None of those preparation strategies are expected to fully offset the economic impact of a plant closure, but they may help mitigate the negative effects.
3) Workers, labor unions, and host communities may benefit from close coordination and communication in plant closure transition planning and preparation efforts.
4) Not all of Minnesota's host communities receive benefits from the power plant they host.

Overall, the study reinforced that host communities are not a monolith, and that preparing for plant closures and the corresponding economic transition takes significant time, planning, and communication and outreach efforts. The Company is engaged with our host communities and our workers, as detailed in Appendix O and O1: 2023 Workforce Transition Plan, Appendix P and P1, and Appendix Q and Q1.

In addition to community impacts, we are also aware that these plant closures impact our employees and their families. With this in mind, and consistent with our past practices, we are working with these impacted employees to transition them to other Xcel Energy plants or areas of the Company. In the past, when plants have been closed or converted (and impacted headcount) we have provided resume writing services, support for interview practice, job training, and job shadowing opportunities. Through natural attrition and job relocations, we have been able to successfully "re-home" nearly all impacted employees from plant closures and conversions to-date. More details about our efforts to help our workers transition to new positions within the Company can be found in Appendix O1, which was also filed in Docket No. E002/M-22-265.

Going forward, we continue to be dedicated to working with employees, communities, and stakeholders to manage community impacts throughout our clean energy transition.

VI. CUSTOMER PREFERENCES

Our Upper Midwest system continues to serve a diverse mix of customers with varied interests and preferences. While most customers continue to prioritize affordability, we have seen increasing interest in customer choice around how and from where they consume energy, sustainability, carbon reduction, and other clean energy objectives. We have taken these interests into consideration in planning our resource mix for the future. Below, we outline the energy preferences our municipal, commercial and industrial, and residential customers have expressed, as well as overall interest in DER, and what the Company is doing to help them achieve their goals through partnerships and programs. Although customer interests and preferences do not ultimately impact the type, timing, or size of resources in our resource plan, they do influence our overall program development so that we can create programs and services that best serve all of our customers' needs.

A. Municipal Customers

Cities and municipalities are increasingly setting and developing strategies around sustainability and climate goals. In fact, there are at least 32 cities in our Upper Midwest jurisdiction that have set carbon reduction or renewable energy goals, according to our Community Energy Goals Survey. We work with many of these communities through our Partners in Energy programs to support achievement of these goals. Minneapolis is the most prominent example, as evidenced by the Clean Energy Partnership that had just started when we filed our 2015 Plan. Since then, the partnership has flourished and advanced, helping to achieve progress toward the city's sustainability goals.

Other municipalities and communities are also developing goals and action plans around renewable energy and climate goals. The Company has a long history of supporting the communities we serve, and we always want to work with our customers and our communities in support of their energy goals. In addition to our Partners in Energy Program, the Company offers the following partnerships and programs:

- Community Relations Managers and Account Managers;
- Community Energy Reports;

- Renewable Energy Programs;
- Electric Vehicle Programs;
- Certified Renewable Percentage; and
- Customized Support for Sustainability Initiatives.

More can be read about these programs and our Community Energy Goals Survey in Appendix V: Community Goals.

B. Commercial and Industrial Customers

Our commercial and industrial customers place a high priority on keeping costs low to remain competitive in their own markets. This is particularly true of large industrial customers, where energy costs can make up a substantial portion of their operating expenses. However, corporate efforts to achieve sustainability goals are also increasing, both in the US broadly and within our system. As the cost of renewable energy declines, affordability and sustainability goals increasingly go hand in hand. Within our system, several of our corporate customers are co-members of the Minnesota Sustainable Growth Coalition, which is a business-led public-private partnership working to advance clean energy and other sustainability and circular economy objectives. We hear from these and other corporate customers across our Upper Midwest system that sustainability and clean energy are important to them, and they want us to offer products that meet these needs. Renewable*Connect is one such product.

In 2015, we worked with customers to develop Renewable*Connect. The program achieved full subscription in its first year. In January 2019, we filed for an expansion of this program, and included an option for high load factor customers (i.e. those that operate continuously during the day) to be served primarily with competitively priced wind and a smaller portion of solar.[9] In 2023, the Commission approved the Company's proposed expansion of this program.[10] The expansion of Renewable*Connect advances the sustainability goals of the participating companies without creating additional costs that must be carried by other, non-participating customers. We are continually evaluating the need for potential expansion of Renewable*Connect. Should there be sufficient customer interest, the Company would look to solicit the necessary resources through an RFP process.

[9] In the Matter of the Petition of Northern States Power Company d/b/a Xcel Energy for the Approval of a Renewable*Connect Program. Docket No. E002/M-19-33.
[10] In the Matter of the Petition of Northern States Power Company d/b/a Xcel Energy for the Approval of a Renewable*Connect Program Modification, Order, May 18, 2023.

In 2019, we also developed a new program called Certified Renewable Percentage (CRP), which is ongoing. The CRP is Renewable Energy Certificate (REC)-based accounting methodology that clarifies the percentage of our system energy delivered to customers that is renewable. The CRP is not a subscription service or program customers need to enroll in. Instead, the Company calculates, certifies, and annually reports a CRP for Minnesota.[11] With the CRP, we retire sufficient RECs on behalf of all our retail customers, such that the total RECs retired annually reflects the portion of delivered energy that is renewable. This allows all retail customers to claim the percentage of renewable energy on the system as the starting point towards their sustainability goals.

C. Residential Customers

Residential customers likewise tell us that they value both opportunities to save energy and to have access to clean, affordable and reliable energy. In response, we have developed programs that offer more convenient payment options, rebates for energy efficiency upgrades, and the chance to reduce the environmental impact of their consumption by choosing renewable energy. Customers are taking advantage of these programs in large numbers—and they have expressed strong satisfaction with their ability to select programs that best meet their individual energy needs. In fact, customers who participate in these programs tend to be more satisfied than customers who are not enrolled in a program.

Programs that we account for in our modeling include EE programs and Beneficial Electrification (BE) of space and water heating. The 2024 Plan marks the first time the Company has included BE assumptions in our electrical sales forecast. More information about how EE and BE impact our modeling can be found in Appendix E: Load and Distributed Energy Resource Forecasting.

VII. SUPPLY & TECHNOLOGY TRENDS

Trends around the supply of equipment for generation and energy storage needed to fulfill our 2024 Plan had a significant impact on the mix and timing of our resource proposals.

Wind, solar, and battery energy storage systems technology costs are expected to continue to improve. While photovoltaic (PV) module costs did increase as a result of

[11] Our most recent report was submitted on June 1, 2023 in Docket No. E999/PR-23-12. The report is filed on June 1 of each year in a reserved docket, which is xx-12, where "xx" is the last two digits of the year.

the AD/CVD and UFLPA policies that were put in place in 2021 and 2022 among other factors, they are trending downward again.[12] Overall, however, commercial solar in particular has experienced significant cost declines, with median installed costs falling over 78 percent since 2010.[13] Consistent with past years, our 2024 Plan assumes that wind and solar capital costs will continue to decline, although at perhaps a slower pace as these technologies advance on their respective maturity curves and as the industry continues to be challenged with supply chain constraints. We also expect technological advancements to continue to improve capacity factors, as tracking and PV module technologies have continued to improve and inverter loading ratios have increased with falling capital costs. These factors continue to improve the cost competitiveness of wind and solar resources in real terms–changes to incentive policies notwithstanding—relative to the other resource options we considered.

We also continue to examine the role energy storage can play in meeting our system needs. Technologically, we expect grid-scale energy storage will support our clean energy goals in the future, by helping us maintain grid stability and supporting peak management while integrating the higher quantities of intermittent renewable generation we envision on our system. From a cost perspective, battery energy storage systems have experienced significant improvements over the last few years, and we expect costs to further decline going forward. We are committed to pursuing this technology, recognizing that challenges remain to our ability to manage seasonal renewable energy variability and longer duration demand-shifting needs. More discussion of our consideration of this technology can be found in Appendix I: Minnesota Energy Storage Systems Assessment

Finally, as we have noted, achieving our corporate decarbonization goals will require further development of technologies that have not yet been identified and commercialized, as discussed in Appendix X: Advanced Technologies. We continue to monitor industry activity around other emerging technologies that may contribute to achievement of our goals. In addition to potential new battery chemistries, potential emerging clean energy technologies include advanced nuclear reactors, hydrogen, types of energy storage technologies beyond batteries, and others. We will continue to evaluate new technologies and take advantage of advancements that will meet our goal and benefit our customers.

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[12] Domestic PV supply is constrained into 2027, but many suppliers have indicated plans to pursue US based production. The AD/CVD and UFLPA policies have resulted in greater risk of modules not being admitted into the US, resulting in the need to take great care in completing detailed due diligence of module suppliers supply chain to understand risk profiles.

[13] Bolinger, Mark and Seel, Joachim. *Utility Scale Solar, 2023 Edition*. Lawrence Berkeley National Laboratory October 2023. Available at: https://emp.lbl.gov/utility-scale-solar/.

VIII. CONCLUSION

As we continue to chart the path toward achieving some of the most ambitious carbon reduction goals of any utility in the United States, we will continue to take into account key internal and external market conditions. This 2024 Plan focuses on reliable, responsible, and cost-effective decarbonization of our system, while accounting for state and federal legislation, equity for our communities and our employees, the wants and needs of our customers, and trends in the industry.

CHAPTER 3 – MINIMUM SYSTEM NEEDS

I. INTRODUCTION

Our resource planning process focuses on deep carbon reductions while serving our Upper Midwest customers reliably and affordably. In this chapter, we describe in more detail how we arrived at the minimum number of resources our system will need through the planning period. The system needs and existing resources evaluated here formulate the baseline upon which we have developed the Reference Case, our modeling scenarios, and ultimately our Preferred Plan.

We have made the following changes to aspects of our Minimum System Needs approach with this Resource Plan:

- *MISO Seasonal Resource Adequacy Requirements.* In the 2024 Plan, we are incorporating a seasonal Planning Reserve Margin to align with the approach recently adopted by MISO. Further, we are applying seasonal accredited capacity (SAC) values for each resource option. These adjustments align with MISO's ongoing effort to address the increasing variability in reliability needs and resource availability across all four seasons.
- *Market Reliance Risk.* We have optimized resource additions in the EnCompass model to ensure that the portfolio of resources developed can serve customer load across all hours by limiting access to the MISO market. The limited access is only applied to the resource optimization to avoid over reliance on MISO market purchases for reliability. We allow the model to access the MISO market to dispatch resource and take advantage of the access to economic resource in the larger MISO market.

II. MEETING CUSTOMER NEEDS

Forecasting customers' needs for electricity is a key component of any resource plan and provides the foundation for determining the type and amount of resources that will be needed over the 15 year planning period. The first step is forecasting the amount of electricity our customers will need over the planning period. To do this, we add a reserve margin that is prescribed by MISO for each season. We then subtract the resources we already have or expect to have (with some adjustments), to determine our net surplus or need.

We illustrate this concept in Figure 3-1 and discuss each of the components below.

Figure 3-1: Seasonal Net Resource Need/Surplus Calculation

Customer Needs Forecast
Plus MISO Reserve Margin
Equals **Total Capacity Obligation**
Minus Demand Response Capability
Minus Generation Capacity (measured by seasonal accredited capacity)
Minus Generation Adjustments
Equals **Net Resource Need/Surplus**

A. Customer Needs Forecast

Forecasting our customers' energy needs starts with a capacity, or peak demand, assessment, which informs the total amount of generating capacity (in megawatts, or MW) needed to meet our customers' needs in the highest demand hour (i.e. peak-hour) in each year of the planning period. In previous resource plans, planning centered on meeting the highest demand hour of a given year, which for NSP occurs in the summer. The introduction of MISO's seasonal construct shifts the focus to planning for the highest demand hour in each season.

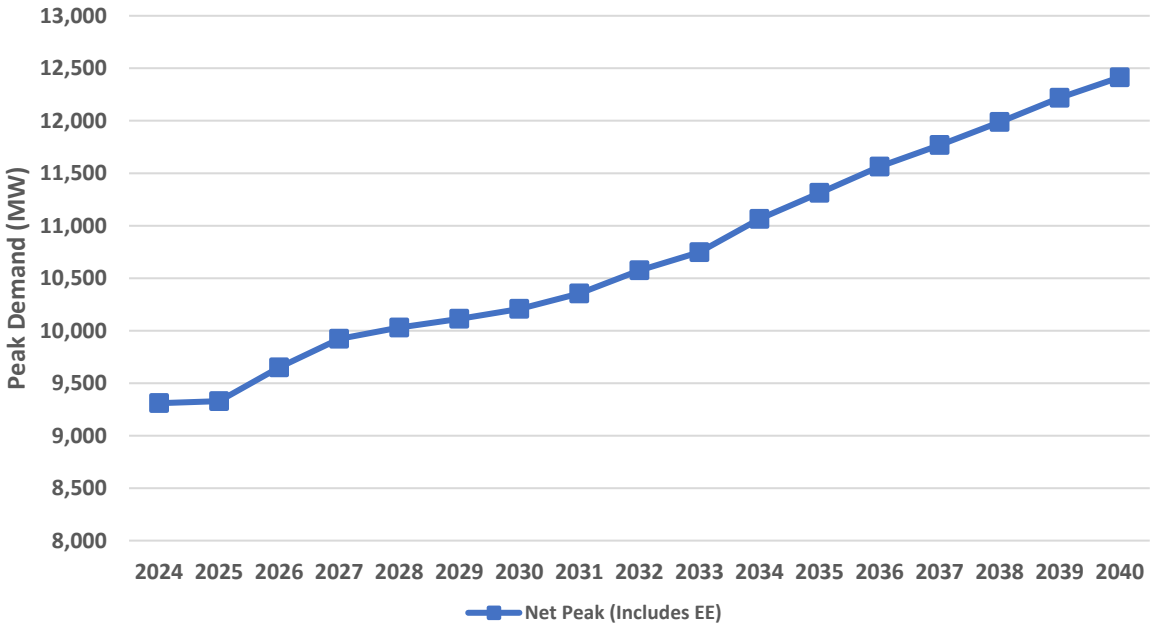
We also assess the amount of total energy (measured in megawatt hours or MWh) we expect customers to consume in each year of the planning period. Together, the peak demand and total energy needs inform the type of generating resources that will best meet customer needs.

1. Peak Demand Requirements

We use econometric analysis and historical actual coincident net peak demand data to determine system capacity requirements for each year. We provide a detailed discussion about our peak demand forecasting methodology in Appendix E: Load and Distributed Energy Resource Forecasting.

During the 2024 – 2040 planning period, the base case peak forecast increases at an average annual growth rate of 1.8 percent. As demonstrated in Figure 3-2 below, annual peak demand increases at an average of 194 MW each year, starting with 9,309 MWs in 2024 to 12,414 MWs in 2040.

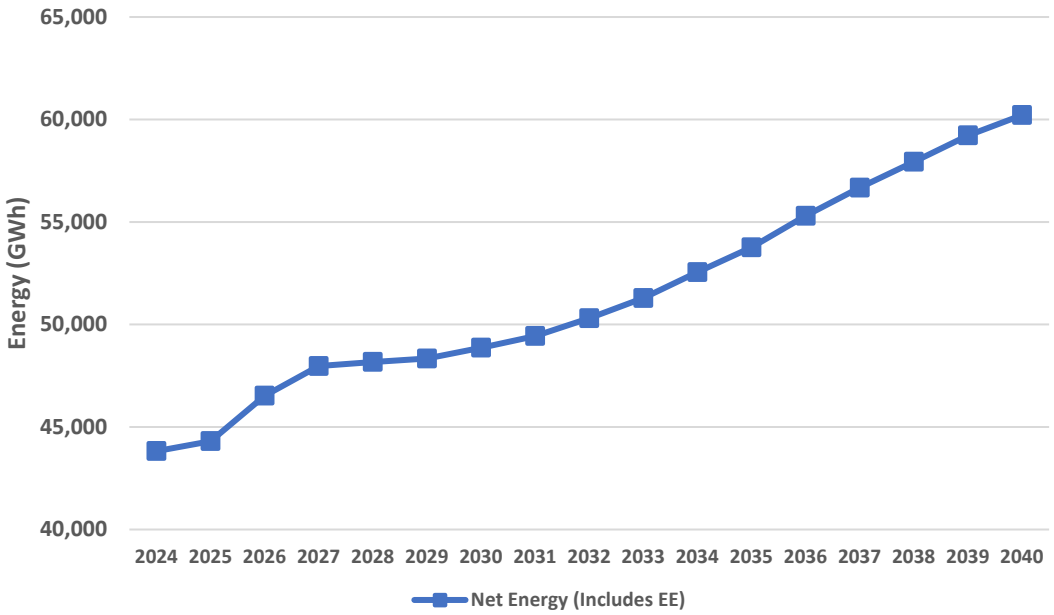
Figure 3-2: NSP System Median Base Summer Peak Demand (MW)
(Includes modeled EE Adjustment)



Additionally, the base energy forecast increases at an average annual growth rate of two percent over the 2024 – 2040 planning period, net of modeled energy savings, forecasted distributed solar, and electric vehicle charging projections. Electric energy requirements[1] are expected to increase at an annual average of 1,025 gigawatt-hours (GWh), starting with 43,823 GWhs in 2024 to 60,215 GWhs in 2040. See Figure 3-3 below.

[1] Gross of rooftop solar generation. Solar generation was modeled as a resource instead of netting against energy requirements.

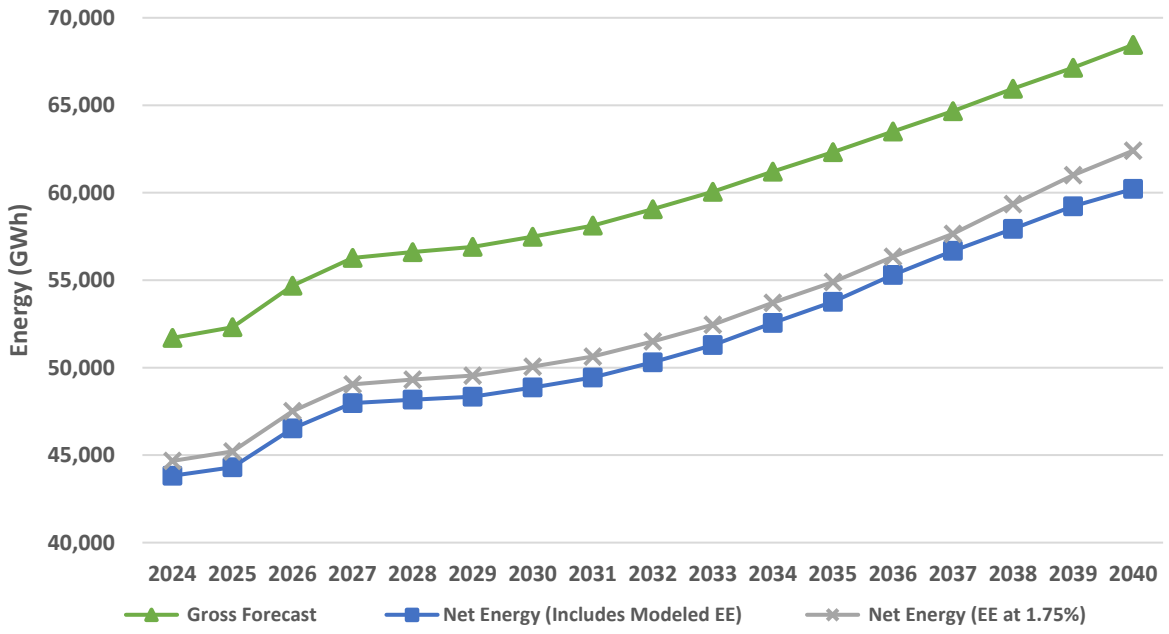
Figure 3-3: NSP System Total Median Net Energy (GWh)
(Includes modeled EE Adjustment)



The projected two percent average annual growth in electric energy requirements is stronger than the actual growth seen over the past few years due, primarily, to forecasted large new data center loads and acceleration in adoption of Electric Vehicles. After adjusting for unusual weather, electric energy requirements increased at an average annual rate of 0.2 percent from 2019 to 2022.

To be consistent with the modeling approach for Energy Efficiency (EE) in our approved 2019 Plan, we continue to model EE as a supply-side resource. In a separate process, we formulated annual EE savings amounts into "Bundles" that we made available in the EnCompass model along with other supply-side resources. This required that we adjust the base energy forecast to remove the embedded EE adjustment that projects the effects of energy savings to the end of the planning period. This resulted in an NSP System Gross Energy Requirements forecast. These adjustments are shown in Figure 3-4 below.

Figure 3-4: Gross Energy Requirements Forecast Compared to Net Energy Requirements Forecast

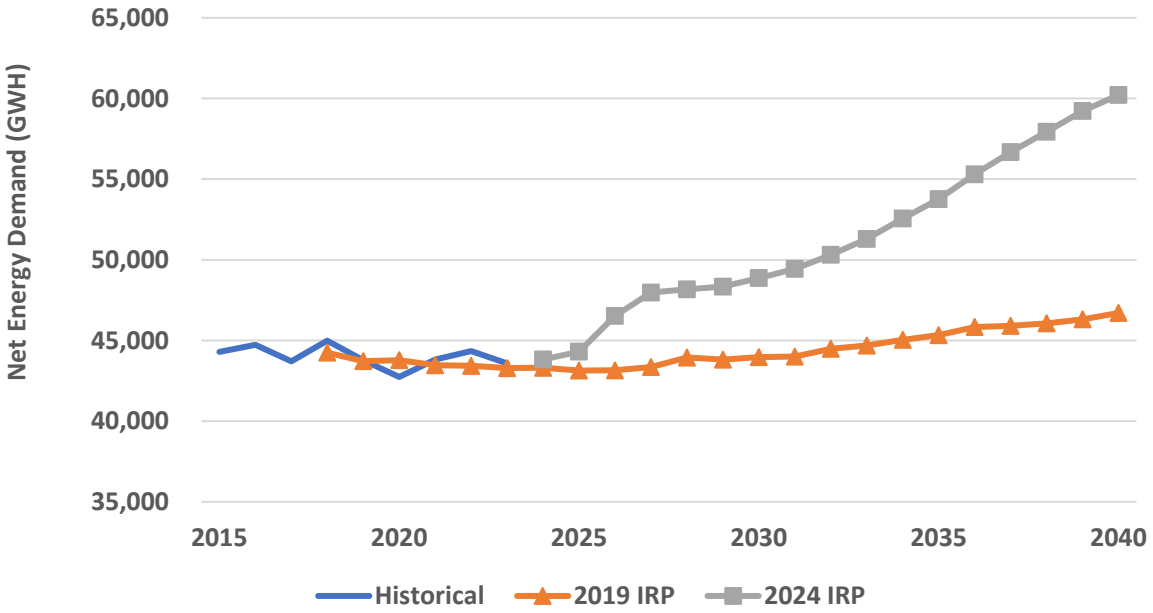


We discuss the EE Bundle modeling further in Appendix E:, Appendix F: EnCompass Modeling Assumptions and Inputs, Appendix H: Resource Options. Appendix J: Distributed Energy Resources contains detail on how the EE bundles were developed.

2. Energy Requirements

We forecast an approximate 35 percent increase in energy requirements over the 2024-2040 planning period, after accounting for EE included in the Base Case. As discussed above, the inclusion of two incremental EE Bundles reflects achievement of approximately 2.2 percent EE, which leaves our Net Demand substantially higher than forecast in our last Resource Plan. Figure 3-5 below compares our estimated net energy demand adjusted by the two EE Bundles, to the energy forecast in our approved 2019 Plan.

Figure 3-5: Forecasted Net Energy Requirements, After Energy Efficiency Adjustments[2] (GWh)



3. Forecast Adjustments

After determining the base peak capacity and energy demand forecasts, we make certain forecast adjustments to account for the impact of events or trends we reasonably expect to occur in the planning period. We summarize our key adjustments below:

DSM. Prior to our 2019 Plan, the load forecasts used in our modeling were adjusted for the expected effects of existing DSM programs. As with our 2019 Plan, in this 2024 Plan, incremental EE beyond that classified as naturally-occurring is no longer embedded in the load forecast; rather, EE is treated as a potential supply-side resource in our modeling, like Demand Response (DR). We further discuss the EE and DR (collectively, DSM) in the context of our resource planning process in Appendix J.

Rooftop solar. Projected rooftop solar is handled similarly to Energy Efficiency and is modeled as a supply-side resource in EnCompass, and is not netted from energy and peak forecasts.

[2] Although we modeled EE bundles as supply-side resources in this Resource Plan, we show the estimated resulting EE as a demand reduction from gross demand for purposes of the chart above.

Expected Customer Changes. We make adjustments to account for known and expected changes in load on our system. These typically reflect expected changes in specific large customers' electricity usage, either because of increased behind the meter energy generation, increased production activities by existing customers, or additional demand from new customers. This adjustment only applies to the Large Commercial/Industrial (CI) class.

Electric Vehicle Adoption. We adjust our energy and peak demand forecasts to account for increasing use of plug-in electric vehicle charging. These forecasts are based on estimates of current EV usage and future adoption (including the effect of financial incentives to facilitate adoption), and the expected electricity consumption per vehicle.

Beneficial Electrification. Residential and Commercial/Industrial energy as well as our peak demand outlooks are adjusted to account for growth in beneficial electrification from converted space and water heating.

We discuss our forecasting process, inputs, assumptions, adjustments, and results in more detail in Appendix E.

III. MISO RESOURCE ADEQUACY REQUIREMENTS

MISO prescribes Resource Adequacy (RA) requirements that are intended to help ensure adequate reliability of the bulk electric supply system. MISO's RA process requires load serving entities (LSE) like the Company to maintain resources or secure capacity to cover their level of demand by a specific margin (planning reserve margin or PRM) to cover potential uncertainty in the availability of resources or level of demand.[3] The RA requirements are fundamental to the resource planning process and inform the level of capacity we need in our portfolio to adequately serve customers.

MISO's resource adequacy construct has historically been centered on an annual PRM. However, recognizing the increasing variability in reliability needs and resource availability throughout the year, MISO has implemented a seasonal RA construct beginning with the 2023 – 2024 planning year (PY), which spans June 1, 2023 through May 31, 2024 (and will be in place for subsequent PYs). The planning seasons are delineated as follows:

Summer: June through August
Fall: September through November
Winter: December through February
Spring: March through May

[3] The factors affecting availability and demand include: planned maintenance, unplanned or forced outages of generating facilities, deratings in resource capabilities, variations in weather, and load forecasting uncertainty.

We describe the various aspects of the seasonal PRM calculation and note that the seasonal MISO PRM and average NSP Coincidence Factor[4] in Table 3-1 below.

Table 3-1: MISO Seasonal Planning Reserve Margin and Average NSP Coincidence Factor[5]

	Summer	Fall	Winter	Spring
MISO Planning Reserve Margin (PRM) PY 2024/2025	9.00%	14.20%	27.40%	26.70%
Average NSP Coincidence Factor	92.24%	92.67%	97.09%	95.61%

Prior to each planning year, MISO determines two different sets of capacity obligations for each LSE; one for the entire MISO footprint as a whole, and one for the Local Resource Zone (LRZ or Zone) where the LSE has load.[6]

A. MISO Footprint Capacity Obligation

By November 1 prior to a planning period, MISO issues the finalized seasonal PRM applicable to all LSEs within its footprint. MISO determines the PRM by performing a technical probabilistic analysis to determine the minimum PRM for each season needed to achieve a Loss of Load Expectation (LOLE) of 0.1 day per year, expressed as a percentage. For example, for the planning year covering June 1, 2024 through May 31, 2025 the overall MISO seasonal PRM on an installed capacity (ICAP)[7] basis and on an unforced capacity rating (UCAP) basis[8] are shown in Table 3-2.

[4] NSP Coincidence Factor refers to the NSP demand at the time of the MISO footprint peak demand.
[5] The values in Table 4-1 are not static and represent a snapshot in time.
[6] Almost all of the NSP system load is located within LRZ 1, which includes almost all of Minnesota, western Wisconsin, and the Dakotas. Approximately 7 MW of load along the Minnesota-Iowa border is located in LRZ 3.
[7] ICAP refers to units' Installed Capacity Rating, which is a capacity accreditation measure based on annual or historical tested generating. The ICAP is the lesser of the generator verification testing capacity or the interconnection service capacity.
[8] UCAP refers to units' Unforced Capacity Rating, which is a function of the unit's installed capacity and its anticipated forced outage rate. A generator's anticipated forced outage rate is typically based on the individual unit's historical performance. UCAP = ICAP x (1 – Forced Outage Rate). *See* "MISO Planning Year 2024-2025 Loss of Load Expectation Study Report". Available at: https://cdn.misoenergy.org/LOLE%20Study%20Report%20PY%202024-2025631112.pdf.

Table 3-2: MISO Footprint PY 2024-2025 Seasonal Planning Reserve Margin

	Summer	Fall	Winter	Spring
MISO PRM ICAP	17.7%	25.2%	49.4%	40.8%
MISO PRM UCAP	9.0%	14.2%	27.4%	26.7%

Over the planning period MISO examined in the 2023-2024 LOLE study,[9] the summer UCAP PRM increased from 7.4 percent in 2023 to 11.2 percent in 2032. The fall UCAP PRM remained relatively constant between 14.9-16.3 percent. The winter and spring UCAP PRMs also remained relatively constant between 23.7 and 25.5 percent between 2024-2033.[10,11]

Each LSE is required to have resources sufficient to meet the forecasted demand at the time of MISO's peak demand, plus its PRM. MISO's tariff acknowledges a state regulatory body's authority to establish a PRM for LSEs within its jurisdiction, which would override the PRM otherwise determined by MISO. None of the NSP System states have established a PRM that would override the MISO PRM.

B. Zonal Capacity Obligation

Additionally, MISO makes an annual determination regarding the amount of capacity required within each of MISO's Zones, called the Local Clearing Requirement (LCR) for each season. The LCR is determined as a function of each Zone's Local Reliability Requirement (LRR) and its Capacity Import Limit (CIL) for each season. The LRR represents the necessary resource requirement in order for a Zone to achieve a LOLE of 0.1 day per year, without relying on resources outside of the Zone. Each Zone, having a smaller footprint than the overall MISO footprint does not benefit from the same level of peak load diversity as does the larger, more diverse MISO footprint. If a Zone within which the Company operates has import capacity, however, the resulting LCR is reduced from the LRR to recognize the transmission system's ability to deliver outside resources into that Zone. Accordingly, the Company plans its minimum system needs based on the MISO-wide PRM while also ensuring zonal requirement are satisfied.

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[9] *See* "MISO Planning Year 2023-2024 Loss of Load Expectation Study Report." Available at: https://cdn.misoenergy.org/PY%202023-2024%20LOLE%20Study%20Report626798.pdf.

[10] We note these values vary slightly from the those presented in Table 4-2, which originate from the MISO PY 2024-2025 LOLE Study. This study has not yet been updated to incorporate the analyses of outyear PRMs.

[11] These PRMs were formulated without the assumption of a Direct Loss of Load methodology, which MISO intends to file in 2024. This change will impact the PRM.

For the 2024-2025 planning year, Zone 1 was determined to require an LRR of 18.9 GW to achieve the LOLE reliability requirement of 0.1 days per year. After accounting for Zone 1's summer CIL of 5.3 GW, Zone 1's summer LCR is reduced to 13.6 GW. Among the several LSEs in LRZ 1, the Company must meet its load share of LRZ 1's LCR as identified in Table 3-3 below.

Table 3-3: MISO PY 2024-2025 Seasonal Local Reliability Requirement

Local Resource Zone 1	Summer	Fall	Winter	Spring	Formula Key
LRZ 1 LRR (GW)	18.9	15.6	22.1	19.1	[A]
LRZ 1 Capacity Import Limit (CIL) (GW)	5.3	6.5	4.9	6.2	[B]
LRZ 1 LCR (GW)	13.6	9.1	17.2	12.9	[A] - [B]
NSP's Share of LRZ 1 LCR (GW)	6.7325	5.8556	7.1288	6.3785	

C. Capacity Obligations Derived from Forecasted Demands

After MISO determines seasonal PRM and zonal LRRs, each LSE's MISO-wide and zonal capacity obligation are derived for each season from its forecast of peak demand (peak load). While LSEs typically forecast the peak demand for their individual system, the resource adequacy process requires the LSE to also forecast:

- The LSE's demand at the time of the MISO footprint's peak demand (MISO Coincident Peak Demand, or MISO CPD); and
- The LSE's demand at the time of the LRZ's peak demand (Zonal Coincident Peak Demand, or Zonal CPD).

Because each LRZ footprint is smaller than the MISO footprint, the LRZ's load diversity is lower than the load diversity of the MISO system, and an LSE's Zonal CPD is typically greater than its MISO CPD.

The NSP System CPD factor measures how closely our system peak matches the MISO system peak. A coincidence factor of 95 percent indicates that we expect to experience load levels that are approximately 95 percent of our peak load during times when the total MISO system load is peaking. In other words, the timing of our peak and the MISO peak does not match exactly, so we are able to reduce the amount of reserves we are required to carry.

Our estimated obligation for all planning period years can be found in the Load and Resources table in Section VI below.

D. Capacity Accreditation of Resources

After these obligation levels have been determined, we consider the type of resources suitable to meet that requirement. MISO's tariff and business practices set forth procedures to enable various types of resources to be used to achieve our RA requirements. MISO has recently made changes to its resource accreditation process, moving from an annual accreditation to a seasonal accreditation capacity (SAC). This change is intended to align resource accreditation with availability in the highest risk periods. Under the new system, MISO accredits resources on their SAC, which is determined by the resource's availability during seasonal RA hours and non-RA hours. MISO conducts independent auctions for all seasons in the spring to clear capacity for LSEs that are short of meeting their seasonal resource adequacy requirements.

Resources used to achieve MISO's RA requirements are referred to as "Planning Resources." Planning Resources include the following sub-types:

- *Capacity Resources*: Physical Generation Resources (i.e., physical assets and purchase agreements), External Resources if located outside of MISO's footprint, and DR Resources participating in MISO's energy and operating reserves market, available during emergencies.
- *Load Modifying Resources*: Behind-the-Meter Generation and DR available during emergencies, which reduces the demand for energy supplies coming from the LSE.
- *Energy Efficiency Resources*: Installed measures on retail customer facilities designed and tested to achieve a permanent reduction in electric energy usage while maintaining a comparable quality of service.

MISO's resource accreditation represents a measure of a resource's reliable contribution to the system's resource adequacy needs. MISO's SAC value for each resource, in megawatts, accounts for various factors such as plant availability and outages during tight system margins and performance during peak hours. Therefore, instead of using installed or nameplate capacity (i.e. ICAP), MISO calculates the SAC value for each resource to determine its expected contribution to RA. These are calculated differently depending on the resource's dispatchability or variability:

- *Dispatchable thermal resources* – MISO determines the SAC value for dispatchable thermal resources pursuant to Schedule 53. The SAC calculation for these

resources is primarily based on the availability of offered resources, mostly during RA hours.

- *DR and EE resources* – MISO assigns capacity accreditation for DR and EE resources based on modeled forecasts.
- *Intermittent Generation and Dispatchable Intermittent resources* – The SAC value for intermittent generation resources or dispatchable intermittent resources is determined by MISO based on historical performance, availability, and type and volume of interconnection service. For wind resources, MISO determines SAC values based on interconnection service volumes and their respective wind capacity credit established through a seasonal Effective Load Carrying Capacity (ELCC) study. Wind capacity credits are determined for individual wind resources based on their average capacity factor during MISO's top eight coincident peaks that occurred during the season for the previous three years.

  The SAC value for non-wind intermittent generation and dispatchable intermittent resources (e.g., run-of-river hydro, solar) is a function of the individual unit's historical performance during the peak hours for each season of the planning period. Specifically, these units are measured on historical performance during the operating hours of 1500 to 1700 during the Summer, Fall and Springs seasons; and the hours of 0800, 0900, 1900 and 2000 in the Winter season over the three-year most recent period.
- *Energy storage resources* – The SAC value for energy storage resources is determined by MISO based on the total net energy during a test of at least one hour, deliverability, and the historical forced outage rate of the resource.

Our modeling selects resources based on their SAC values from MISO PY 2023/2024 with a long-term trend to ELCC values for wind and solar resources, to ensure we maintain adequate capacity on our system over the planning period.

IV. DEMAND SIDE MANAGEMENT

DSM programs offer our customers opportunities to lower their energy use and manage their peak demand, in particular through EE and DR programs included in our Energy Conservation and Optimization (ECO) Triennial Plan. We base our forecasts and potential incremental additions on historic achievements through our programs, as well as external studies about expected and potentially achievable adoption rates.

As previously discussed, we adjusted the customer capacity and energy forecasts in the 2024 Plan to distinguish incremental EE from the load forecast. We modeled incremental DR and EE achievements as "Bundles" to be evaluated alongside other resource options. Each Bundle represents a combination of program achievements expected to lead to a certain amount of avoided load or energy per year, at an estimated blended cost.

For EE, these Bundles include measures that work to reduce a customer's overall energy usage throughout the year. The Commission's Order in Docket No. 19-368, on June 14, 2022, requires the Company to save, on average, at least 780 gigawatt-hours via energy efficiency each year through 2034. To demonstrate compliance with that target in this Resource Plan, the Company has bifurcated naturally occurring EE[12] from energy savings claimed through our ECO programs. We included three EE Bundles in our modeling for both the Reference Case and Preferred Plan. The Company developed the EE bundles based on the filed 2024-2026 ECO Triennial.[13]

The DR Bundles, on the other hand, reflect a customer's commitment to discrete reductions in demand (e.g., on a day when peak load is expected to be high otherwise). These actions are expected to reduce the anticipated annual system peak demand, as well as smooth demand on specific days when weather or other conditions lead to high demand at a certain point in time. In the Order approving our 2019 Plan,[14] the Commission directed that the Company "shall continue to acquire no less than 400 MWs of incremental demand response by 2023 as ordered in the Company's last Resource Plan." In this 2024 Plan, we included six DR Bundles in our modeling for both the Reference Case and Preferred Plan.

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[12] Naturally Occurring energy efficiency includes customers who take action without participating in energy efficiency programs and instances of equipment that currently may be influenced by energy efficiency programs, but in the future world would not be part of an energy efficiency program because an efficient technology is required to meet code or has become common practice.
[13] 2024-2026 ECO Triennial Plan, as filed, Docket No. G,E002/CIP-23-92, June 29, 2023.
[14] *See* E002/RP-19-368 Order Approving Plan with Modifications and Establishing Requirements for Future Filings (April 15, 2022), Order Point 2.A.2.

We discuss the development of the bundles, our expected EE and DR levels, our analysis, and the changing DSM landscape in more detail in Appendix J.

V. EXISTING AND APPROVED RESOURCES

Our current generating resources[15] comprise a diverse portfolio including nuclear, coal, wind, biomass, solar, hydro, natural gas, and oil-fueled facilities. Physical generating assets owned by the Company have a net capacity of approximately 9,500 MWs, including about 2,300 MWs of wind. In addition to these assets, we purchase power from additional physical generating assets representing a capacity of approximately 5,600 MWs.[16] Together, these provide approximately 15,000 MWs of generation resources, of which approximately 7,700 MWs[17] is supplied by renewables. In addition to the physical assets above, customer-owned distributed solar, demand response, and energy efficiency provide additional portfolio diversity. Counting these additional customer-facing resource types, as well as the Company's nuclear units, more than 11,400 MWs of resources[18] supply carbon-free energy for our system.

A. Renewable Resources

In total, we currently have approximately 7,700 MWs of renewable capacity serving the NSP System, including:[19]

- 4,500 MWs of wind resources;
- 2,300 MWs of solar, including community solar programs and grid-scale solar;[20]
- 800 MWs of hydroelectric power;[21] and
- 130 MWs of biomass and landfill gas.

B. Nuclear

Our Monticello and Prairie Island nuclear plants provide a total net capacity of approximately 1,650 MWs of clean energy. These units operate at high-capacity factors and provide nearly 30 percent of the total electric energy and approximately 40 percent of the carbon-free energy our customers consume. Between 2019 and 2023, we have consistently maintained production costs at approximately $31.25 per

[15] Includes approved resources: Sherco Solar 1, 2, and 3; Louise, Fillmore and Apple River solar.
[16] This total excludes the Company's current diversity exchange contract with Manitoba Hydro.
[17] *Id.*
[18] *Id.*
[19] Note: these values are approximate.
[20] Includes solar projects anticipated to be operational in 2024.
[21] Excluding capacity associated with diversity agreement contracts with Manitoba Hydro.

megawatt-hour (MWh) or less, which is a decrease of more than 20 percent when compared to 2013 production costs.

C. Coal

Our coal fleet includes our Sherburne County Generating Station (Sherco) Units 1 and 3 in Becker, Minnesota, and the Allen S. King plant[22] in Oak Park Heights, Minnesota. This coal fleet provides almost 1,700 MW of baseload and cycling generating capacity and supports system reliability. The Commission approved our proposal to retire Sherco Coal Units 1 and 2 in 2026 and 2023, respectively, in its Order in Docket No. E-002/RP-15-21(January 11, 2017). Sherco Unit 2 was retired on December 31, 2023, resulting in a loss of 682 MW of firm dispatchable generation from the NSP system. In the last Resource Plan, the Commission approved our proposal to retire the Allen S. King Generating Station in 2028 and Sherco Unit 3 in 2030.[23] These retirements are reflected in our Reference Case.

D. Natural Gas (and Oil-Fired) Fleet

Our natural gas fleet consists of both intermediate and peaking generation. We have five owned or contracted intermediate-type generating assets that provide over 2,000 MWs of capacity. We have peaking-type resources located at seven sites, providing nearly another 2,000 MWs of capacity. Combined, these facilities provide valuable load following capabilities for our system, cycling as necessary to provide important flexibility to our generation operations and support to our growing renewable resources.

VI. NET RESOURCE SURPLUS/DEFICIT

As described above, our forecast of customers' peak demand and MISO RA requirements are used to determine our overall total generating capacity obligation. From this we deduct our expected load management achievements and accredited capacity of the various resources we have included in our Reference Case to determine our net generation capacity surplus or deficit. We anticipate a net surplus through 2026 and a deficit thereafter, starting first in the spring and summer of 2027. Reference Case Load and Resources tables for each season are in Tables 3-4 through 3-7 below.

[22] Asset is in seasonal operation. The identified capacity represents its maximum capacity offered during the winter season.
[23] *In the Matter of the 2020-2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy,* Docket No. E-001/RP-19-368, Order (April 15, 2022), at Order Point 2.A.4.

Table 3-4: Reference Case Load and Resources,[24] 2024-2040 Planning Period, Summer Season

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
System Needs: Summer																	
Forecasted gross load	10,735	10,769	11,087	11,361	11,468	11,489	11,550	11,518	11,621	11,671	11,757	11,817	11,920	11,954	12,047	12,148	12,226
Adjustment to Load from non-bundled Energy Efficiency	(1,347)	(1,277)	(1,195)	(1,132)	(1,072)	(1,004)	(927)	(839)	(772)	(718)	(623)	(524)	(482)	(461)	(482)	(513)	(602)
Adjustment to Load from EVs and Beneficial Electrification	20	35	54	81	115	158	213	361	482	620	768	919	1,058	1,193	1,324	1,453	1,578
Forecasted Net Load	9,408	9,526	9,946	10,311	10,511	10,643	10,835	11,040	11,331	11,573	11,902	12,212	12,496	12,686	12,890	13,088	13,202
MISO System Coincidence	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%
Coincident Load	8,678	8,787	9,174	9,511	9,695	9,817	9,994	10,183	10,452	10,675	10,979	11,264	11,526	11,702	11,890	12,073	12,178
MISO Planning Reserve Margin (UCAP)	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
NSP Obligation (Summer)	**9,459**	**9,578**	**10,000**	**10,367**	**10,568**	**10,700**	**10,894**	**11,100**	**11,393**	**11,636**	**11,967**	**12,278**	**12,564**	**12,755**	**12,960**	**13,159**	**13,274**
Reference Case Existing & Approved Resources (Seasonal Accredited Capacity, Summer)																	
Demand Response (Existing)	1,011	1,015	1,019	1,021	1,021	1,020	1,016	1,012	1,008	1,004	1,001	997	993	989	985	982	978
Coal	1,475	1,475	1,475	883	883	461	461	0	0	0	0	0	0	0	0	0	0
Nuclear	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,206	649	649	649	649	649	649
Natural Gas/Oil*	4,020	3,719	3,962	3,962	3,445	3,117	2,843	2,727	2,433	2,433	2,433	2,433	2,433	2,433	2,433	2,119	2,119
Biomass/RDF	110	61	61	61	61	61	61	61	61	61	61	38	38	38	7	7	7
Storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro	659	170	169	169	169	169	169	169	100	97	80	78	72	70	70	70	70
Wind	785	743	744	743	737	706	700	683	674	583	573	566	516	494	502	496	473
Solar (Utility-Scale System Resources)	147	259	464	396	362	329	296	262	256	249	242	236	207	201	195	189	183
Solar (Legacy CSGs)	438	367	341	233	214	195	176	157	153	150	147	143	170	165	160	155	150
Solar (Net Metered as of 2024)	121	84	57	52	47	40	36	33	33	32	29	28	27	28	27	26	24
Existing Resources	**10,513**	**9,641**	**10,039**	**9,268**	**8,687**	**7,845**	**7,505**	**6,852**	**6,465**	**6,357**	**5,771**	**5,169**	**5,106**	**5,067**	**5,029**	**4,694**	**4,655**
Summer Net Resource (Need)/Surplus After Existing & Approved Resources	**1,054**	**64**	**39**	**(1,099)**	**(1,881)**	**(2,855)**	**(3,388)**	**(4,248)**	**(4,927)**	**(5,279)**	**(6,195)**	**(7,109)**	**(7,458)**	**(7,688)**	**(7,930)**	**(8,465)**	**(8,619)**
Reference Case Incremental Distributed Resources (Seasonal Accredited Capacity, Summer)																	
Demand Response (Incremental)	177	178	179	179	179	178	177	175	174	172	171	169	168	166	165	163	162
Energy Efficiency (EE) Bundles	114	215	321	426	528	628	712	801	883	963	1,047	1,125	1,094	1,077	1,060	1,023	988
Solar (Non-Legacy CSGs)	8	40	74	102	118	130	137	140	150	159	168	176	183	190	196	201	206
Solar (Net Metered Installed after 2024)	0	18	25	33	41	49	53	56	63	71	81	88	93	97	102	107	115
Solar (3% Distributed Solar Energy Standard)	0	0	0	21	78	107	128	114	114	114	114	113	113	112	112	111	110
Incremental Distributed Resources Brought Forth in This Plan	**299**	**451**	**598**	**761**	**944**	**1,092**	**1,208**	**1,285**	**1,383**	**1,479**	**1,580**	**1,671**	**1,651**	**1,643**	**1,634**	**1,605**	**1,581**
Summer Net Resource (Need)/Surplus Even After Additional Distributed Resources	**1,353**	**514**	**637**	**(338)**	**(937)**	**(1,763)**	**(2,181)**	**(2,963)**	**(3,544)**	**(3,800)**	**(4,615)**	**(5,438)**	**(5,807)**	**(6,045)**	**(6,296)**	**(6,860)**	**(7,038)**

[24] In addition to existing and approved resources, those indicated with a * include pending or proposed resources that we have included across all Scenarios, including the Reference Case. This includes new resources at the Wheaton Generating Station, which are currently before the Public Service Commission of Wisconsin.

Table 3-5: Reference Case Load and Resources,[25] 2024-2040 Planning Period, Fall Season

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
System Needs: Fall																	
Forecasted gross load	8,809	8,820	9,085	9,300	9,328	9,338	9,357	9,370	9,286	9,310	9,343	9,386	9,402	9,435	9,478	9,515	9,295
Adjustment to Load from non-bundled Energy Efficiency	(1,302)	(1,226)	(1,156)	(1,089)	(1,027)	(965)	(892)	(818)	(736)	(673)	(581)	(501)	(458)	(442)	(461)	(482)	(562)
Adjustment to Load from EVs and Beneficial Electrification	21	39	58	87	121	168	224	298	509	648	802	951	1,089	1,225	1,356	1,485	1,882
Forecasted Net Load	7,528	7,633	7,987	8,299	8,423	8,540	8,689	8,850	9,060	9,285	9,564	9,836	10,034	10,218	10,373	10,517	10,616
MISO System Coincidence	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%
Coincident Load	6,976	7,073	7,401	7,690	7,805	7,914	8,053	8,201	8,396	8,605	8,863	9,115	9,298	9,469	9,612	9,747	9,838
MISO Planning Reserve Margin (UCAP)	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%
NSP Obligation (Fall)	**7,967**	**8,078**	**8,452**	**8,782**	**8,914**	**9,038**	**9,196**	**9,365**	**9,588**	**9,826**	**10,121**	**10,410**	**10,618**	**10,814**	**10,977**	**11,131**	**11,235**
Reference Case Existing & Approved Resources (Seasonal Accredited Capacity, Fall)																	
Demand Response (Existing)	759	762	764	766	766	765	763	760	757	754	752	749	746	744	741	739	736
Coal	1,505	1,505	1,505	872	872	455	455	0	0	0	0	0	0	0	0	0	0
Nuclear	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,219	668	668	668	668	668	668
Natural Gas/Oil*	3,810	3,726	3,726	3,726	2,938	2,938	2,644	2,533	2,235	2,235	2,235	2,235	2,235	2,235	2,235	1,953	1,953
Biomass/RDF	90	57	57	57	57	57	57	57	57	57	57	37	37	37	7	7	7
Storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro	659	169	169	169	169	169	169	169	100	97	80	78	72	70	70	70	70
Wind	989	925	918	904	888	841	825	794	751	696	691	649	637	616	633	633	611
Solar (Utility-Scale System Resources)	66	137	262	251	239	228	216	205	207	208	210	211	192	193	194	195	196
Solar (Legacy CSGs)	194	172	154	148	141	135	129	123	124	125	127	128	158	158	159	160	161
Solar (Net Metered as of 2024)	90	56	34	33	31	28	26	25	26	26	25	25	25	26	27	27	25
Existing Resources	**9,956**	**9,306**	**9,385**	**8,721**	**7,898**	**7,413**	**7,081**	**6,461**	**6,053**	**5,995**	**5,395**	**4,781**	**4,770**	**4,747**	**4,734**	**4,451**	**4,427**
Fall Net Resource (Need)/Surplus After Existing & Approved Resources	**1,990**	**1,228**	**933**	**(62)**	**(1,016)**	**(1,625)**	**(2,115)**	**(2,904)**	**(3,535)**	**(3,832)**	**(4,726)**	**(5,629)**	**(5,848)**	**(6,066)**	**(6,243)**	**(6,679)**	**(6,808)**
Reference Case Incremental Distributed Resources (Seasonal Accredited Capacity, Fall)																	
Demand Response (Incremental)	97	97	97	98	97	97	96	95	94	93	92	91	90	89	88	87	86
Energy Efficiency (EE) Bundles	116	218	325	432	536	637	723	812	895	976	1,061	1,139	1,108	1,091	1,073	1,036	1,000
Solar (Non-Legacy CSGs)	4	23	45	65	78	90	101	110	121	133	145	157	169	182	195	207	220
Solar (Net Metered Installed after 2024)	0	12	15	21	27	34	39	43	50	59	69	77	84	92	98	109	120
Solar (3% Distributed Solar Energy Standard)	0	0	0	13	52	74	94	89	92	95	98	101	105	108	111	115	118
Incremental Distributed Resources Brought Forth in This Plan	**217**	**351**	**483**	**628**	**790**	**932**	**1,052**	**1,149**	**1,252**	**1,356**	**1,465**	**1,566**	**1,556**	**1,561**	**1,565**	**1,553**	**1,545**
Fall Net Resource (Need)/Surplus Even After Additional Distributed Resources	**2,207**	**1,579**	**1,416**	**566**	**(226)**	**(693)**	**(1,063)**	**(1,755)**	**(2,283)**	**(2,475)**	**(3,260)**	**(4,063)**	**(4,292)**	**(4,505)**	**(4,678)**	**(5,126)**	**(5,263)**

[25] *Id.*

Table 3-6: Reference Case Load and Resources,[26] 2024-2040 Planning Period, Winter Season

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
System Needs: Winter																	
Forecasted gross load	7,660	7,791	8,047	8,156	8,177	8,208	8,243	8,275	8,252	8,308	8,101	8,126	8,129	8,427	8,464	8,534	8,256
Adjustment to Load from non-bundled Energy Efficiency	(1,067)	(958)	(903)	(880)	(805)	(782)	(727)	(671)	(599)	(541)	(446)	(383)	(350)	(360)	(380)	(388)	(439)
Adjustment to Load from EVs and Beneficial Electrification	20	56	81	101	154	171	234	309	493	661	986	1,156	1,315	1,325	1,480	1,640	1,912
Forecasted Net Load	6,612	6,889	7,225	7,377	7,526	7,596	7,750	7,913	8,146	8,428	8,641	8,899	9,094	9,392	9,565	9,786	9,728
MISO System Coincidence	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%
Coincident Load	6,420	6,689	7,015	7,163	7,307	7,375	7,524	7,683	7,909	8,183	8,390	8,640	8,829	9,119	9,286	9,501	9,445
MISO Planning Reserve Margin (UCAP)	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%
NSP Obligation (Winter)	**8,179**	**8,522**	**8,937**	**9,125**	**9,309**	**9,396**	**9,586**	**9,788**	**10,076**	**10,425**	**10,689**	**11,007**	**11,249**	**11,617**	**11,831**	**12,105**	**12,033**
Reference Case Existing & Approved Resources (Seasonal Accredited Capacity, Winter)																	
Demand Response (Existing)	441	443	445	447	447	447	447	447	447	447	447	447	447	446	446	446	446
Coal	1,562	1,562	1,562	938	938	469	469	0	0	0	0	0	0	0	0	0	0
Nuclear	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,250	665	665	665	665	665	665
Natural Gas/Oil*	4,372	4,372	4,204	4,204	3,997	3,255	3,255	2,753	2,753	2,480	2,480	2,480	2,480	2,480	2,480	2,480	2,131
Biomass/RDF	96	52	52	52	52	52	52	52	52	52	52	29	29	29	7	7	7
Storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro	610	610	169	169	169	169	169	169	100	100	80	80	72	72	70	70	70
Wind	2,146	1,641	1,685	1,596	1,573	1,488	1,470	1,426	1,392	1,193	1,154	1,109	1,073	928	923	892	831
Solar (Utility-Scale System Resources)	1	28	58	50	42	34	27	19	11	23	34	45	56	60	70	80	89
Solar (Legacy CSGs)	5	41	34	29	25	20	16	11	7	14	20	27	34	50	57	65	73
Solar (Net Metered as of 2024)	0	52	6	7	6	5	4	3	2	3	5	7	8	10	11	13	14
Existing Resources	**11,059**	**10,627**	**10,041**	**9,318**	**9,075**	**7,766**	**7,734**	**6,706**	**6,589**	**6,137**	**5,521**	**4,888**	**4,864**	**4,740**	**4,729**	**4,717**	**4,327**
Winter Net Resource (Need)/Surplus After Existing & Approved Resources	**2,880**	**2,106**	**1,104**	**193**	**(234)**	**(1,630)**	**(1,851)**	**(3,082)**	**(3,487)**	**(4,288)**	**(5,168)**	**(6,119)**	**(6,384)**	**(6,877)**	**(7,101)**	**(7,387)**	**(7,706)**
Reference Case Incremental Distributed Resources (Seasonal Accredited Capacity, Winter)																	
Demand Response (Incremental)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy Efficiency (EE) Bundles	130	243	363	482	597	710	805	904	997	1,087	1,179	1,265	1,230	1,211	1,191	1,150	1,110
Solar (Non-Legacy CSGs)	0	6	10	13	14	14	12	10	7	14	23	33	45	57	70	85	100
Solar (Net Metered Installed after 2024)	0	11	3	5	5	6	6	5	3	7	14	21	28	35	43	53	71
Solar (3% Distributed Solar Energy Standard)	0	0	0	3	9	11	12	8	5	10	16	22	28	34	40	47	54
Incremental Distributed Resources Brought Forth in This Plan	**130**	**260**	**375**	**503**	**625**	**741**	**835**	**927**	**1,012**	**1,119**	**1,232**	**1,341**	**1,331**	**1,337**	**1,344**	**1,335**	**1,335**
Winter Net Resource (Need)/Surplus Even After Additional Distributed Resources	**3,010**	**2,366**	**1,480**	**696**	**392**	**(889)**	**(1,016)**	**(2,155)**	**(2,475)**	**(3,168)**	**(3,935)**	**(4,778)**	**(5,054)**	**(5,540)**	**(5,757)**	**(6,053)**	**(6,371)**

[26] *Id.*

Table 3-7: Reference Case Load and Resources,[27] 2024-2040 Planning Period, Spring Season

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
System Needs: Spring																	
Forecasted gross load	8,137	8,181	8,473	8,699	8,809	8,712	8,697	8,737	8,786	8,789	8,840	8,699	8,753	8,785	8,801	8,839	8,843
Adjustment to Load from non-bundled Energy Efficiency	(1,108)	(1,062)	(1,012)	(949)	(961)	(808)	(738)	(687)	(635)	(569)	(488)	(401)	(375)	(366)	(385)	(394)	(459)
Adjustment to Load from EVs and Beneficial Electrification	14	24	39	57	107	113	200	265	353	459	571	887	1,026	1,158	1,287	1,412	1,534
Forecasted Net Load	7,043	7,143	7,500	7,808	7,955	8,018	8,158	8,314	8,504	8,679	8,923	9,185	9,404	9,577	9,703	9,858	9,918
MISO System Coincidence	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%
Coincident Load	6,733	6,830	7,171	7,465	7,606	7,666	7,800	7,949	8,131	8,298	8,531	8,782	8,991	9,157	9,277	9,425	9,483
MISO Planning Reserve Margin (UCAP)	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%
NSP Obligation (Spring)	**8,531**	**8,653**	**9,085**	**9,459**	**9,637**	**9,712**	**9,883**	**10,072**	**10,302**	**10,514**	**10,809**	**11,127**	**11,392**	**11,601**	**11,754**	**11,941**	**12,015**
Reference Case Existing & Approved Resources (Seasonal Accredited Capacity, Spring)																	
Demand Response (Existing)	811	815	819	821	822	821	820	818	816	814	813	811	809	808	806	804	803
Coal	1,229	1,229	1,229	669	669	276	276	0	0	0	0	0	0	0	0	0	0
Nuclear	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,247	664	664	664	664	664	664
Natural Gas/Oil*	4,003	4,003	3,919	3,919	3,710	3,130	3,130	2,702	2,702	2,430	2,430	2,430	2,430	2,430	2,430	2,430	2,169
Biomass/RDF	87	53	53	53	53	53	53	53	53	53	53	36	36	36	8	8	8
Storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro	659	659	169	169	169	169	169	169	100	100	80	78	72	70	70	70	70
Wind	1,106	890	835	777	715	632	578	510	457	398	395	395	395	352	362	362	349
Solar (Utility-Scale System Resources)	157	90	180	182	185	187	189	191	193	186	178	171	163	141	134	127	121
Solar (Legacy CSGs)	483	112	106	107	109	111	112	114	116	112	108	104	100	116	110	105	99
Solar (Net Metered as of 2024)	119	131	53	26	25	25	25	26	27	25	24	23	21	21	21	19	17
Existing Resources	**10,476**	**9,803**	**9,185**	**8,545**	**8,279**	**7,226**	**7,174**	**6,405**	**6,285**	**5,940**	**5,328**	**4,712**	**4,692**	**4,638**	**4,605**	**4,590**	**4,300**
Spring Net Resource (Need)/Surplus After Existing & Approved Resources	**1,945**	**1,150**	**100**	**(914)**	**(1,357)**	**(2,486)**	**(2,708)**	**(3,667)**	**(4,016)**	**(4,574)**	**(5,482)**	**(6,415)**	**(6,700)**	**(6,963)**	**(7,150)**	**(7,352)**	**(7,715)**
Reference Case Incremental Distributed Resources (Seasonal Accredited Capacity, Spring)																	
Demand Response (Incremental)	109	109	110	110	110	110	109	109	108	107	107	106	105	105	104	104	103
Energy Efficiency (EE) Bundles	124	233	348	462	573	682	773	870	959	1,046	1,137	1,222	1,189	1,170	1,151	1,111	1,074
Solar (Non-Legacy CSGs)	3	15	31	47	60	74	88	102	113	119	123	127	130	133	134	135	136
Solar (Net Metered Installed after 2024)	0	29	24	17	22	31	38	45	53	58	68	71	74	75	78	79	85
Solar (3% Distributed Solar Energy Standard)	0	0	0	10	40	61	82	83	86	85	84	82	80	79	77	75	73
Incremental Distributed Resources Brought Forth in This Plan	**236**	**386**	**513**	**646**	**806**	**957**	**1,091**	**1,208**	**1,319**	**1,415**	**1,518**	**1,608**	**1,578**	**1,562**	**1,544**	**1,504**	**1,470**
Spring Net Resource (Need)/Surplus Even After Additional Distributed Resources	**2,181**	**1,537**	**612**	**(268)**	**(552)**	**(1,529)**	**(1,618)**	**(2,459)**	**(2,697)**	**(3,159)**	**(3,963)**	**(4,807)**	**(5,121)**	**(5,402)**	**(5,605)**	**(5,848)**	**(6,245)**

[27] *Id.*

VII. MEETING RENEWABLE ENERGY REQUIREMENTS AND GOALS

A. Minimum Compliance Requirements

Each of the states in the NSP System has a different public policy with respect to renewable energy requirements or objectives. Table 3-8 below illustrates each state's renewable energy standard (RES).

Table 3-8: Renewable Energy Requirements and Objectives by State – NSP System

State	Renewable & Recycled	Renewable	Carbon-free	Solar	Distributed Solar
Minnesota		30% by 2020* 55% by 2035	80% by 2030 90% by 2035 100% by 2040	1.5% by 2020*	3% by 2030
North Dakota	10% by 2015**				
South Dakota	10% by 2015**				
Wisconsin	12.9% by 2015*				
Michigan	50% by 2030 60% by 2035		100% by 2040		

*Goal Met
**Voluntary objective met

Of our states that have renewable standards expressed as a percentage of electric retail sales from qualifying resources by a certain date, Minnesota's RES is the highest, requiring that 30 percent of the Company's energy come from renewables, with at least 24 percent of the electricity we provide to retail customers coming from wind energy by 2020.[28] Legislation passed in the 2013 session also established a Solar Energy Standard (SES) for Minnesota that requires that investor-owned utilities in the state generate 1.5 percent of 2020 retail sales, net of customer exclusions, from solar energy resources. Of that 1.5 percent, 10 percent must come from systems with

[28] This requirement is included in the total 30 percent RES, and we are authorized to count a limited amount of solar energy towards an overall 25 percent wind and solar requirement (amounting to 1 percent of total sales). The SES is assessed separately. Large hydro does not count as a renewable energy source for purpose of the Minnesota RES. Minn. Stat. § 216B.1691.

capacity less than 40 kW.[29] Additionally, the Distributed Solar Energy Standard requires that three percent of solar power come from distributed energy by 2030, and the Carbon Free Standard (CFS) requires 80 percent of retail sales to come from carbon-free energy by 2030,[30] 90 percent by 2035, and 100 percent by 2040.

North Dakota and South Dakota each have a voluntary objective that includes renewable or recycled energy.[31] Further, our North Dakota regulators have indicated that compliance with the North Dakota Renewable Energy Objective should be accomplished with competitively-priced energy.

To-date we have implemented plans that result in the entire NSP System complying with, at the very least, the highest of renewable energy requirements across our jurisdictions, in this case, the Minnesota RES. This strategy also places us in compliance with the specific requirements in each of our other jurisdictions. As a result, we have been planning for renewable energy additions, and allocating their benefits, to all our jurisdictions (with certain exceptions as discussed in Chapter 2, Planning Landscape). As state energy policies continue to evolve, however, we will continue to examine whether this requires a strategy change going forward, and engage our Commissions as needed on that topic.

B. RES and SES Compliance

We project continued compliance with the renewable energy goals and standards in each of our NSP states under our Preferred Plan. The Company currently maintains a set of banked Renewable Energy Credits (RECs) for future compliance.[32] In the past, we have leveraged our REC bank to manage the size, type, and timing of renewable energy additions on our system, to ensure that we identify and acquire the renewable generation resources that provide our customers with the greatest value at the lowest

[29] The original legislation set a threshold of 20 kW, but was increased to 40 kW in 2018, per HF3232. *See* "Minnesota Renewable energy Standard: Utility Compliance." Minnesota Department of Commerce (January 2019) at 7. Available at: https://www.leg.state.mn.us/docs/2019/mandated/190330.pdf.

[30] Minn. Stat. § 216B.1691 Subd. 2h states that projects must comply with eligibility requirements to count toward the DSES. Eligibility requirements stipulate that the project must be: 10 MW or less; connected to our distribution system; located in our Minnesota service territory; and constructed/procured after August 1, 2023 using a Commission-approved competitive bidding process; etc.

[31] As defined in North Dakota Century Code, 49-02-25, recycled energy means "systems producing electricity from currently unused waste heat resulting from combustion or other processes into electricity and which do not use an additional combustion process. The term does not include any system whose primary purpose is the generation of electricity unless the generation system consumes wellhead gas that would otherwise be flared, vented, or wasted." South Dakota Codified Law 49-34A-94 contains a similar definition.

[32] A REC is an accounting device designed to reflect the renewable energy attributes of a particular MWh of renewable energy generation. RECs are the currency for compliance with state renewable targets.

cost. The Company currently expects to generate a sufficient number of RECs throughout the planning period to satisfy our renewable obligations. Additional information on our compliance with RES and SES is provided in Appendix N: Standard Obligations.

C. Carbon Free Standards

In 2023, the Minnesota Legislature amended the requirements set forth in Minn. Stat. § 216B.1691 to create new carbon-free energy standards (see Minn. Laws 2023, chp. 7). The new legislation requires Xcel Energy to generate or procure carbon-free energy equivalent to 100 percent of its Minnesota retail sales by 2040. The law, Minn. Stat. § 216B.1691, also requires Xcel Energy to achieve interim carbon-free standards of 80 percent by 2030, and 90 percent by 2035.

Further, both Wisconsin and Michigan's Governors recently put forward 100 percent by 2040 carbon reduction goals for their respective states' electric sector. Proceedings by those states' Public Utilities Commissions are still in the early stages and have not produced any final compliance requirements for electric utilities. Additional information regarding our compliance with the newly enacted carbon-free energy standard is provided in Appendix N.

VIII. ENERGY POLICY AND COMPANY GOALS

As discussed above, we believe that we are well positioned to meet minimum system needs. At least through 2026, we expect that we will be able to meet those needs with existing and already-approved resources. In December 2018, the Company announced its goals to reduce carbon dioxide (CO_2) emissions 80 percent by 2030 below 2005 levels company-wide, and to serve customers with 100 percent carbon-free electricity by 2050. Our 2024 Plan is informed by these internal policies, as well as the renewable energy milestones set forth in Minn. Stat. § 216B.1691, and demonstrates our commitment to a cost-effective, renewable, and carbon-free future. Additionally, our Preferred Plan will result in significant carbon reductions and keeps us on track to provide 100 percent carbon-free electricity by 2050.

IX. REFERENCE CASE

We incorporate all the aforementioned elements into the EnCompass modeling tool, which allows us to explore how we best meet our customer and policy requirements under a variety of conditions and at a reasonable cost. We work with internal and external subject matter experts to develop starting assumptions that reflect their expert opinion of likely future conditions. We then test the robustness of the plan through sensitivity analysis and special studies by individually changing key assumptions and re-running the plans under these changed assumptions. Our analysis resulted in the following Reference Case Expansion Plan, depicted in Tables 3-9 through 3-13 below.

Table 3-9: Reference Case Annual Expansion Plan, Summer Season UCAP[33]

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Generic Units																	
Solar (Utility-Scale System Resources)	0	0	0	0	0	29	103	46	0	0	0	0	0	0	0	0	0
Storage	0	0	0	425	0	102	0	148	151	0	0	0	437	445	284	0	0
Firm Dispatchable	0	0	0	629	629	0	629	0	314	314	0	629	0	0	0	629	0
Wind	0	0	0	72	325	72	0	216	142	70	278	172	102	67	66	98	227
Distributed Resources																	
Demand Response	177	182	187	189	189	188	182	177	171	166	160	155	150	145	140	134	129
Energy Efficiency (EE) Bundles	114	101	106	105	102	100	84	88	83	80	84	78	0	0	0	0	0
Solar (Net Metered After 2024, 3% DSES, & Non-Legacy CSGs)	8	50	41	58	81	49	33	0	17	17	19	14	12	11	10	9	12
Total Annual Resource Additions, Summer Accredited Capacity	**299**	**333**	**333**	**1,477**	**1,326**	**540**	**1,031**	**675**	**878**	**647**	**542**	**1,048**	**700**	**668**	**500**	**871**	**368**

[33] Note: This table includes EE, DR, and Distributed Solar resources that are also reflected in the Load and Resources Table.

Table 3-10: Reference Case Annual Expansion Plan, Fall Season UCAP[34]

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Generic Units																	
Solar (Utility-Scale System Resources)	0	0	0	0	0	20	76	36	0	0	0	0	0	0	0	0	0
Storage	0	0	0	391	0	90	0	122	128	0	0	0	403	419	271	0	0
Firm Dispatchable	0	0	0	628	628	0	628	0	314	314	0	628	0	0	0	628	0
Wind	0	0	0	88	392	86	0	252	168	84	336	210	126	84	84	126	294
Distributed Resources																	
Demand Response	97	100	103	105	105	104	100	96	92	89	85	81	78	74	71	67	64
Energy Efficiency (EE) Bundles	116	102	107	107	103	101	86	89	84	81	84	78	0	0	0	0	0
Solar (Net Metered After 2024, 3% DSES, & Non-Legacy CSGs)	4	31	24	39	58	41	35	8	21	24	26	23	23	23	23	26	28
Total Annual Resource Additions, Fall Accredited Capacity	**217**	**233**	**235**	**1,357**	**1,286**	**442**	**924**	**604**	**807**	**591**	**531**	**1,021**	**630**	**600**	**449**	**847**	**386**

[34] *Id.*

Table 3-11: Reference Case Annual Expansion Plan, Winter Season UCAP[35]

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Generic Units																	
Solar (Utility-Scale System Resources)	0	0	0	0	0	3	9	3	0	0	0	0	0	0	0	0	0
Storage	0	0	0	433	0	104	0	151	148	0	0	0	422	430	273	0	0
Firm Dispatchable	0	0	0	598	598	0	598	0	299	299	0	598	0	0	0	598	0
Wind	0	0	0	156	696	153	0	449	296	144	557	337	196	126	122	176	395
Distributed Resources																	
Demand Response	0	2	4	5	6	6	6	6	6	6	5	5	5	5	5	5	5
Energy Efficiency (EE) Bundles	130	114	119	119	115	113	95	99	93	90	92	86	0	0	0	0	0
Solar (Net Metered After 2024, 3% DSES, & Non-Legacy CSGs)	0	17	0	8	8	3	0	0	0	17	21	22	25	25	28	32	40
Total Annual Resource Additions, Winter Accredited Capacity	**130**	**133**	**123**	**1,320**	**1,423**	**382**	**709**	**707**	**841**	**556**	**675**	**1,049**	**648**	**586**	**427**	**811**	**439**

[35] *Id.*

Table 3-12: Reference Case Annual Expansion Plan, Spring Season UCAP[36]

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Generic Units																	
Solar (Utility-Scale System Resources)	0	0	0	0	0	16	66	34	0	0	0	0	0	0	0	0	0
Storage	0	0	0	422	0	100	0	141	137	0	0	0	342	336	206	0	0
Firm Dispatchable	0	0	0	702	702	0	702	0	351	351	0	702	0	0	0	702	0
Wind	0	0	0	76	315	65	0	161	96	48	192	120	72	48	48	72	168
Distributed Resources																	
Demand Response	109	113	117	119	121	120	117	115	113	110	108	106	103	101	99	97	94
Energy Efficiency (EE) Bundles	124	109	115	114	111	108	92	96	90	87	91	85	0	0	0	0	0
Solar (Net Metered After 2024, 3% DSES, & Non-Legacy CSGs)	3	41	11	19	49	43	42	22	22	9	13	6	4	2	3	0	4
Total Annual Resource Additions, Spring Accredited Capacity	**236**	**263**	**243**	**1,451**	**1,297**	**452**	**1,019**	**568**	**808**	**605**	**404**	**1,018**	**521**	**487**	**356**	**870**	**266**

[36] *Id.*

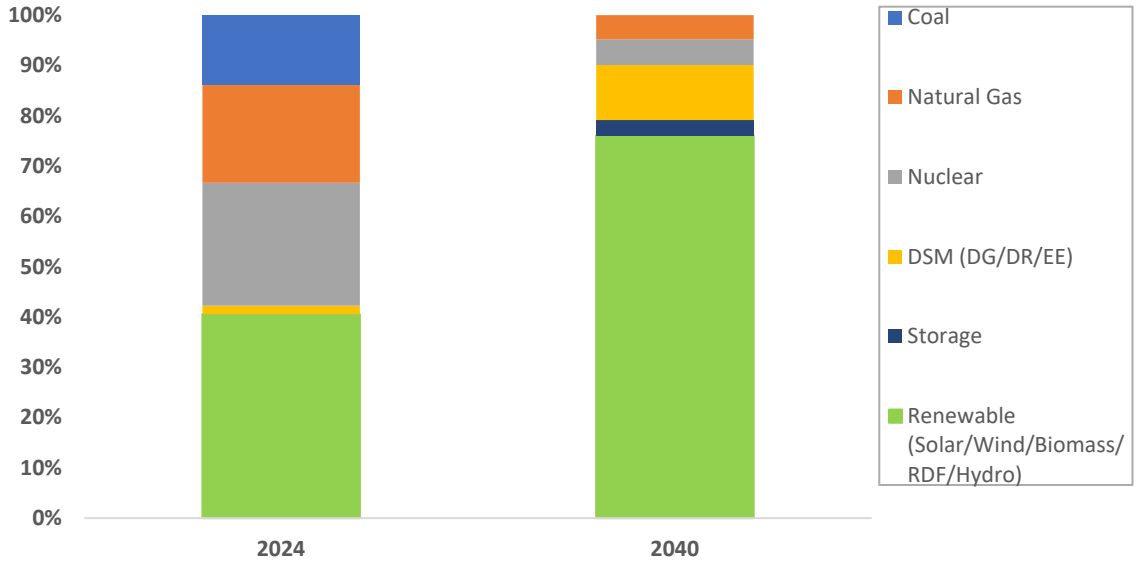
Table 3-13: Reference Case Annual Expansion Plan, ICAP[37]

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Generic Units																	
Solar (Utility-Scale System Resources)	0	0	0	0	0	100	400	200	0	900	0	800	0	0	0	0	0
Storage	0	0	0	480	0	120	0	180	180	0	0	0	480	480	300	0	0
Firm Dispatchable	0	0	0	748	748	0	748	0	374	374	0	748	0	0	0	748	0
Wind	0	0	0	400	1,800	400	0	1,200	800	400	1,600	1,000	600	400	400	600	1,400
Distributed Resources																	
Demand Response	231	234	236	238	239	239	238	238	237	236	236	235	235	234	234	233	233
Energy Efficiency (EE) Bundles	114	101	106	105	102	100	84	88	83	80	84	78	0	0	0	0	0
Solar (Net Metered After 2024, 3% DSES, & Non-Legacy CSGs)	18	119	138	194	306	263	245	109	107	117	169	110	114	80	96	124	174
Reference Case Total Annual Resource Additions	**363**	**453**	**480**	**2,165**	**3,195**	**1,222**	**1,716**	**2,015**	**1,781**	**2,107**	**2,089**	**2,972**	**1,429**	**1,194**	**1,030**	**1,705**	**1,807**

[37] *Id.*

The Reference Case presented here would result in the following energy mix depicted in Figure 3-6 below.

Figure 3-6: NSP System Reference Case Energy Mix in 2024 and 2040



In Chapter 4, we detail our Preferred Plan. In Chapter 5: Economic Modeling Framework, we outline and discuss the starting assumptions, scenarios, and sensitivities that formed our EnCompass modeling analysis, and resulted in our Preferred Plan.

X. CONCLUSION

Our 2024 Plan focuses on reducing carbon emissions while ensuring reliable and affordable service to our customers. The minimum number of resources required for the planning period is determined based on system needs and existing resources. The Reference Case, modeling scenarios, and Preferred Plan are developed based on this baseline. In our 2024 Plan, our minimum system needs are informed by the seasonal resource adequacy construct recently implemented by MISO and our energy adequacy analysis. These changes are intended to address the increasing variability in reliability needs and resource availability throughout the year and align resource accreditation with availability.

CHAPTER 4 - THE PREFERRED PLAN

I. INTRODUCTION

The Preferred Plan we propose here continues to deliver on our obligations to provide safe, reliable, and affordable service to our customers while further accelerating our ambitious carbon-reduction strategy. It increases the pace of the carbon-reduction efforts approved in our 2019 Plan, while continuing to ensure our system maintains robust reliability.

Building on our ongoing efforts to transform our energy system, and based on extensive collaboration with our stakeholders, the key components of our Preferred Plan include:

- Adding thousands of megawatts of additional renewable resources to our system, including customer-sited DERs;
- Integrating and investing in energy storage systems, including adding short-duration storage systems to our fleet;
- Extending the life of our nuclear fleet;
- Ensuring reliability through additional firm dispatchable generation; and
- Continuing to increase Energy Efficiency and Demand Response resources to help reduce overall system demand.

Our Preferred Plan leverages existing grid connections and proven technologies, while using emerging technologies like battery storage to provide a balanced mix of resources, at an estimated average annual increase in retail rates of less than one percent, all while preserving our fundamental commitment to reliability.

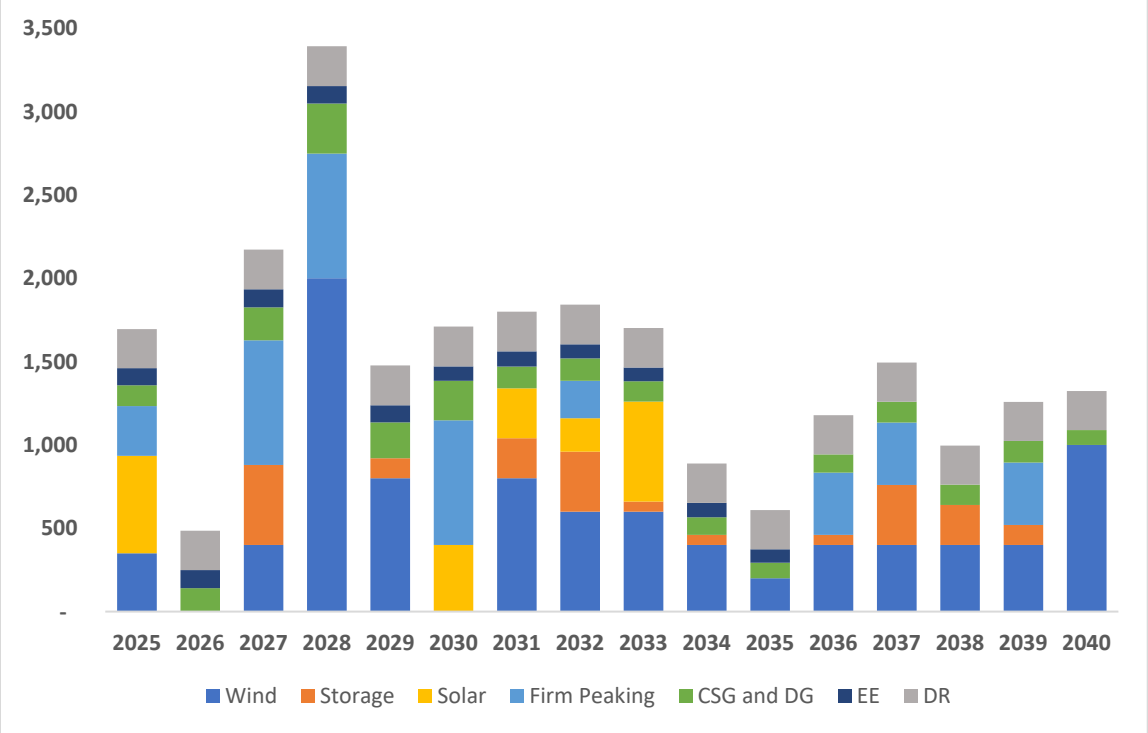
Our planning objectives center on addressing generation decarbonization and load growth while maintaining reliability, and the cost effectiveness of our Preferred Plan. Importantly, we understand and have considered the impact that our Preferred Plan will have on our customers and have engaged with stakeholders and the community to help inform and further refine our Preferred Plan. Our strategy reflects our commitment to providing clean, reliable, and affordable energy to our customers, while also leading the charge in the clean energy transition.

II. PREFERRED PLAN

Our Preferred Plan is designed to accelerate our carbon-reduction efforts while maintaining a safe, reliable, and affordable system for our customers and

communities. Figures 4-1 and 4-2 below outline our Preferred Plan's modeled resource additions over the 2024 – 2040 planning period. Resource additions in 2025 include the approved Sherco Solar resources expected to achieve commercial operations in 2025, the approved Apple River solar resource, and the investments at our Wheaton and Blue Lake facilities approved in 2019 Plan.[1]

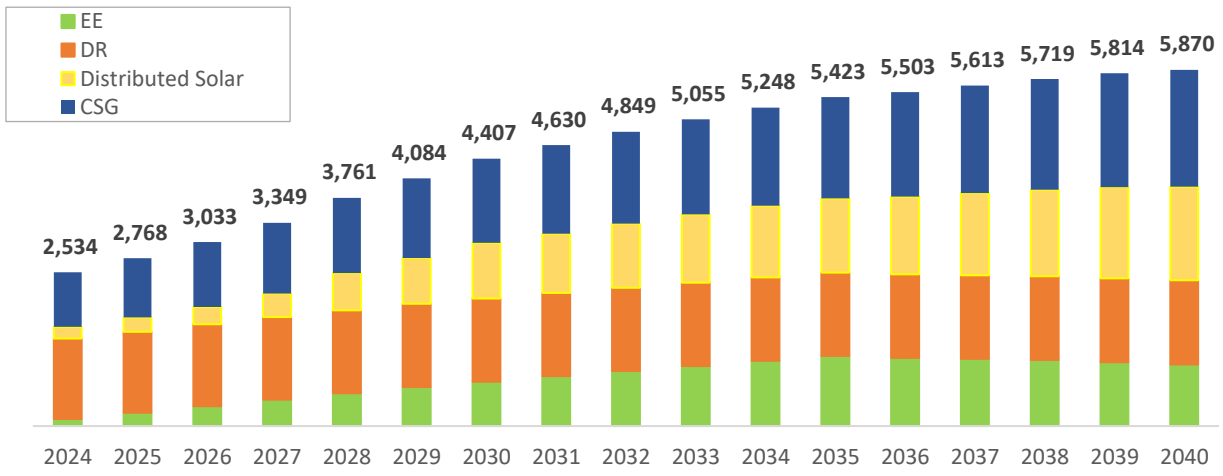
Figure 4-1: Preferred Plan Resource Additions (MW)



	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Wind	350	0	400	2,000	800	0	800	600	600	400	200	400	400	400	400	1,000
Storage	0	0	480	0	120	0	240	360	60	60	0	60	360	240	120	0
Solar	585	0	0	0	0	400	300	200	600	0	0	0	0	0	0	0
Firm Peaking	298	0	748	748	0	748	0	225	0	0	0	374	374	0	374	0
CSG and DG	124	140	198	301	215	237	131	134	123	106	94	110	125	121	130	90
EE	103	108	108	105	103	87	91	85	82	86	80	0	0	0	0	0
DR	234	237	238	239	239	239	238	237	237	236	236	235	235	235	234	234

[1] The Wheaton repowering is currently under review by the Wisconsin Public Service Commission.

Figure 4-2: Preferred Plan Cumulative Capacity
Demand Side Resources and Community Solar Gardens (MW)



The figures illustrate our Preferred Plan's aim to maximize cost-effective renewable resources. This is in addition to the significant distributed resources projected, which align with state law and policy. The Preferred Plan is supported by firm dispatchable generation, enhancing renewable integration and system reliability, in an effort to reduce market exposure and risk.

With this diverse mix of resources, our system will not be overly reliant on any one fuel source, and we will continue to ensure reliability, while retaining the flexibility to consider the economics of new resources as our baseload plants retire. Our projected capacity and energy mix for 2040 under our Preferred Plan can be seen in Figures 4-3 and 4-4 below.

Figure 4-3: NSP System 2024 and 2040 Preferred Plan Capacity Mix

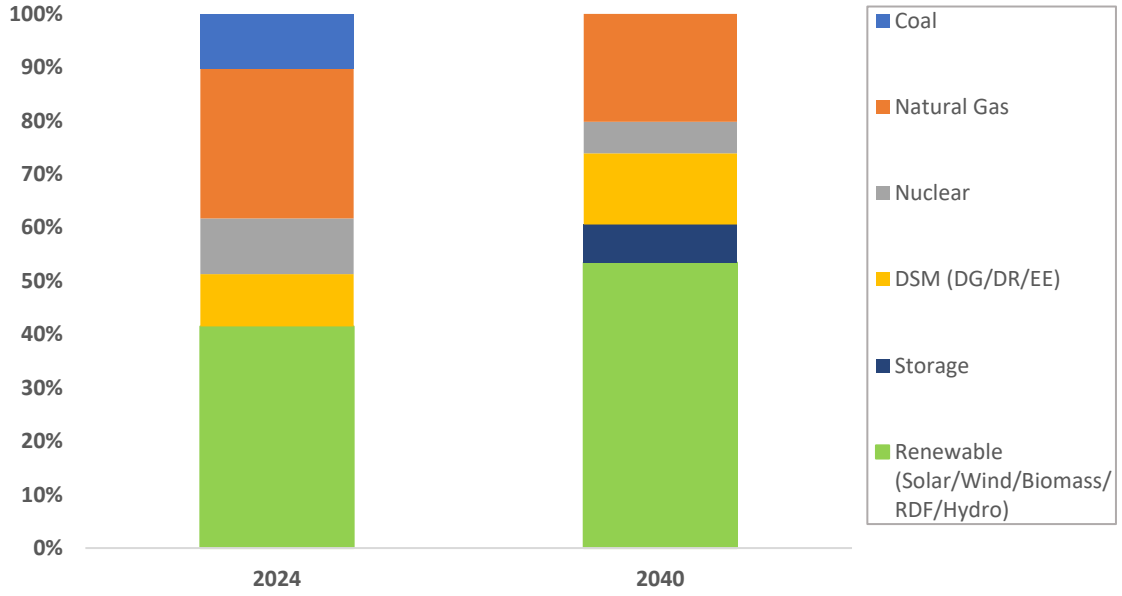
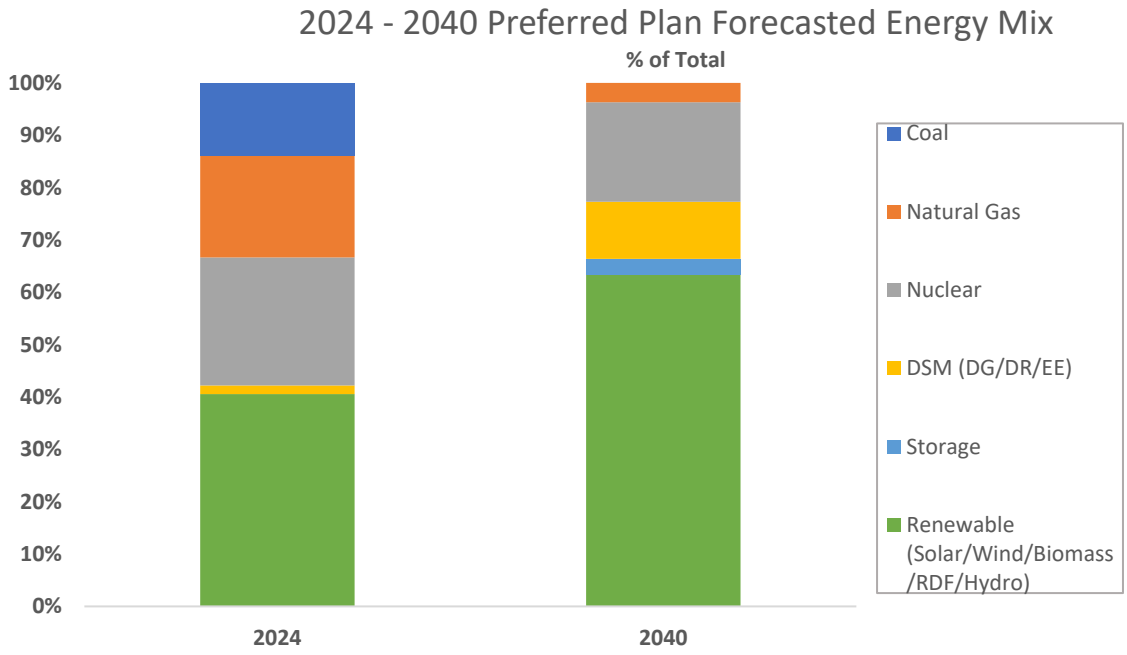


Figure 4-4: NSP System 2024 and 2040 Preferred Plan Energy Mix



Below, we discuss our Preferred Plan's anticipated resource mix in more detail.

A. Coal Resources

Our Preferred Plan continues along the path that the Commission set in our 2019 Plan when it approved our proposal to close all of our coal units by 2030. We retired Sherco Unit 2 at the end of 2023, removing approximately 700 MWs of baseload coal from our fleet. We continue to plan for retiring Sherco Unit 1 in 2026, King in 2028, and Sherco Unit 3 in 2030, bringing our total coal reductions to 2,400 MWs.

Closing our coal units aligns with our sustainability goals and makes economic sense due to changes in federal policy that makes replacing coal generation with cleaner energy sources more cost-effective. Regardless, these coal units have been a cornerstone of our fleet for decades, operating at high load-factors to provide reliable power to our customers. We therefore need to retire these resources responsibly by giving ourselves sufficient time to build the necessary replacement resources, help transition our workforce, and maintain a reliable system. Our Preferred Plan is designed to allow us to do just that.

B. Renewable Resources

As part of our Preferred Plan, we plan to add significant wind and solar resources. Robust renewable additions continue to be a critical component of our vision to achieving our clean energy commitments. In addition to helping to achieve our renewable energy goals, wind and solar do not have any fuel costs and act to insulate the Company against rising fuel prices. Our Preferred Plan reflects a modeled expansion need of nearly 9,900 MWs of utility-scale renewable resources by 2040, with new resource additions beginning in 2027.

We have long been one of the nation's leading providers of wind energy and expect this to continue. Our Preferred Plan reflects the need for an incremental 8,400 MWs of wind capacity through 2040. We note that the MISO accreditation for wind is higher than the assumption used in our 2019 Plan, and the assumption coupled with the lower levelized cost of energy from IRA production tax credits is driving the wind additions.

In addition to this substantial increase in wind generation, our Preferred Plan reflects a modeled expansion need for 1,500 MWs of solar through 2040. Further, our Preferred Plan includes nearly 2,000 MWs of Community Solar Gardens and nearly 1,600 MWs of distributed solar resources in compliance with state law.

C. Firm and Dispatchable Resources

We plan to add essential firm dispatchable capacity to our resource mix. As we transition from a system built off of baseload coal to one that is made up primarily of clean, intermittent, and short duration resources, we remain committed to ensuring that we can still meet our customers' energy demands at all times. This reliability is a fundamental obligation of our service and one that our customers expect. Unlike intermittent renewable resources, firm dispatchable resources can be relied on to deliver power on-demand for extended periods of time due to their primary characteristics: dispatchability and consistent fuel supply. Our focus on reliability is particularly important because at the same time we are planning to retire our entire coal fleet (approximately 2,400 MWs of baseload generation), we also have nearly 1,700 MWs of power purchase agreements (PPAs) with other capacity resources set to expire between 2025 and 2028.

As shown in our energy adequacy analysis in Appendix D: Energy Adequacy Analysis, additional firm dispatchable resources help maintain reliability amid retiring base load generation. Our 2024 Plan therefore includes the addition of approximately 3500 MW of cumulative firm dispatchable between 2027 and 2040 to ensure long-duration, affordable energy when our intermittent renewables are not able to fully meet our customers' needs.

D. Battery Energy Storage Systems

We plan to add Battery Energy Storage Systems (BESS) to help meet some of our dispatchable needs. In addition to firm dispatchable resources, our modeling shows an incremental need for approximately 2,100 MW of storage between 2027 and 2040. The BESS modeled as part of our 2024 Plan are short-duration storage systems. Although valuable, short-duration BESS cannot currently meet the longer duration dispatch needed from firm dispatchable resources.[2] Instead, the primary value to our system that short-duration BESS provides is in aiding renewable integration, providing grid support, deferring some, but not all, traditional grid investments, and improving power quality. We provide additional information on the uses of BESS, and its limitations, as part of the Appendix I: Minnesota Energy Storage Systems Assessment.

[2] Recently, we partnered with Form Energy to deploy and test a multi-day, iron-air battery system at the Sherco site, but the project is a pilot, to allow for further study. We anticipate that advancements in long-duration storage and grid-forming technologies will continue, and that long-duration storage, together with other grid investments to ensure system stability, will have the potential to address firm dispatchable needs in the future.

E. Nuclear Resources

We plan to extend operations at both of our nuclear plants. Combined, this will provide approximately 1,650 MW of net dispatchable generation. We propose to extend operation of the two Prairie Island Nuclear Generating Plant units for 20 years past the current license expirations, to 2053/2054, and to extend operation of the Monticello Nuclear Generating Plant by 10 years to 2050, which aligns with our Subsequent License Renewal application for Monticello pending review by the Nuclear Regulatory Commission.

To accommodate more intermittent renewable resources on the grid, we work with the MISO Day-Ahead market to allow for flexible power operations capabilities at all three nuclear units. Our nuclear plants can safely and efficiently accommodate power changes of approximately 280 MW—or over 15 percent—of our nuclear capacity in response to the market. Our nuclear fleet is also a critical component of our reliability and stability strategy, particularly during the winter months, when MISO's seasonal resource adequacy construct reduces the accredited capacity of renewables. We discuss the benefits of nuclear, as well as the performance of our nuclear fleet, in greater detail in Appendix M: Nuclear.

By continuing the operation of these plants to at least 2050, customers will continue to benefit from the carbon-free, baseload power that our nuclear fleet provides, while helping to keep costs low as we leverage existing, reliable resources on our system. Nuclear is central to achieving our carbon reduction goals and maintain reliability.

III. ACTION PLANS

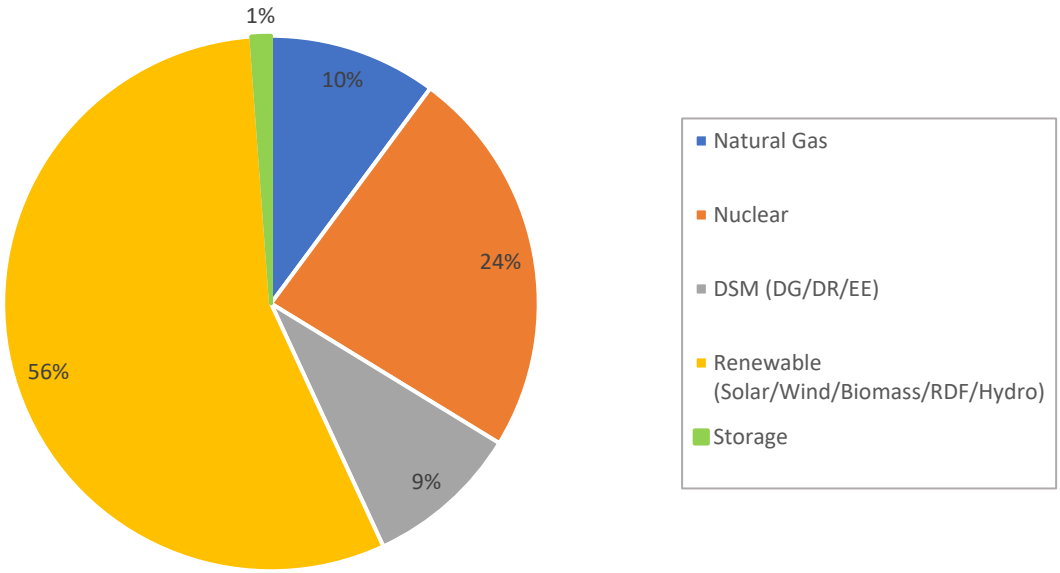
A. Five-Year Plan (2024-2030)

Our 2024 Plan does not identify any incremental capacity needs until 2027. However, from 2027 through 2030, our Preferred Plan contemplates adding over 6,000 MWs of incremental generation. Below, we discuss the near-term actions by resource type that underly our long-term plan, recognizing that the resource additions may need to be smoothed during the implementation process to create a portfolio of projects that can be constructed effectively within the constraints of the market for equipment and labor.

With our 2024 Plan, we are taking steps to transform our energy resource portfolio to include a robust mix of renewable resources, supported by firm dispatchable resources. We anticipate that by 2030, our forecasted energy mix, would match that

displayed in Figure 4-5, and models a nearly 88 percent reduction in CO_2 emissions from 2005 levels by 2030.

Figure 4-5: NSP System 2030 Preferred Plan Energy Mix



The details of this near-term resource mix and related action plan are provided below.

1. Wind

Our 2024 Plan proposes to add 3,200 MWs of wind additions through 2030. 2,800 MWs of the 3,200 MWs near-term wind total is assumed to utilize the MN Energy Connection Sherco Generation tie line. The remaining 400 MWs of generation is generic and non-location specific. We are pursuing 1,200 MWs of this wind through the recently approved MN Development Transfer Resource Acquisition Process to utilize the MN Energy Connection tie line. We would expect to begin further procurement activities and the proceedings for regulatory approval in the next year to ensure we have the necessary wind generation online before the capacity is needed through a Commission approved bidding process. To the extent we encounter opportunities to economically repower existing resources or if specific customer programs require specific procurements, we expect to pursue them and submit the plans for approval in separate proceedings.

2. Solar

Our 2024 Plan adds 400 MWs of solar using the King Interconnection in 2030. Beyond these additions, we do not include any new utility scale solar projects between 2024 through 2030, other than those already approved by the Commission and included in our Base Case.

One of the key components of our 2019 Plan was the Sherco Solar project. We are currently working on completing the Sherco Solar project, which will be constructed in two separate 230 MW AC blocks. The first block is scheduled to be completed in October 2024, and the second block in October 2025.

On the distributed solar side, we have incorporated forecasted growth into our 2024 Plan. We recognize the potential of distributed solar capacity and are committed to harnessing this potential to further our clean energy objectives. As measures of this, we have used as model assumptions the maximum possible level of non-legacy community solar gardens and levels of 3 percent distributed solar energy standard (DSES) solar that attain full compliance with the DSES by the 2030 requirement. Additionally, we also understand that the actual additions to customer-owned, behind the meter distributed solar capacity may exceed the forecasted amount included in our Preferred Plan and have thus included additional modeling examining higher levels of this resource.

3. Firm Dispatchable

Our 2024 Plan calls for 2,244 MWs of firm dispatchable resources by 2030. These resources are split between 748 MWs in 2027, 748 MWs in 2028, and 748 MWs in 2030. Approximately 374 MWs of the 2028 need is located on our re-optimized Sherco Generation tie line and is pending regulatory approvals from the Commission. The rest of the firm dispatchable additions are not location specific.

We have already opened a proceeding before the Minnesota Commission to consider up to 800 MWs of firm dispatchable resources.[3] The 800 MWs are included in the 2,244 MWs proposed in our Plan. However, our modeling for our 2024 Plan confirms a need exceeding 800 MWs of firm dispatchable resources. As part of the 800 MW proceeding, the Company has submitted three proposals totaling in excess of 800 MWs. Third party providers have also submitted their own proposals.

[3] Docket No. E002/CN-23-212

4. Battery Energy Storage Systems

We plan to add approximately 600 MWs of BESS by 2030. The 600 MWs of BESS is comprised of a modeled 480 MWs of generic storage in 2027, and 120 MWs as part of our re-optimized Sherco Generation tie line in 2029. We expect to solicit these resources as part of a request for proposals under a commission approved bidding process.

5. Nuclear Extension

In order to support our nuclear extensions to at least 2050, steps will need to be taken in the near future. We plan on filing a Certificate of Need with the Commission on February 7, 2024, for additional dry fuel storage to support continued operation of Prairie Island through 2053/2054. The concrete pad construction would occur over a 9–12-month period between 2027 and 2029 to support license extension and future dry fuel storage needs. By the end of 2026, we anticipate submitting our application for license renewal with the Nuclear Regulatory Commission to extend the Prairie Island Nuclear Generating Plant operating license from 2033/2034 to 2053/2054.

With respect to Monticello, the Commission recently approved, in August 2023, dry fuel storage expansion in support of a Subsequent License Renewal, which is currently pending review by the Nuclear Regulatory Commission. The concrete pad construction at Monticello would occur in 2026 over a 9-12-month duration with spent fuel loading occurring in 2028 to support license extension and future dry fuel storage needs. Shortly after a Commission decision on this 2024 Plan, we will also seek another Certificate of Need to support the additional 10-year life extension.

Throughout the planning process, we continue to collaborate with the Prairie Island Indian Community, the City of Red Wing, the City of Monticello, Goodhue County, Wright County, and other community interests to ensure transparency and continuous partnership.

6. Refuse Derived Fuel Waste to Energy Extension

Finally, all three of our renewable Refuse Derived Fuel (RDF) waste to energy generating plants are slated for retirement in 2027 and we plan to extend the life and operations of our Red Wing, Mankato, and French Island RDF plants to 2037, 2037, and 2040 respectively. These plants not only add significant value to our system and help us achieve our renewable energy goals with reliable power, but also provide value to the local communities they serve. We plan to address the extension of these plants

in our upcoming annual remaining lives filings. More about these plants, and the value they provide to their community is included in Appendix W: RDF Plants.

B. Long-Term Plan

In addition to our immediate five-year action plan, our long-term 2024 Plan relies on model-selected resources in the 2031-2040 planning period that we envision could be part of our energy future including:

- Adding an additional 1,100 MWs of incremental utility-scale solar;
- Adding an additional 5,200 MWs of incremental wind and repowering existing wind resources when economical;
- Adding an additional 1,500 MWs of incremental Battery Energy Storage Systems;
- Adding approximately 1,347 MWs of incremental firm dispatchable resources;
- Developing additional regional transmission infrastructure;
- Growing our DR portfolio to approximately 1,385 MW by 2040; and
- Continuing plans to achieve average annual energy savings, through our energy efficiency programs between 2031-2040.

Our 2024 Plan presents a pathway to 2040 to meet Minnesota's 100 percent carbon free by 2040 law. While these modeled additions project what our system would look like in 2040, we note that ingenuity, new technologies, and transmission will be necessary in order to ensure we can achieve our longer-term goals of 100 percent carbon-free electricity across the NSP system by 2050.

While our 2024 Plan examines the generation side of the equation, the Company is working on creating a long-term Vision study to examine the 2040 and 2050 timeframes to determine what transmission investments might be needed to achieve a 100 percent carbon-free energy plan. The study will include a comprehensive look at load growth, including varying electrification and adoption rates, generation profiles and locational data, and finally transmission needed to accommodate the future carbon goals. We look forward to leveraging these studies to inform our planning as they become available.

IV. PUBLIC INTEREST ANALYSIS

Based on our detailed analysis, we conclude that the 2024 Plan is in the public interest. We believe it best balances our goals to ensure reliability, achieve significant carbon reduction, and maintain reasonable costs to customers.

The Commission's rules identify the factors that the Commission must consider when determining if the 2024 Plan is in the public interest.[4] Specifically, these rules require that resource options and resource plans are to be evaluated on their ability to:

- Maintain or improve the adequacy and reliability of utility service;
- Keep the customers' bills and the utility rates as low as practicable, given regulatory and other constraints;
- Minimize adverse socioeconomic effects and adverse effects upon the environment;
- Enhance the utility's ability to respond to changes in the financial, social, and technological factors affecting its operations; and
- Limit the risk of adverse effects on the utility and its customers from financial, social, and technological factors that the utility cannot control.

By planning ahead and charting an orderly, gradual transition of our generation fleet, we believe our 2024 Plan achieves all of these goals while managing the impacts to our communities and employees, preserving the reliability and stability of our system, and maintaining affordability for our customers. As set forth in more detail below, we believe our 2024 Plan is in the public interest and merits Commission approval.

A. Reliability

The 2024 Plan aims to provide safe and reliable service amidst the retirement of baseload units and the addition of variable renewable generation capacity. Challenges in planning for reliability are presented by the new seasonal MISO Resource Adequacy construct, the increase in intermittent resources, and the uncertainty in future capacity accreditation and Planning Reserve Margins. The future accreditation of resources, crucial for investments in solar and storage resources, is particularly challenging due to its dependence on the installed capacity of all resource types across the MISO system.

In this 2024 Plan, we used an updated analytical approach to design a plan that addresses these challenges. It both ensures we have sufficient resources to meet our customers' needs and positions us to be able to comply with future changes to the MISO Resource Adequacy construct. We plan to meet customer needs with very limited reliance on neighboring systems and the broader MISO market. At the same time, we benefit from participation in the MISO market by incorporating the current planning assumptions and allowing for the economic dispatch of our resources within

[4] Minn. R. 7843.0500, subp. 3.

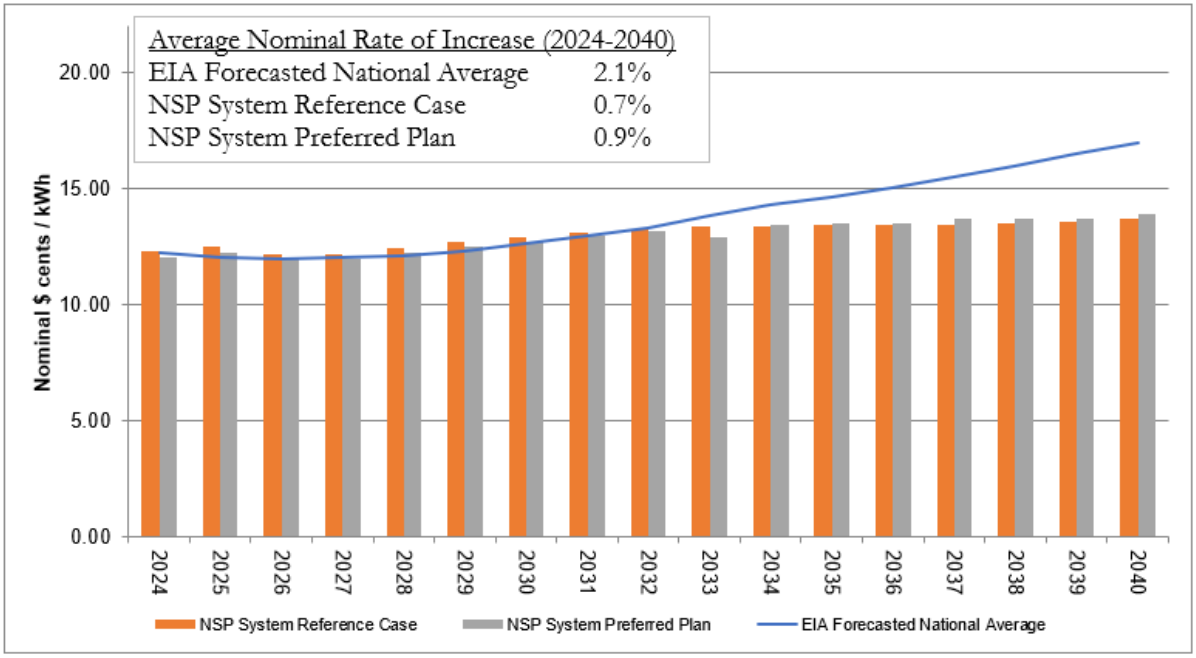
the broader region. As a result, our 2024 Plan is robust under changing assumptions and provides a path to transition our system while maintaining the reliable system our customers expect. For further detail on our reliability stress tests, see Appendix D: Energy Adequacy Analysis.

B. Impact to Customer Bills

The opportunity to achieve significant reductions in our carbon emissions for a nominal increase in cost is one of the principal benefits of our 2024 Plan. By leveraging technological advancements and financial savings from recent policies such as the IRA, we are able to present a 2024 Plan that achieves significant carbon reductions at a nominal customer cost of less than one percent annual increase in retail rates compared to the EIA forecasted national average electricity rate increase of over two percent. In other words, we can achieve significant CO_2 emissions reductions, with cost impacts that are less than half of the expected national average increase in electricity prices.

Figure 4-6 shows the relative cost growth of our 2024 Plan in comparison to the national average.

Figure 4-6: Preferred Plan Average Rate Impact for the NSP System



While there is a cost to add the resources the Company needs over the next 15 years to continue providing safe and reliable service, to comply with state energy

requirements, and to address plant retirements and PPA expirations, the cost is modest and appropriate in light of the benefits. For further details about the rate impact analysis, please see Chapter 6: Customer Rate and Cost Impacts.

C. Environmental Effects

Minimizing and addressing environmental effects is foundational to our 2024 Plan. In particular, our 2024 Plan increases the share of clean generating resources which can significantly and cost-effectively reduce the negative impacts like air and water pollution, land use, and associated environmental compliance cost. All NSP coal units are scheduled to cease operation by December 31, 2030, and we are replacing those resources primarily with new renewable resources and extended nuclear generation resources. This will lead to an increased share of clean energy supply, including utility-scale renewables and energy storage, and clean DERs, resulting in environmental and health benefits for the communities in which we work and that we serve. Our 2024 Plan also charts a path to meet Minnesota's 100 x 2040 law, to meet our own aggressive decarbonization goals, and to comply with EPA standards. A full discussion of the environmental regulations impacting planning can be found in Appendix K: Environmental Regulations Review.

D. Socioeconomic Impacts

We acknowledge that phasing out some of our legacy generation assets has a significant impact on the economies of the communities where those plants are located and the employees who work in those facilities. We will continue to make efforts to draw new development to locations where our current units have been or will be retired and to support our employees, consistent with our past practices, by working with those impacted to transition to new positions. Additional details of these efforts can be found in Appendix O and O1: 2023 Workforce Transition Plan.

Our plan to promote clean and distributed resources generates socioeconomic benefits, by preserving jobs with our nuclear fleet and creating jobs throughout renewable development and construction. We are also committed to working with our communities and stakeholders to ensure meaningful opportunities for them to participate in the process. Additional details can be found in Appendix R: Equity.

E. Flexibility to Respond to Change

Our 2024 Plan positions the Company to meet near-term needs and create flexibility for the future. Planning constructs, federal and state policy changes, and technology

development, cost, and adoption all create uncertainty, which led us to prioritize strategic flexibility in our 2024 Plan. With this diverse mix of resources, our system will not be overly reliant on any one fuel source, and we will continue to ensure reliability, while retaining the flexibility to consider the economics of new resources as our baseload plants retire. For example, we have left open our firm and dispatchable capacity needs in our long-term plan, recognizing that the technology landscape is rapidly changing, and new options may be more economically favorable than natural gas at that time. This flexibility enhances our ability to respond to changes in our planning landscape that could affect our operations during the planning period and preserves some agility for us to respond and adapt.

F. Limiting Risks

The Preferred Plan addresses major risks by maintaining portfolio diversity, retaining optionality and effectively managing market exposure. The Plan incorporates significant capacity additions to replace retiring resources and expiring PPAs, consisting of a diverse portfolio of DSM, nuclear and RDF extension, solar, wind, and firm dispatchable resource additions. Further, ensuring we do not become too dependent on a single fuel source mitigates risk.

We also have evaluated factors such as energy market exposure and portfolio length. All of our baseload scenarios show high levels of market interaction but are not overly reliant on the market to serve customer load.

V. CONCLUSION

Our Preferred Plan builds upon the efforts approved in our 2019 Plan and aligns with state and federal energy policies. The plan includes significant additions of renewable resources, investments in energy storage systems, extension of our nuclear fleet's life, and an increase in Energy Efficiency and Demand Response resources. It also includes the necessary firm dispatchable resources—modeled to provide less than 5 percent of our system's energy by 2040—necessary to maintain reliability as we continue to pursue the clean energy transition. By leveraging existing grid connections, proven technologies, and emerging technologies like battery storage, we aim to provide a balanced mix of resources.

We have considered the average annual rate impact on our customers and engaged with stakeholders and the community to refine our Plan. Our planning objectives are centered on balancing service reliability, affordability, environmental impacts, and equitable community investment. This strategy reflects our commitment to leading the

charge in the clean energy transition while ensuring that our energy remains clean, reliable, and affordable for our customers. Our 2024 Plan presents the best path forward for the Company, our customers, and the energy future of our Upper Midwest system, and is thus in the public interest. We look forward to the implementation of the 2024 Plan and the positive impacts it will have on our energy system and the broader community.

Table 4-1-Preferred Plan UCAP Load and Resources, 2024-2040 Planning Period, Summer Season

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
System Needs: Summer																	
Forecasted gross load	10,735	10,769	11,087	11,361	11,468	11,489	11,550	11,518	11,621	11,671	11,757	11,817	11,920	11,954	12,047	12,148	12,226
Adjustment to Load from non-bundled Energy Efficiency	(1,347)	(1,277)	(1,195)	(1,132)	(1,072)	(1,004)	(927)	(839)	(772)	(718)	(623)	(524)	(482)	(461)	(482)	(513)	(602)
Adjustment to Load from EVs and Beneficial Electrification	20	35	54	81	115	158	213	361	482	620	768	919	1,058	1,193	1,324	1,453	1,578
Forecasted Net Load	9,408	9,526	9,946	10,311	10,511	10,643	10,835	11,040	11,331	11,573	11,902	12,212	12,496	12,686	12,890	13,088	13,202
MISO System Coincidence	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%	92.24%
Coincident Load	8,678	8,787	9,174	9,511	9,695	9,817	9,994	10,183	10,452	10,675	10,979	11,264	11,526	11,702	11,890	12,073	12,178
MISO Planning Reserve Margin (UCAP)	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
NSP Obligation (Summer)	**9,459**	**9,578**	**10,000**	**10,367**	**10,568**	**10,700**	**10,894**	**11,100**	**11,393**	**11,636**	**11,967**	**12,278**	**12,564**	**12,755**	**12,960**	**13,159**	**13,274**
Preferred Plan Existing & Approved Resources (Seasonal Accredited Capacity, Summer)																	
Demand Response, Existing	1,011	1,015	1,019	1,021	1,021	1,020	1,016	1,012	1,008	1,004	1,001	997	993	989	985	982	978
Coal	1,475	1,475	1,475	883	883	461	461	0	0	0	0	0	0	0	0	0	0
Nuclear	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,747	1,747
Natural Gas/Oil	4,020	3,719	3,962	3,962	3,445	3,117	2,843	2,727	2,433	2,433	2,433	2,433	2,433	2,433	2,433	2,119	2,119
Biomass/RDF	110	61	61	61	61	61	61	61	61	61	61	38	38	38	7	7	7
Storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro	659	170	169	169	169	169	169	169	100	97	80	78	72	70	70	70	70
Wind	785	743	744	743	737	706	700	683	674	583	573	566	516	494	502	496	473
Solar (Utility-Scale System Resources)	147	259	464	396	362	329	296	262	256	249	242	236	207	201	195	189	183
Solar (Legacy CSGs)	438	367	341	233	214	195	176	157	153	150	147	143	170	165	160	155	150
Solar (Net Metered as of 2024)	121	84	57	52	47	40	36	33	33	32	29	28	27	28	27	26	24
Existing Resources	**10,513**	**9,641**	**10,039**	**9,268**	**8,687**	**7,845**	**7,505**	**6,852**	**6,465**	**6,357**	**6,313**	**6,267**	**6,204**	**6,165**	**6,127**	**5,792**	**5,753**
Summer Net Resource (Need)/Surplus After Existing & Approved Resources	**1,054**	**64**	**39**	**(1,099)**	**(1,881)**	**(2,855)**	**(3,388)**	**(4,248)**	**(4,927)**	**(5,279)**	**(5,654)**	**(6,011)**	**(6,360)**	**(6,590)**	**(6,832)**	**(7,367)**	**(7,521)**
Preferred Plan Incremental Distributed Resources (Seasonal Accredited Capacity, Summer)																	
Demand Response (Incremental)	177	178	179	179	179	178	177	175	174	172	171	169	168	166	165	163	162
Energy Efficiency (EE) Bundles	114	215	321	426	528	628	712	801	883	963	1,047	1,125	1,094	1,077	1,060	1,023	988
Solar (Non-Legacy CSGs)	8	40	74	102	118	130	137	140	150	159	168	176	183	190	196	201	206
Solar (Net Metered Installed after 2024)	0	18	25	33	41	49	53	56	63	71	81	88	93	97	102	107	115
Solar (3% Distributed Solar Energy Standard)	0	0	0	21	78	107	128	114	114	114	114	113	113	112	112	111	110
Incremental Distributed Resources Brought Forth in This Plan	**299**	**451**	**598**	**761**	**944**	**1,092**	**1,208**	**1,285**	**1,383**	**1,479**	**1,580**	**1,671**	**1,651**	**1,643**	**1,634**	**1,605**	**1,581**
Summer Net Resource (Need)/Surplus Even After Additional Distributed Resources	**1,353**	**514**	**637**	**(338)**	**(937)**	**(1,763)**	**(2,181)**	**(2,963)**	**(3,544)**	**(3,800)**	**(4,074)**	**(4,340)**	**(4,709)**	**(4,947)**	**(5,198)**	**(5,762)**	**(5,940)**
Preferred Plan Resource Additions (Seasonal Accredited Capacity, Summer)																	
Solar (Utility-Scale System Resources)	0	0	0	0	0	0	103	161	201	328	319	310	301	292	283	275	266
Storage	0	0	0	425	417	512	502	689	1,006	1,079	1,154	1,177	1,256	1,615	1,873	2,024	2,062
Firm Dispatchable	0	0	0	629	1,257	1,257	1,886	1,886	2,086	2,086	2,086	2,086	2,400	2,714	2,714	3,029	3,029
Wind	0	0	0	72	433	577	576	720	819	915	974	998	1,054	1,109	1,162	1,214	1,361
Preferred Plan Resource Additions	**0**	**0**	**0**	**1,126**	**2,107**	**2,346**	**3,067**	**3,455**	**4,111**	**4,407**	**4,533**	**4,571**	**5,011**	**5,730**	**6,033**	**6,541**	**6,718**
Projected Net Position (Need)/Surplus	**1,353**	**514**	**637**	**787**	**1,170**	**582**	**887**	**492**	**568**	**608**	**459**	**230**	**302**	**783**	**834**	**779**	**778**

Table 4-2-Preferred Plan UCAP Load and Resources, 2024-2040 Planning Period, Fall Season

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
System Needs: Fall																	
Forecasted gross load	8,809	8,820	9,085	9,300	9,328	9,338	9,357	9,370	9,286	9,310	9,343	9,386	9,402	9,435	9,478	9,515	9,295
Adjustment to Load from non-bundled Energy Efficiency	(1,302)	(1,226)	(1,156)	(1,089)	(1,027)	(965)	(892)	(818)	(736)	(673)	(581)	(501)	(458)	(442)	(461)	(482)	(562)
Adjustment to Load from EVs and Beneficial Electrification	21	39	58	87	121	168	224	298	509	648	802	951	1,089	1,225	1,356	1,485	1,882
Forecasted Net Load	7,528	7,633	7,987	8,299	8,423	8,540	8,689	8,850	9,060	9,285	9,564	9,836	10,034	10,218	10,373	10,517	10,616
MISO System Coincidence	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%	92.67%
Coincident Load	6,976	7,073	7,401	7,690	7,805	7,914	8,053	8,201	8,396	8,605	8,863	9,115	9,298	9,469	9,612	9,747	9,838
MISO Planning Reserve Margin (UCAP)	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%
NSP Obligation (Fall)	**7,967**	**8,078**	**8,452**	**8,782**	**8,914**	**9,038**	**9,196**	**9,365**	**9,588**	**9,826**	**10,121**	**10,410**	**10,618**	**10,814**	**10,977**	**11,131**	**11,235**
Preferred Plan Existing & Approved Resources (Seasonal Accredited Capacity, Fall)																	
Demand Response, Existing	759	762	764	766	766	765	763	760	757	754	752	749	746	744	741	739	736
Coal	1,505	1,505	1,505	872	872	455	455	0	0	0	0	0	0	0	0	0	0
Nuclear	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796
Natural Gas/Oil	3,810	3,726	3,726	3,726	2,938	2,938	2,644	2,533	2,235	2,235	2,235	2,235	2,235	2,235	2,235	1,953	1,953
Biomass/RDF	90	57	57	57	57	57	57	57	57	57	57	37	37	37	7	7	7
Storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro	659	169	169	169	169	169	169	169	100	97	80	78	72	70	70	70	70
Wind	989	925	918	904	888	841	825	794	751	696	691	649	637	616	633	633	611
Solar (Utility-Scale System Resources)	66	137	262	251	239	228	216	205	207	208	210	211	192	193	194	195	196
Solar (Legacy CSGs)	194	172	154	148	141	135	129	123	124	125	127	128	158	158	159	160	161
Solar (Net Metered as of 2024)	90	56	34	33	31	28	26	25	26	26	25	25	25	26	27	27	25
Existing Resources	**9,956**	**9,306**	**9,385**	**8,721**	**7,898**	**7,413**	**7,081**	**6,461**	**6,053**	**5,995**	**5,972**	**5,908**	**5,898**	**5,875**	**5,862**	**5,579**	**5,555**
Fall Net Resource (Need)/Surplus After Existing & Approved Resources	**1,990**	**1,228**	**933**	**(62)**	**(1,016)**	**(1,625)**	**(2,115)**	**(2,904)**	**(3,535)**	**(3,832)**	**(4,150)**	**(4,501)**	**(4,721)**	**(4,939)**	**(5,116)**	**(5,552)**	**(5,680)**
Preferred Plan Incremental Distributed Resources (Seasonal Accredited Capacity, Fall)																	
Demand Response (Incremental)	97	97	97	98	97	97	96	95	94	93	92	91	90	89	88	87	86
Energy Efficiency (EE) Bundles	116	218	325	432	536	637	723	812	895	976	1,061	1,139	1,108	1,091	1,073	1,036	1,000
Solar (Non-Legacy CSGs)	4	23	45	65	78	90	101	110	121	133	145	157	169	182	195	207	220
Solar (Net Metered Installed after 2024)	0	12	15	21	27	34	39	43	50	59	69	77	84	92	98	109	120
Solar (3% Distributed Solar Energy Standard)	0	0	0	13	52	74	94	89	92	95	98	101	105	108	111	115	118
Incremental Distributed Resources Brought Forth in This Plan	**217**	**351**	**483**	**628**	**790**	**932**	**1,052**	**1,149**	**1,252**	**1,356**	**1,465**	**1,566**	**1,556**	**1,561**	**1,565**	**1,553**	**1,545**
Fall Net Resource (Need)/Surplus Even After Additional Distributed Resources	**2,207**	**1,579**	**1,416**	**566**	**(226)**	**(693)**	**(1,063)**	**(1,755)**	**(2,283)**	**(2,475)**	**(2,684)**	**(2,935)**	**(3,164)**	**(3,377)**	**(3,551)**	**(3,998)**	**(4,135)**
Preferred Plan Resource Additions (Seasonal Accredited Capacity, Fall)																	
Solar (Utility-Scale System Resources)	0	0	0	0	0	0	76	126	163	274	276	277	279	280	282	283	285
Storage	0	0	0	391	375	448	428	571	854	937	1,024	1,067	1,159	1,517	1,790	1,966	2,033
Firm Dispatchable	0	0	0	628	1,255	1,255	1,883	1,883	2,075	2,075	2,075	2,075	2,388	2,702	2,702	3,016	3,016
Wind	0	0	0	88	523	689	680	840	966	1,092	1,176	1,218	1,302	1,386	1,470	1,554	1,764
Preferred Plan Resource Additions	**0**	**0**	**0**	**1,107**	**2,153**	**2,393**	**3,067**	**3,420**	**4,058**	**4,378**	**4,551**	**4,637**	**5,129**	**5,886**	**6,244**	**6,819**	**7,098**
Projected Net Position (Need)/Surplus	**2,207**	**1,579**	**1,416**	**1,673**	**1,928**	**1,699**	**2,004**	**1,665**	**1,775**	**1,903**	**1,867**	**1,701**	**1,964**	**2,509**	**2,693**	**2,821**	**2,963**

Table 4-3-Preferred Plan UCAP Load and Resources, 2024-2040 Planning Period, Winter Season

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
System Needs: Winter																	
Forecasted gross load	7,660	7,791	8,047	8,156	8,177	8,208	8,243	8,275	8,252	8,308	8,101	8,126	8,129	8,427	8,464	8,534	8,256
Adjustment to Load from non-bundled Energy Efficiency	(1,067)	(958)	(903)	(880)	(805)	(782)	(727)	(671)	(599)	(541)	(446)	(383)	(350)	(360)	(380)	(388)	(439)
Adjustment to Load from EVs and Beneficial Electrification	20	56	81	101	154	171	234	309	493	661	986	1,156	1,315	1,325	1,480	1,640	1,912
Forecasted Net Load	6,612	6,889	7,225	7,377	7,526	7,596	7,750	7,913	8,146	8,428	8,641	8,899	9,094	9,392	9,565	9,786	9,728
MISO System Coincidence	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%	97.09%
Coincident Load	6,420	6,689	7,015	7,163	7,307	7,375	7,524	7,683	7,909	8,183	8,390	8,640	8,829	9,119	9,286	9,501	9,445
MISO Planning Reserve Margin (UCAP)	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%
NSP Obligation (Winter)	**8,179**	**8,522**	**8,937**	**9,125**	**9,309**	**9,396**	**9,586**	**9,788**	**10,076**	**10,425**	**10,689**	**11,007**	**11,249**	**11,617**	**11,831**	**12,105**	**12,033**
Preferred Plan Existing & Approved Resources (Seasonal Accredited Capacity, Winter)																	
Demand Response, Existing	441	443	445	447	447	447	447	447	447	447	447	447	447	446	446	446	446
Coal	1,562	1,562	1,562	938	938	469	469	0	0	0	0	0	0	0	0	0	0
Nuclear	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,826	1,826
Natural Gas/Oil	4,372	4,372	4,204	4,204	3,997	3,255	3,255	2,753	2,753	2,480	2,480	2,480	2,480	2,480	2,480	2,480	2,131
Biomass/RDF	96	52	52	52	52	52	52	52	52	52	52	29	29	29	7	7	7
Storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro	610	610	169	169	169	169	169	169	100	100	80	80	72	72	70	70	70
Wind	2,146	1,641	1,685	1,596	1,573	1,488	1,470	1,426	1,392	1,193	1,154	1,109	1,073	928	923	892	831
Solar (Utility-Scale System Resources)	1	28	58	50	42	34	27	19	11	23	34	45	56	60	70	80	89
Solar (Legacy CSGs)	5	41	34	29	25	20	16	11	7	14	20	27	34	50	57	65	73
Solar (Net Metered as of 2024)	0	52	6	7	6	5	4	3	2	3	5	7	8	10	11	13	14
Existing Resources	**11,059**	**10,627**	**10,041**	**9,318**	**9,075**	**7,766**	**7,734**	**6,706**	**6,589**	**6,137**	**6,097**	**6,049**	**6,025**	**5,901**	**5,890**	**5,878**	**5,487**
Winter Net Resource (Need)/Surplus After Existing & Approved Resources	**2,880**	**2,106**	**1,104**	**193**	**(234)**	**(1,630)**	**(1,851)**	**(3,082)**	**(3,487)**	**(4,288)**	**(4,592)**	**(4,958)**	**(5,224)**	**(5,716)**	**(5,941)**	**(6,227)**	**(6,546)**
Preferred Plan Incremental Distributed Resources (Seasonal Accredited Capacity, Winter)																	
Demand Response (Incremental)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy Efficiency (EE) Bundles	130	243	363	482	597	710	805	904	997	1,087	1,179	1,265	1,230	1,211	1,191	1,150	1,110
Solar (Non-Legacy CSGs)	0	6	10	13	14	14	12	10	7	14	23	33	45	57	70	85	100
Solar (Net Metered Installed after 2024)	0	11	3	5	5	6	6	5	3	7	14	21	28	35	43	53	71
Solar (3% Distributed Solar Energy Standard)	0	0	0	3	9	11	12	8	5	10	16	22	28	34	40	47	54
Incremental Distributed Resources Brought Forth in This Plan	**130**	**260**	**375**	**503**	**625**	**741**	**835**	**927**	**1,012**	**1,119**	**1,232**	**1,341**	**1,331**	**1,337**	**1,344**	**1,335**	**1,335**
Winter Net Resource (Need)/Surplus Even After Additional Distributed Resources	**3,010**	**2,366**	**1,480**	**696**	**392**	**(889)**	**(1,016)**	**(2,155)**	**(2,475)**	**(3,168)**	**(3,359)**	**(3,617)**	**(3,893)**	**(4,380)**	**(4,596)**	**(4,892)**	**(5,211)**
Preferred Plan Resource Additions (Seasonal Accredited Capacity, Winter)																	
Solar (Utility-Scale System Resources)	0	0	0	0	0	0	9	12	9	30	44	59	73	88	102	116	129
Storage	0	0	0	433	425	521	512	702	984	1,052	1,122	1,142	1,214	1,557	1,802	1,943	1,974
Firm Dispatchable	0	0	0	598	1,197	1,197	1,795	1,795	1,976	1,976	1,976	1,976	2,275	2,574	2,574	2,873	2,873
Wind	0	0	0	156	928	1,224	1,210	1,496	1,702	1,867	1,949	1,955	2,021	2,079	2,128	2,168	2,369
Preferred Plan Resource Additions	**0**	**0**	**0**	**1,187**	**2,549**	**2,942**	**3,526**	**4,006**	**4,671**	**4,924**	**5,091**	**5,131**	**5,584**	**6,298**	**6,606**	**7,100**	**7,346**
Projected Net Position (Need)/Surplus	**3,010**	**2,366**	**1,480**	**1,883**	**2,941**	**2,053**	**2,510**	**1,851**	**2,195**	**1,756**	**1,731**	**1,514**	**1,691**	**1,918**	**2,009**	**2,207**	**2,135**

Table 4-4-Preferred Plan UCAP Load and Resources, 2024-2040 Planning Period, Spring Season

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
System Needs: Spring																	
Forecasted gross load	8,137	8,181	8,473	8,699	8,809	8,712	8,697	8,737	8,786	8,789	8,840	8,699	8,753	8,785	8,801	8,839	8,843
Adjustment to Load from non-bundled Energy Efficiency	(1,108)	(1,062)	(1,012)	(949)	(961)	(808)	(738)	(687)	(635)	(569)	(488)	(401)	(375)	(366)	(385)	(394)	(459)
Adjustment to Load from EVs and Beneficial Electrification	14	24	39	57	107	113	200	265	353	459	571	887	1,026	1,158	1,287	1,412	1,534
Forecasted Net Load	7,043	7,143	7,500	7,808	7,955	8,018	8,158	8,314	8,504	8,679	8,923	9,185	9,404	9,577	9,703	9,858	9,918
MISO System Coincidence	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%	95.61%
Coincident Load	6,733	6,830	7,171	7,465	7,606	7,666	7,800	7,949	8,131	8,298	8,531	8,782	8,991	9,157	9,277	9,425	9,483
MISO Planning Reserve Margin (UCAP)	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%
NSP Obligation (Spring)	**8,531**	**8,653**	**9,085**	**9,459**	**9,637**	**9,712**	**9,883**	**10,072**	**10,302**	**10,514**	**10,809**	**11,127**	**11,392**	**11,601**	**11,754**	**11,941**	**12,015**
Preferred Plan Existing & Approved Resources (Seasonal Accredited Capacity, Spring)																	
Demand Response, Existing	811	815	819	821	822	821	820	818	816	814	813	811	809	808	806	804	803
Coal	1,229	1,229	1,229	669	669	276	276	0	0	0	0	0	0	0	0	0	0
Nuclear	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821
Natural Gas/Oil	4,003	4,003	3,919	3,919	3,710	3,130	3,130	2,702	2,702	2,430	2,430	2,430	2,430	2,430	2,430	2,430	2,169
Biomass/RDF	87	53	53	53	53	53	53	53	53	53	53	36	36	36	8	8	8
Storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro	659	659	169	169	169	169	169	169	100	100	80	78	72	70	70	70	70
Wind	1,106	890	835	777	715	632	578	510	457	398	395	395	395	352	362	362	349
Solar (Utility-Scale System Resources)	157	90	180	182	185	187	189	191	193	186	178	171	163	141	134	127	121
Solar (Legacy CSGs)	483	112	106	107	109	111	112	114	116	112	108	104	100	116	110	105	99
Solar (Net Metered as of 2024)	119	131	53	26	25	25	25	26	27	25	24	23	21	21	21	19	17
Existing Resources	**10,476**	**9,803**	**9,185**	**8,545**	**8,279**	**7,226**	**7,174**	**6,405**	**6,285**	**5,940**	**5,902**	**5,869**	**5,849**	**5,795**	**5,762**	**5,747**	**5,457**
Spring Net Resource (Need)/Surplus After Existing & Approved Resources	**1,945**	**1,150**	**100**	**(914)**	**(1,357)**	**(2,486)**	**(2,708)**	**(3,667)**	**(4,016)**	**(4,574)**	**(4,907)**	**(5,258)**	**(5,543)**	**(5,806)**	**(5,993)**	**(6,195)**	**(6,558)**
Preferred Plan Incremental Distributed Resources (Seasonal Accredited Capacity, Spring)																	
Demand Response (Incremental)	109	109	110	110	110	110	109	109	108	107	107	106	105	105	104	104	103
Energy Efficiency (EE) Bundles	124	233	348	462	573	682	773	870	959	1,046	1,137	1,222	1,189	1,170	1,151	1,111	1,074
Solar (Non-Legacy CSGs)	3	15	31	47	60	74	88	102	113	119	123	127	130	133	134	135	136
Solar (Net Metered Installed after 2024)	0	29	24	17	22	31	38	45	53	58	68	71	74	75	78	79	85
Solar (3% Distributed Solar Energy Standard)	0	0	0	10	40	61	82	83	86	85	84	82	80	79	77	75	73
Incremental Distributed Resources Brought Forth in This Plan	**236**	**386**	**513**	**646**	**806**	**957**	**1,091**	**1,208**	**1,319**	**1,415**	**1,518**	**1,608**	**1,578**	**1,562**	**1,544**	**1,504**	**1,470**
Spring Net Resource (Need)/Surplus Even After Additional Distributed Resources	**2,181**	**1,537**	**612**	**(268)**	**(552)**	**(1,529)**	**(1,618)**	**(2,459)**	**(2,697)**	**(3,159)**	**(3,389)**	**(3,650)**	**(3,964)**	**(4,245)**	**(4,448)**	**(4,691)**	**(5,088)**
Preferred Plan Resource Additions (Seasonal Accredited Capacity, Spring)																	
Solar (Utility-Scale System Resources)	0	0	0	0	0	0	66	117	152	244	234	224	214	204	195	185	176
Storage	0	0	0	422	410	499	485	658	912	942	972	956	983	1,218	1,362	1,420	1,394
Firm Dispatchable	0	0	0	702	1,403	1,403	2,105	2,105	2,319	2,319	2,319	2,319	2,669	3,020	3,020	3,371	3,371
Wind	0	0	0	76	420	516	472	535	552	624	672	696	744	792	840	888	1,008
Preferred Plan Resource Additions	**0**	**0**	**0**	**1,199**	**2,233**	**2,418**	**3,127**	**3,415**	**3,935**	**4,130**	**4,196**	**4,195**	**4,610**	**5,235**	**5,417**	**5,864**	**5,949**
Projected Net Position (Need)/Surplus	**2,181**	**1,537**	**612**	**931**	**1,682**	**889**	**1,509**	**955**	**1,238**	**970**	**808**	**545**	**646**	**990**	**969**	**1,173**	**861**

Table 4-5-Preferred Plan ICAP Load and Resources, 2024-2040 Planning Period, Summer Season

ICAP Rating - Load and Resources 2024-2040 Planning Period																	
Determination of Need	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
							System Needs: Summer										
Forecasted Net Load	9,408	9,526	9,946	10,311	10,511	10,643	10,835	11,040	11,331	11,573	11,902	12,212	12,496	12,686	12,890	13,088	13,202
MISO System Coincidence	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Coincident Load	9,408	9,526	9,946	10,311	10,511	10,643	10,835	11,040	11,331	11,573	11,902	12,212	12,496	12,686	12,890	13,088	13,202
MISO Planning Reserve Margin (ICAP)	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%
Obligation (Summer)	**11,073**	**11,212**	**11,706**	**12,136**	**12,371**	**12,527**	**12,753**	**12,994**	**13,337**	**13,621**	**14,009**	**14,373**	**14,708**	**14,932**	**15,171**	**15,405**	**15,539**
Existing & Approved Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response, Existing	1,020	1,034	1,048	1,057	1,062	1,066	1,067	1,069	1,070	1,071	1,073	1,074	1,076	1,078	1,080	1,082	1,084
Coal	1,705	1,705	1,705	1,027	1,027	517	517	0	0	0	0	0	0	0	0	0	0
Nuclear	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,192	646	646	646	646	646	646
Natural Gas/Oil	4,687	4,617	4,478	4,478	4,244	3,538	3,538	3,031	3,031	2,733	2,733	2,733	2,733	2,733	2,733	2,733	2,372
Storage	0	0	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0
Biomass/RDF	128	70	70	70	70	70	70	70	70	70	70	44	44	44	12	12	12
Hydro	753	753	301	301	301	301	301	301	184	184	151	137	124	124	120	120	120
Wind	4,520	4,312	4,485	4,310	4,273	4,094	4,088	4,023	3,960	3,349	3,337	3,313	3,313	2,933	3,013	3,013	2,908
Solar (Utility-Scale System Resources)	1,315	1,968	3,487	3,671	3,814	3,956	4,096	4,236	4,336	4,432	4,529	4,627	4,725	4,729	4,826	4,923	5,019
Solar (Legacy CSGs)	881	877	872	868	864	859	855	851	846	842	838	834	830	825	821	817	813
Solar (Net Metered as of 2024)	171	151	150	149	148	148	147	146	145	145	144	143	142	142	141	140	140
Existing Resources	**16,918**	**17,224**	**18,345**	**17,679**	**17,551**	**16,297**	**16,427**	**15,475**	**15,391**	**14,574**	**14,077**	**13,562**	**13,634**	**13,255**	**13,393**	**13,486**	**13,113**
Summer Existing & Approved Net Resource (Need)/Surplus	**5,845**	**6,012**	**6,639**	**5,543**	**5,180**	**3,770**	**3,674**	**2,480**	**2,054**	**952**	**68**	**(811)**	**(1,074)**	**(1,677)**	**(1,779)**	**(1,919)**	**(2,426)**
Incremental Distributed Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response (Incremental)	231	234	236	238	239	239	238	238	237	236	236	235	235	234	234	233	233
Energy Efficiency (EE) Bundles	114	215	321	426	528	628	712	801	883	963	1,047	1,125	1,094	1,077	1,060	1,023	988
Solar (Non-Legacy CSGs)	0	100	199	298	377	455	533	610	667	724	780	836	892	948	1,003	1,058	1,113
Solar (Net Metered Installed after 2024)	0	37	76	109	149	210	254	288	326	375	477	520	567	580	609	667	787
Solar (3% Distributed Solar Energy Standard)	0	0	0	62	250	373	497	494	506	517	529	540	551	562	574	585	596
Incremental Distributed Resources Brought Forth in This Plan	**345**	**586**	**832**	**1,133**	**1,542**	**1,905**	**2,234**	**2,430**	**2,619**	**2,815**	**3,068**	**3,256**	**3,339**	**3,402**	**3,479**	**3,566**	**3,717**
Summer Net Resource (Need)/Surplus Even After Additional Distributed Resources	**6,191**	**6,597**	**7,471**	**6,676**	**6,722**	**5,675**	**5,908**	**4,910**	**4,673**	**3,768**	**3,136**	**2,445**	**2,265**	**1,725**	**1,701**	**1,647**	**1,291**
Preferred Plan Resource Additions / Retirements	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Solar (Utility-Scale System Resources)	0	0	0	0	0	0	400	698	895	1,490	1,483	1,475	1,468	1,460	1,453	1,446	1,439
Storage	0	0	0	480	480	600	600	840	1,200	1,260	1,320	1,320	1,380	1,740	1,980	2,100	2,100
Firm Dispatchable	0	0	0	662	1,323	1,323	1,985	1,985	2,196	2,196	2,196	2,196	2,526	2,857	2,857	3,188	3,188
Wind	0	0	0	400	2,400	3,200	3,200	4,000	4,600	5,200	5,600	5,800	6,200	6,600	7,000	7,400	8,400
Preferred Plan Resource Adjustments	**0**	**0**	**0**	**1,542**	**4,203**	**5,123**	**6,185**	**7,523**	**8,890**	**10,146**	**10,598**	**10,791**	**11,574**	**12,658**	**13,290**	**14,134**	**15,127**
Summer Preferred Plan Net Resource (Need)/Surplus	**6,191**	**6,597**	**7,471**	**8,217**	**10,925**	**10,799**	**12,093**	**12,433**	**13,563**	**13,913**	**13,734**	**13,235**	**13,839**	**14,383**	**14,991**	**15,781**	**16,418**

Table 4-6-Preferred Plan ICAP Load and Resources, 2024-2040 Planning Period, Fall Season

ICAP Rating - Load and Resources 2024-2040 Planning Period																		
Determination of Need	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
							System Needs: Fall										
Forecasted Net Load	7,528	7,633	7,987	8,299	8,423	8,540	8,689	8,850	9,060	9,285	9,564	9,836	10,034	10,218	10,373	10,517	10,616
MISO System Coincidence	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Coincident Load	7,528	7,633	7,987	8,299	8,423	8,540	8,689	8,850	9,060	9,285	9,564	9,836	10,034	10,218	10,373	10,517	10,616
MISO Planning Reserve Margin (ICAP)	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Obligation (Fall)	**9,425**	**9,556**	**9,999**	**10,390**	**10,545**	**10,692**	**10,879**	**11,080**	**11,343**	**11,625**	**11,974**	**12,315**	**12,562**	**12,793**	**12,987**	**13,168**	**13,291**
Existing & Approved Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response, Existing	734	747	759	767	772	776	779	781	784	787	790	792	796	799	802	805	809
Coal	1,705	1,705	1,705	1,027	1,027	517	517	0	0	0	0	0	0	0	0	0	0
Nuclear	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,192	646	646	646	646	646	646
Natural Gas/Oil	4,687	4,617	4,478	4,478	4,244	3,538	3,538	3,031	3,031	2,733	2,733	2,733	2,733	2,733	2,733	2,733	2,372
Storage	0	0	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0
Biomass/RDF	128	70	70	70	70	70	70	70	70	70	70	44	44	44	12	12	12
Hydro	753	753	301	301	301	301	301	301	184	184	151	137	124	124	120	120	120
Wind	4,520	4,312	4,485	4,310	4,273	4,094	4,088	4,023	3,960	3,349	3,337	3,313	3,313	2,933	3,013	3,013	2,908
Solar (Utility-Scale System Resources)	1,315	1,968	3,487	3,671	3,814	3,956	4,096	4,236	4,336	4,432	4,529	4,627	4,725	4,729	4,826	4,923	5,019
Solar (Legacy CSGs)	881	877	872	868	864	859	855	851	846	842	838	834	830	825	821	817	813
Solar (Net Metered as of 2024)	171	151	150	149	148	148	147	146	145	145	144	143	142	142	141	140	140
Existing Resources	**16,632**	**16,936**	**18,056**	**17,388**	**17,261**	**16,007**	**16,139**	**15,187**	**15,105**	**14,289**	**13,793**	**13,281**	**13,353**	**12,976**	**13,115**	**13,210**	**12,839**
Fall Existing & Approved Net Resource (Need)/Surplus	**7,206**	**7,380**	**8,057**	**6,998**	**6,715**	**5,314**	**5,259**	**4,108**	**3,762**	**2,664**	**1,820**	**966**	**791**	**183**	**128**	**42**	**(453)**
Incremental Distributed Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response (Incremental)	143	146	148	149	150	150	150	150	150	150	150	150	150	150	150	150	150
Energy Efficiency (EE) Bundles	116	218	325	432	536	637	723	812	895	976	1,061	1,139	1,108	1,091	1,073	1,036	1,000
Solar (Non-Legacy CSGs)	0	100	199	298	377	455	533	610	667	724	780	836	892	948	1,003	1,058	1,113
Solar (Net Metered Installed after 2024)	0	37	76	109	149	210	254	288	326	375	477	520	567	580	609	667	787
Solar (3% Distributed Solar Energy Standard)	0	0	0	62	250	373	497	494	506	517	529	540	551	562	574	585	596
Incremental Distributed Resources Brought Forth in This Plan	**259**	**501**	**748**	**1,050**	**1,460**	**1,826**	**2,156**	**2,354**	**2,544**	**2,742**	**2,996**	**3,184**	**3,268**	**3,331**	**3,409**	**3,495**	**3,646**
Fall Net Resource (Need)/Surplus Even After Additional Distributed Resources	**7,466**	**7,881**	**8,805**	**8,049**	**8,176**	**7,140**	**7,415**	**6,461**	**6,307**	**5,406**	**4,815**	**4,150**	**4,059**	**3,513**	**3,537**	**3,537**	**3,193**
Preferred Plan Resource Additions / Retirements	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Solar (Utility-Scale System Resources)	0	0	0	0	0	0	400	698	895	1,490	1,483	1,475	1,468	1,460	1,453	1,446	1,439
Storage	0	0	0	480	480	600	600	840	1,200	1,260	1,320	1,320	1,380	1,740	1,980	2,100	2,100
Firm Dispatchable	0	0	0	738	1,477	1,477	2,215	2,215	2,441	2,441	2,441	2,441	2,810	3,179	3,179	3,548	3,548
Wind	0	0	0	400	2,400	3,200	3,200	4,000	4,600	5,200	5,600	5,800	6,200	6,600	7,000	7,400	8,400
Preferred Plan Resource Adjustments	**0**	**0**	**0**	**1,618**	**4,357**	**5,277**	**6,415**	**7,753**	**9,135**	**10,391**	**10,843**	**11,036**	**11,858**	**12,980**	**13,612**	**14,494**	**15,487**
Fall Preferred Plan Net Resource (Need)/Surplus	**7,466**	**7,881**	**8,805**	**9,667**	**12,533**	**12,417**	**13,831**	**14,215**	**15,442**	**15,797**	**15,659**	**15,186**	**15,917**	**16,493**	**17,149**	**18,032**	**18,680**

Table 4-7-Preferred Plan ICAP Load and Resources, 2024-2040 Planning Period, Winter Season

ICAP Rating - Load and Resources 2024-2040 Planning Period																	
Determination of Need	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
							System Needs: Winter										
Forecasted Net Load	6,612	6,889	7,225	7,377	7,526	7,596	7,750	7,913	8,146	8,428	8,641	8,899	9,094	9,392	9,565	9,786	9,728
MISO System Coincidence	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Coincident Load	6,612	6,889	7,225	7,377	7,526	7,596	7,750	7,913	8,146	8,428	8,641	8,899	9,094	9,392	9,565	9,786	9,728
MISO Planning Reserve Margin (ICAP)	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%
Obligation (Winter)	**9,879**	**10,293**	**10,794**	**11,022**	**11,243**	**11,348**	**11,578**	**11,822**	**12,170**	**12,591**	**12,910**	**13,295**	**13,586**	**14,032**	**14,290**	**14,620**	**14,534**
Existing & Approved Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response, Existing	367	379	390	401	406	411	416	421	427	432	437	443	448	454	460	466	472
Coal	1,705	1,705	1,705	1,027	1,027	517	517	0	0	0	0	0	0	0	0	0	0
Nuclear	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,192	646	646	646	646	646	646
Natural Gas/Oil	4,687	4,617	4,478	4,478	4,244	3,538	3,538	3,031	3,031	2,733	2,733	2,733	2,733	2,733	2,733	2,733	2,372
Storage	0	0	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0
Biomass/RDF	128	70	70	70	70	70	70	70	70	70	70	44	44	44	12	12	12
Hydro	753	753	301	301	301	301	301	301	184	184	151	137	124	124	120	120	120
Wind	4,520	4,312	4,485	4,310	4,273	4,094	4,088	4,023	3,960	3,349	3,337	3,313	3,313	2,933	3,013	3,013	2,908
Solar (Utility-Scale System Resources)	1,315	1,968	3,487	3,671	3,814	3,956	4,096	4,236	4,336	4,432	4,529	4,627	4,725	4,729	4,826	4,923	5,019
Solar (Legacy CSGs)	881	877	872	868	864	859	855	851	846	842	838	834	830	825	821	817	813
Solar (Net Metered as of 2024)	171	151	150	149	148	148	147	146	145	145	144	143	142	142	141	140	140
Existing Resources	**16,265**	**16,568**	**17,687**	**17,023**	**16,895**	**15,642**	**15,776**	**14,828**	**14,748**	**13,934**	**13,441**	**12,931**	**13,006**	**12,631**	**12,773**	**12,871**	**12,501**
Winter Existing & Approved Net Resource (Need)/Surplus	**6,386**	**6,275**	**6,893**	**6,001**	**5,652**	**4,293**	**4,199**	**3,005**	**2,577**	**1,343**	**531**	**(364)**	**(580)**	**(1,401)**	**(1,517)**	**(1,750)**	**(2,033)**
Incremental Distributed Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response (Incremental)	41	43	45	47	48	48	49	50	51	52	53	54	55	56	57	57	58
Energy Efficiency (EE) Bundles	130	243	363	482	597	710	805	904	997	1,087	1,179	1,265	1,230	1,211	1,191	1,150	1,110
Solar (Non-Legacy CSGs)	0	100	199	298	377	455	533	610	667	724	780	836	892	948	1,003	1,058	1,113
Solar (Net Metered Installed after 2024)	0	37	76	109	149	210	254	288	326	375	477	520	567	580	609	667	787
Solar (3% Distributed Solar Energy Standard)	0	0	0	62	250	373	497	494	506	517	529	540	551	562	574	585	596
Incremental Distributed Resources Brought Forth in This Plan	**171**	**424**	**683**	**998**	**1,420**	**1,797**	**2,138**	**2,346**	**2,547**	**2,754**	**3,017**	**3,214**	**3,295**	**3,357**	**3,434**	**3,517**	**3,665**
Winter Net Resource (Need)/Surplus Even After Additional Distributed Resources	**6,557**	**6,699**	**7,576**	**6,999**	**7,072**	**6,090**	**6,336**	**5,351**	**5,124**	**4,098**	**3,548**	**2,851**	**2,715**	**1,956**	**1,917**	**1,767**	**1,632**
Preferred Plan Resource Additions / Retirements	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Solar (Utility-Scale System Resources)	0	0	0	0	0	0	400	698	895	1,490	1,483	1,475	1,468	1,460	1,453	1,446	1,439
Storage	0	0	0	480	480	600	600	840	1,200	1,260	1,320	1,320	1,380	1,740	1,980	2,100	2,100
Firm Dispatchable	0	0	0	748	1,496	1,496	2,244	2,244	2,470	2,470	2,470	2,470	2,844	3,218	3,218	3,592	3,592
Wind	0	0	0	400	2,400	3,200	3,200	4,000	4,600	5,200	5,600	5,800	6,200	6,600	7,000	7,400	8,400
Preferred Plan Resource Adjustments	**0**	**0**	**0**	**1,628**	**4,376**	**5,296**	**6,444**	**7,782**	**9,164**	**10,420**	**10,872**	**11,065**	**11,891**	**13,018**	**13,651**	**14,537**	**15,530**
Winter Preferred Plan Net Resource (Need)/Surplus	**6,557**	**6,699**	**7,576**	**8,627**	**11,448**	**11,386**	**12,780**	**13,133**	**14,288**	**14,517**	**14,420**	**13,916**	**14,606**	**14,974**	**15,568**	**16,304**	**17,162**

Table 4-8-Preferred Plan ICAP Load and Resources, 2024-2040 Planning Period, Spring Season

ICAP Rating - Load and Resources 2024-2040 Planning Period																	
Determination of Need	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
							System Needs: Spring										
Forecasted Net Load	7,043	7,143	7,500	7,808	7,955	8,018	8,158	8,314	8,504	8,679	8,923	9,185	9,404	9,577	9,703	9,858	9,918
MISO System Coincidence	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Coincident Load	7,043	7,143	7,500	7,808	7,955	8,018	8,158	8,314	8,504	8,679	8,923	9,185	9,404	9,577	9,703	9,858	9,918
MISO Planning Reserve Margin (ICAP)	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%
Obligation (Spring)	**9,916**	**10,058**	**10,560**	**10,994**	**11,201**	**11,289**	**11,487**	**11,707**	**11,974**	**12,220**	**12,564**	**12,933**	**13,241**	**13,484**	**13,662**	**13,879**	**13,965**
Existing & Approved Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response, Existing	683	696	709	719	725	729	733	737	741	745	749	753	757	761	766	770	775
Coal	1,705	1,705	1,705	1,027	1,027	517	517	0	0	0	0	0	0	0	0	0	0
Nuclear	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,192	646	646	646	646	646	646
Natural Gas/Oil	4,687	4,617	4,478	4,478	4,244	3,538	3,538	3,031	3,031	2,733	2,733	2,733	2,733	2,733	2,733	2,733	2,372
Storage	0	0	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0
Biomass/RDF	128	70	70	70	70	70	70	70	70	70	70	44	44	44	12	12	12
Hydro	753	753	301	301	301	301	301	301	184	184	151	137	124	124	120	120	120
Wind	4,520	4,312	4,485	4,310	4,273	4,094	4,088	4,023	3,960	3,349	3,337	3,313	3,313	2,933	3,013	3,013	2,908
Solar (Utility-Scale System Resources)	1,315	1,968	3,487	3,671	3,814	3,956	4,096	4,236	4,336	4,432	4,529	4,627	4,725	4,729	4,826	4,923	5,019
Solar (Legacy CSGs)	881	877	872	868	864	859	855	851	846	842	838	834	830	825	821	817	813
Solar (Net Metered as of 2024)	171	151	150	149	148	148	147	146	145	145	144	143	142	142	141	140	140
Existing Resources	**16,581**	**16,886**	**18,006**	**17,341**	**17,214**	**15,960**	**16,093**	**15,143**	**15,062**	**14,247**	**13,752**	**13,241**	**13,315**	**12,938**	**13,079**	**13,175**	**12,804**
Spring Existing & Approved Net Resource (Need)/Surplus	**6,665**	**6,828**	**7,446**	**6,347**	**6,013**	**4,671**	**4,606**	**3,436**	**3,088**	**2,027**	**1,189**	**308**	**74**	**(546)**	**(584)**	**(704)**	**(1,160)**
Incremental Distributed Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response (Incremental)	136	138	140	142	143	144	144	144	145	145	145	146	146	146	147	147	148
Energy Efficiency (EE) Bundles	124	233	348	462	573	682	773	870	959	1,046	1,137	1,222	1,189	1,170	1,151	1,111	1,074
Solar (Non-Legacy CSGs)	0	100	199	298	377	455	533	610	667	724	780	836	892	948	1,003	1,058	1,113
Solar (Net Metered Installed after 2024)	0	37	76	109	149	210	254	288	326	375	477	520	567	580	609	667	787
Solar (3% Distributed Solar Energy Standard)	0	0	0	62	250	373	497	494	506	517	529	540	551	562	574	585	596
Incremental Distributed Resources Brought Forth in This Plan	**260**	**508**	**763**	**1,073**	**1,491**	**1,864**	**2,200**	**2,405**	**2,603**	**2,807**	**3,068**	**3,263**	**3,345**	**3,407**	**3,484**	**3,568**	**3,717**
Spring Net Resource (Need)/Surplus Even After Additional Distributed Resources	**6,925**	**7,337**	**8,210**	**7,420**	**7,504**	**6,535**	**6,807**	**5,842**	**5,691**	**4,834**	**4,256**	**3,571**	**3,419**	**2,861**	**2,900**	**2,864**	**2,557**
Preferred Plan Resource Additions / Retirements	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Solar (Utility-Scale System Resources)	0	0	0	0	0	0	400	698	895	1,490	1,483	1,475	1,468	1,460	1,453	1,446	1,439
Storage	0	0	0	480	480	600	600	840	1,200	1,260	1,320	1,320	1,380	1,740	1,980	2,100	2,100
Firm Dispatchable	0	0	0	738	1,477	1,477	2,215	2,215	2,441	2,441	2,441	2,441	2,810	3,179	3,179	3,548	3,548
Wind	0	0	0	400	2,400	3,200	3,200	4,000	4,600	5,200	5,600	5,800	6,200	6,600	7,000	7,400	8,400
Preferred Plan Resource Adjustments	**0**	**0**	**0**	**1,618**	**4,357**	**5,277**	**6,415**	**7,753**	**9,135**	**10,391**	**10,843**	**11,036**	**11,858**	**12,980**	**13,612**	**14,494**	**15,487**
Spring Preferred Plan Net Resource (Need)/Surplus	**6,925**	**7,337**	**8,210**	**9,038**	**11,861**	**11,812**	**13,222**	**13,595**	**14,826**	**15,225**	**15,100**	**14,607**	**15,276**	**15,840**	**16,513**	**17,358**	**18,044**

CHAPTER 5 - ECONOMIC MODELING FRAMEWORK

I. INTRODUCTION

We have used the EnCompass Resource Planning model to perform our economic analysis since 2020. We use EnCompass as our primary resource planning software to estimate the costs of various resource expansion plan options, evaluate specific capacity alternatives, and measure the potential risks of new environmental legislation and other policy scenarios. EnCompass results are a decision support tool to guide development and selection of a Preferred Plan and test the robustness of the plan under a variety of assumptions and sensitivities.

To ultimately identify and refine our Preferred Plan presented in Chapter 4, we created three scenarios that examined different combinations and timing of baseload nuclear unit retirements, and the resulting size, type, and timing of new resources we would need to add in order to continue meeting customers' needs and achieve our 2030 carbon reduction goals. We refer to these scenarios as "baseload study scenarios." After this analysis was completed, we used the outcomes and sensitivity tests to select and refine a Preferred Plan. Finally, we conducted special studies on the Preferred Plan for a more thorough examination of specific issues not fully covered in the plan.

We discuss our assumptions, scenarios, sensitivities and how these inputs guided selection of our Preferred Plan in more detail below. This comprehensive analysis ultimately aligns with and reinforces our Preferred Plan.

II. BASE ASSUMPTIONS IN THE REFERENCE CASE

There are several assumptions included in our baseline data inputs that are common across all scenarios studied. These factors may, in some cases, be varied within sensitivities, but are largely kept constant across the default study of each scenario.

As discussed in Chapter 2: Planning Landscape, in 2023, the Minnesota Legislature amended the requirements set forth in Minn. Stat. § 216B.1691 to include additional milestones for renewable energy as well as creating new carbon-free energy standards (see Minn. Laws 2023, Ch. 7). Further, Minnesota's distributed solar energy standard (DSES) was amended at subdivision 2h of Minn. Stat. § 216B.1691. This amendment mandates that at least three percent of the Company's retail electric sales in Minnesota be generated from solar energy generating systems that meet certain eligibility criteria by 2030. While we did not include constraints to meet the required renewable energy

standard, solar energy standard, or carbon-free standard, we did include a modeling constraint to comply with the three percent DSES by 2030.[1]

Other important starting assumptions in our analysis include:

Load Forecast. The Company used discrete changes in assumptions for electric vehicles, large commercial and industrial customers, beneficial electrification, and rooftop solar to determine our load and energy forecasts under two alternatives to the base forecast, which is our most probable forecast of future load changes: the High and Low load sensitivities. We provide detailed descriptions of our load forecasting methodology and assumptions under each of our sensitivities in Appendix E: Load and Distributed Energy Resource Forecasting.

We also incorporated a seasonal planning reserve margin, per MISO requirements, as shown in Table 5-1. The modeled Planning Reserve Margin is based on the MISO Planning Year 2024-2025 assumptions, adjusted for the average coincidence factors in MISO Planning Year 2024-2025 and Planning Year 2023-2024. EnCompass determines an effective reserve margin based on our MISO coincident factor assumption. For summer 2024, the coincidence factor results in a reduction to net load of 730 MW.

Table 5-1: Seasonal Planning Reserve Margin

	Summer	Fall	Winter	Spring
MISO Planning Reserve Margin (PRM) PY24/25	9.00%	14.20%	27.40%	26.70%
Average Coincidence Factor	92.24%	92.67%	97.09%	95.61%

Existing Fleet. We develop forecasts to model our existing fleet's cost and performance assumptions (such as variable O&M, heat rate, forced outage rate, maintenance requirements, etc.) based on historical data, with adjustments for known future changes where applicable. Additional operational and performance assumptions include:

- Retirements of Sherburne County Generating Station (Sherco) Units 1 and 3 in 2026 and 2030, respectively, and retirement of the Allen S. King plant in 2028, as approved in our 2019 Plan;[2]

[1] Our plan complies with the renewable standards and the carbon-free standard as shown in Appendix N: Standard Obligations.
[2] Sherco Unit 2 was retired on December 31, 2023.

- Sherco Units 1 and King are dispatched economically through their respective retirement dates. Sherco 3 is jointly owned with Southern Municipal Power Agency (SMMPA). We are currently offering Sherco 3 as a must-run under our operating agreement with SMMPA. We will continue to work with SMMPA to identify opportunities to operate Sherco 3 more flexibly as the plant nears its end of life. Therefore, in the modeling, we have assumed Sherco 3 is offered as must-run through 2029 and offered on an economic basis in 2030.
- Retirement of all other facilities at their current expected end of life, if that is planned to occur within the resource planning period, unless we have specifically included costs of life extension (e.g. for nuclear units in scenarios that include life extension);
- Short-term PPA extensions for Mankato Energy Center and Cannon Falls, consistent with recently-executed agreements;
- Sherco and King generation tie lines reoptimized with a Combustion Turbine (CT) allowed for selection on the Sherco generation tie-line; and
- Continued operation of the Company's owned hydroelectric resources based on historical performance.

Major PPA expirations include:

- Manitoba Hydro: 835 MW in 2025
- Cottage Grove: 226 MW in 2027
- Mankato Energy Center: 314 MW in 2028
- Cannon Falls: 317 MW in 2028

Additional cost–related assumptions include:

- Costs are escalated based on corporate estimates of expected inflation rates,
- Costs associated with re-licensing the nuclear plants were developed for use in the Baseload Study modeling.

Renewable Energy. The addition of Sherco Solar 1, 2, and 3, Apple River Solar, and the Louise and Fillmore solar projects are included in our baseline assumptions. We also included small solar resources in our baseline assumptions.

In addition, we have assumed:

- Accreditation of wind, solar and battery resources based on the 2023-2024 MISO Planning Year seasonal accredited capacity. For years beyond 2024, the seasonal accredited capacity trends over multiple years to meet the assumptions in MISO's November 2022 Regional Resource Assessment (RRA).
- The costs used for wind, solar, and storage assets fully incorporate the Production Tax Credit (PTC) or Investment Tax Credit (ITC) in the Inflation Reduction Act (IRA). The IRA allows the transferability of tax credits, allows utilities to elect out from normalization for storage facilities, and allows owners of solar facilities to claim a PTC in lieu of the ITC, which is subject to normalization.
- The resources on the generation tie-lines to Sherco and King were allowed to re-optimize—meaning the model selected from an updated resource mix based on updated assumptions to maximize customer and system benefits. Wind, Solar, and a firm dispatchable resource were available for selection on the Sherco tie-line. Solar additions were available for selection on the King tie-line.

Markets. We have optimized resource additions in the EnCompass model to ensure that the portfolio of resources developed is capable of serving customer load across all hours by limiting access to the MISO market. The limited access is only applied to the resource optimization to avoid over reliance on MISO market purchases for reliability or sales for wholesale revenues. We allow the model to access the MISO market to dispatch resources and take advantage of the access to economic resources in the larger MISO market.

Wholesale electricity price forecasts. To derive the forecast of monthly On and Off-peak electricity prices, the Company uses a simple average of On and Off-peak power price forecasts provided by external analysts Wood Mackenzie and S&P Global. To generate hourly market prices, the Company uses the hourly energy price forecast from the Horizons Energy EnCompass National Database, specifically the energy prices at the MISO-ND-MN node and scales it to match the monthly On and Off-peak price forecasts.

Purchase and sales limits. In our EnCompass model, when we allow access to the MISO market, we include a limit on the amount of energy that we can either purchase from or sell to the MISO market. This limit was established in our 2019 Plan based on PROMOD modeling and historical transfer data. For 2024-2029, we have continued to assume a market interaction limit of 2,300 MWs. Further, we include a cap on

market sales of no more than 25 percent of retail sales consistent with the assumption used in our 2019 Plan. While significant transmission expansion projects are at various stages of development, as discussed in Appendix T: MISO Grid Congestion, we believe it is prudent to limit market exposure during this period of rapid energy transition as further discussed below.

Emissions rates and costs. Emission rates for existing and planned resources are consistent with historical and expected performance. We assume the following costs and apply them to emitting resources as relevant:

- For the regulatory cost of carbon, we use the regulatory cost range of $5-$75 per ton starting in 2028 and escalating at inflation. Our base assumption uses the mid-point of the regulatory cost of carbon range. The regulatory cost of carbon impacts the dispatch of resources in the Encompass modeling. The modeling optimizes the dispatch based on cost, and therefore the dispatch of emitting resources is reduced relative to a scenario where the regulatory cost is not included. Our projected carbon reduction of 88 percent by 2030 is based on modeling that includes the mid-point of the regulatory cost of carbon range.
- Externality costs are included based on United States Environmental Protection Agency's (EPA) September 2022 *External Review Draft of Report on the Social Cost of Greenhouse Gases*[3] (EPA SC-GHG) consistent with the Commission's Order,[4] for purposes of measuring environmental and socioeconomic costs under Minn. Stat. § 216B.2422, Subd. 3, with the base assumption using the mid-range values. To avoid double counting, we adjusted the EPA SC-GHG values for modeling purposes by subtracting the Regulatory Cost of Carbon from the EPA SC-GHG value starting in 2028. Additional combinations of externality and regulatory costs were included as sensitivity cases.

Generic Resources. EnCompass uses generically defined resources to meet future demand when our already existing and approved resources are not sufficient in a given year. Generic resources are modeled as incremental units of a certain installed capacity size. The ICAP values are provided below, and the UCAP, representing the MISO seasonal accredited capacity value the units would yield, is factored into the Encompass modeling process. For example, although the generic unit size for solar is 100 MW installed capacity, the resource adequacy or MISO capacity credit value we would expect to receive for a plant of that size is as little as 6.3 MWs in the winter for

[3] We understand the EPA finalized the draft SC-GHG values in November 2023.
[4] Order in Docket Nos. E-999CI-07-1199, E-999/DI-22-236, E-999/CI-14-463. December 19, 2023.

Planning Year 2023-2024.

Generic units ICAP values included in modeling are as follows:[5]

- 374 MW gas-fired CT unit,
- 225 MW gas-fired CT unit,
- 108 MW reciprocating engine peaking unit (RICE),
- 60 MW utility scale battery,
- 200 MW wind project,
- 100 MWdc utility scale solar, and
- 130 MWdc solar + 60 MWac battery, 100 MWac inverter.

Appendix F: EnCompass Modeling Assumptions & Inputs, provides more detail on modeling assumptions. Please see Appendix H: Resource Options, for additional discussion on supply-side resource options included in the analysis.

Customer Programs. Incremental customer programs for Demand Response (DR) and Energy Efficiency (EE) were included as potential resources in the EnCompass model. The derivation of these six DR and three EE "Bundles" is described in Appendix J: Distributed Energy Resources. It is important to note that these Bundles represent generic Demand-Side Management (DSM) additions and therefore may not perfectly align with the size and timing of actual DR or EE additions to the system in the future.

III. SCENARIOS

We created three scenarios to examine combinations and timing of baseload nuclear unit retirements (our only remaining baseload units after Sherco and King retire by the end of this decade), and the resulting size, type, and timing of new resources we would need to add to continue meeting customers' needs and achieve our 2030 carbon reduction goals. We describe key parameters of these scenarios below.

[5] The cost and performance data for these units are based on consultant's estimates, publicly available third-party data, and internal company data. Availability dates are selected based on our estimates of the lead time needed for regulatory approvals, financing, permitting and construction.

A. Reference Case Scenario

We describe the development of our Reference Case in Chapter 3: Minimum System Needs. The Reference Case (Scenario 1) is an extension of our approved 2019 Plan,[6] in that all of the baseload units retire at their currently scheduled retirement dates, and it serves as our starting point. The Reference Case includes the following underlying assumptions:

- Approved resources, including: Sherco Solar 1, 2, and 3; Apple River, Louise and Fillmore solar projects; Wheaton Repower.[7]
- Extension of our Refuse Derived Fuel Waste to Energy Generating Plants.
- Short-term PPA extensions include: Mankato Energy Center and Cannon Falls.
- Sherco and King Tie-Line reoptimized.
- CT allowed for selection on Sherco Tie-Line.
- Optimized without market purchases/sales.
- Dispatched with access to MISO market.

Additional resource options are evaluated and optimized in the modeling and added when economic. These resource options include wind, solar, storage, combustion turbines, and reciprocating engines, as described in Appendix F: EnCompass Modeling Assumptions & Inputs.

To determine the optimal strategy regarding the future of the baseload nuclear fleet, we developed two additional scenarios with varying combinations of nuclear retirement dates. The resulting system needs were then met with an EnCompass model-optimized portfolio of new resources. Internal finance, energy supply, and nuclear subject matter experts worked to develop a robust set of assumptions and potential retirement dates for the nuclear retirements. These input assumptions include: ongoing capital expenditures, O&M expenses, and decommissioning and/or life extension costs. We also incorporated planning level estimates from a "leave behind" study conducted by the Company to determine the transmission system impacts of the nuclear plants' retirement to inform our Preferred Plan.

[6] July 25, 2021 Reply Comments, Docket No. E002/RP-19-368.
[7] Wheaton Repower is subject to approval by the Public Service Commission of Wisconsin.

B. Prairie Island Extension Scenario

For the Prairie Island extension scenario (Scenario 2), the Prairie Island 1 and 2 retirement date extends from 2033/2034 to 2053/2054. The Monticello retirement date is unchanged. This scenario is designed to test the economics of re-licensing Prairie Island and extending the operational life by 20 years.

C. Extend All Nuclear Scenario

For the "extend all nuclear" scenario (Scenario 3), the Prairie Island 1 and 2 retirement date extends from 2033/2034 to 2053/2054, and the Monticello retirement date extends from 2040 to 2050. This scenario is designed to test the economics of re-licensing both Prairie Island 1 and 2 and Monticello, extending the operational life of Prairie Island by 20 years and Monticello by 10 years.

IV. MARKET ACCESS AND RELIABILITY

While reliability has always been a critical objective of resource planning, there has been increased focus on regional reliability in the past several years as utilities and other generation owners across the country retire significant dispatchable capacity, replacing it with significant amounts of variable renewable generation. In 2022, the North American Reliability Corporation (NERC) concluded that the MISO region was at risk of insufficient electricity supplies during peak winter conditions.[8] MISO's 2022-2023 Planning Resource Auction (PRA) resulted in a capacity shortfall for the MISO North/Central Regions resulting in the price of capacity clearing at the Cost of New Entry (CONE). More recently, NERC concluded that the supply of electricity in the MISO region "is more likely to be insufficient in the forecast period and that more firm resources are needed."[9]

Recognizing the evolving reliability challenges, MISO has proposed changes to its resource adequacy (RA) construct. The seasonal RA construct was implemented last year and provided reserve margin and resource capacity contributions tailored to each season (spring, summer, fall, winter). Additional changes to the RA construct are also under consideration and will impact the resources needed in the MISO region to meet reliability requirements.

[8] 2022-2023 NERC Winter Reliability Assessment (November 2022) at p. 4. Available at: https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_WRA_2022.pdf.
[9] 2023 NERC Long-Term Reliability Assessment (Dec. 2023) at p. 7. Available at: https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2023.pdf

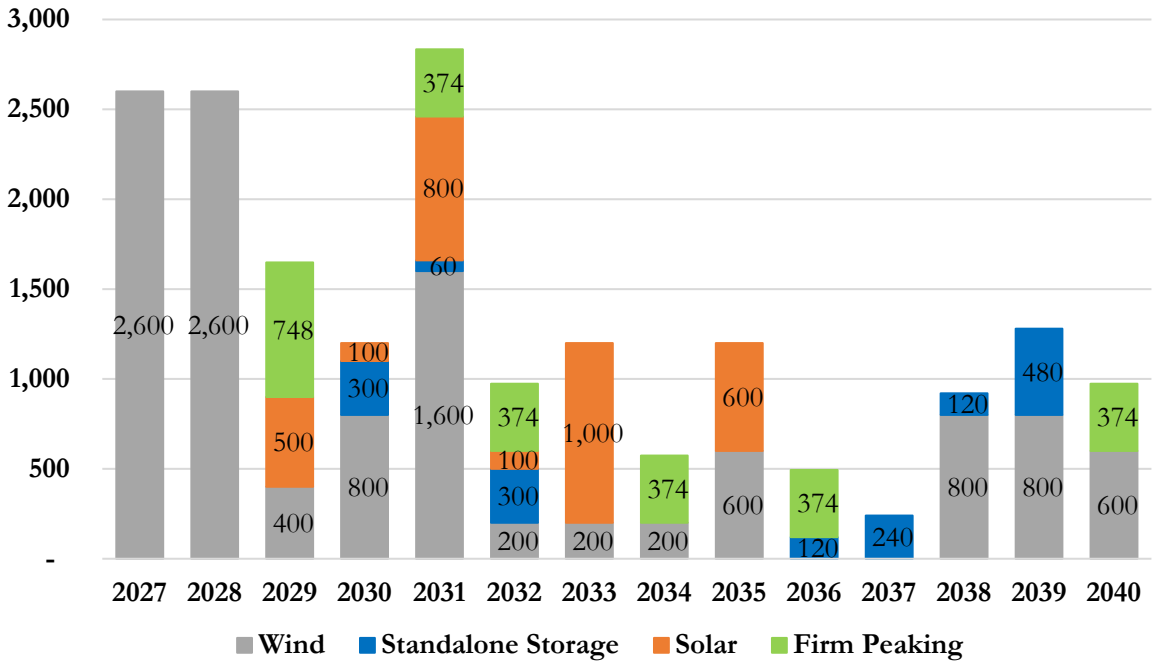
The evolving MISO RA construct creates a challenge to resource planning. Ensuring resource and energy adequacy to all our customers across our Upper Midwest System is a foundational duty of our business. The challenges facing resource planning include the change to a seasonal RA construct, a transition to a higher percentage of intermittent resources across the region, and uncertainty in accredited capacity and future Planning Reserve Margins (PRM). The future accreditation of resources presents a particularly difficult challenge for planners. Investments in solar and storage resources, like other resources, depend on the capacity value of the resources over the life of the assets, which is dependent upon the installed capacity of all resource types in the MISO system.

In this 2024 Plan, the Company used an analytical approach to develop a plan that ensures we have sufficient resources to meet our customers' needs at all times and positions us to be able to comply with future changes to the MISO RA construct, while retaining the economic benefits of the MISO market. Our 2024 Plan adds resources to be able to meet customer needs with very limited reliance on neighboring systems and the broader MISO market. At the same time, our 2024 Plan retains the benefits of participation in the MISO market by incorporating the current planning assumptions and allowing for the economic dispatch of our resources within the broader region. We have tested our Preferred Plan using historical data to analyze variations in load and renewable production. Our 2024 Plan is robust under changing assumptions and provides a path to transition our system while maintaining the reliable system our customers expect.

In our 2019 Plan, we allowed access to the MISO market, subject to an hourly limit on the amount of energy that we could buy or sell to the MISO market. This limit was developed for our 2019 Plan based on PROMOD modeling and historical transfers. We also imposed a limit on market sales of no more than 25 percent of retail sales, consistent with the assumption used in our last 2019 Plan. Given the scale and pace of change in the market at that time, this approach was reasonable for that plan.

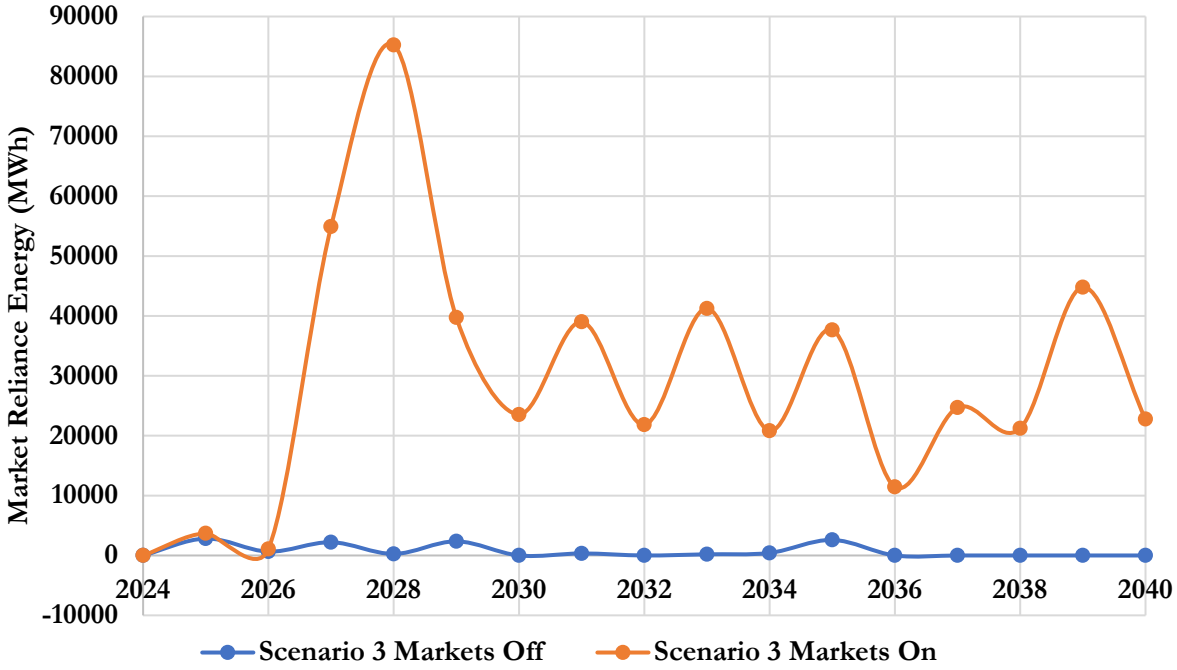
Using the same market access assumptions as those applied in the 2019 Plan now, however, results in a plan with substantial market exposure. In other words, when we allow EnCompass to optimize the resource expansion with the ability to rely on the market, the resources included in the expansion plan are unable to serve our load in a significant number of hours. The Market Access Optimization expansion plan, which represents Scenario 3 with 2,300 MW of hourly market access, is shown below in Figure 5-1.

Figure 5-1: Market Access Optimization Expansion Plan (MW)



The model makes large wind resources additions in 2027, 2028, and beyond (adding over 10,000 MW of wind alone during the planning period) to fulfill capacity needs based on accreditation assumptions and current market conditions. The model assumes excess energy is sold into the market, and the resulting wholesale revenue would make these significant wind resource additions cost-effective. The model does not select firm dispatchable resources until 2029. To assess the market exposure of this plan, we modeled a dispatch run on the expansion plan without market access. This dispatch run provides the number of hours our system relies on market purchases to serve load. The expected market reliance energy shown in Figure 5-2 below is the total megawatt-hours (MWh) in each year in which the expansion plan resources are unable to serve our load and must rely on market purchases.

Figure 5-2: Market Access Optimization - Expected Market Reliance



The significant amount of market reliance results when the plan is optimized with market access. Such a plan's market exposure would be risky for multiple reasons. During the times when the plan is reliant on the market for purchases, Locational Marginal Prices (LMPs) may be unreasonable, or worse, resources may simply not be available. During times when the plan is selling into the market, if LMPs are low, the substantial amount of resources added may not be cost-effective as anticipated by the model. In addition, the resources may not be able to comply with future changes to the MISO reliability construct, if, for instance, there are significant changes to capacity accreditation in the future.

Moreover, historically, we have planned to have enough resources to meet our load serving needs. In the past, when our system relied on fewer renewable resources, this meant ensuring we had sufficient resources to meet our annual planning reserve margin. In general, having sufficient capacity to meet our annual peak resulted in sufficient capacity to meet our needs year-round. As more variable resources have been added to our system, it has become necessary to consider more hours of the year. The change to a seasonal RA construct and the use of the chronological hourly modeling tool, EnCompass, were both motivated by the changing resource mix.

While we have optimized our portfolio without access to the market, we will continue to benefit from the access to the MISO market as we have in the past. We will continue to dispatch our resources on an economic basis. We will purchase from the market when market purchases are lower cost than using our own resources, and we will sell excess generation into the market to benefit our customers. While we optimized the capacity expansion additions without market reliance, we conduct a dispatch run in the Encompass model with market access to reflect these market interaction benefits. Furthermore, as noted above, we plan for our peak needs coincident with the MISO peak. The coincidence factor allows us to procure less capacity than we would otherwise need. In addition, we plan to the MISO PRM, which is developed considering the broader MISO footprint.

By optimizing the resource expansion plan without access to the market, we ensure that our 2024 Plan can serve our customers' needs across all hours of the year and positions us to be able to comply with future changes to the MISO RA construct. Our 2024 Plan adds resources to be able to meet customer needs with very limited reliance on neighboring systems and the broader MISO market for reliability. At the same time, our 2024 Plan retains the benefits of participation in the MISO market by incorporating the current planning assumptions and allowing for the economic dispatch of our resources within the broader region. We have tested our Preferred Plan using historical data to analyze variations in load and renewable production. Our 2024 Plan is robust under changing assumptions as further described in Appendix D: Energy Adequacy Analysis and provides a path to transition our system while maintaining the reliable system our customers expect.

V. SENSITIVITIES

To determine how changes in our assumptions impact the costs or characteristics of the baseload study plans, we examine them under a number of sensitivities. This testing provides insights on potential plan performance and helps us assess the "robustness" of each scenario in the face of future uncertainty, meaning that we want to test how resilient the scenario is to changes in one or more key assumptions. Generally, if a given plan is extremely sensitive to changes in assumptions, it would not represent a prudent course of action for the Company to pursue, because it would subject our customers to excessive risk. Compared to our 2019 Plan, this 2024 Plan includes fewer scenarios, but more sensitivities to address key resource robustness and policy uncertainties as described throughout this section. A summary of sensitivities is presented in Table 5-2 with additional discussion below.

Table 5-2: Sensitivities and Special Studies

Category	Scenario Descriptions
Standard	PVSC – Base, i.e., with Mid Reg Cost ($40) >2028 + Mid Draft EPA <2028 + (Draft EPA - Reg Cost) starting in 2028
	PVRR – Base, i.e., no carbon cost and environmental externality
Sensitivities on All Three Nuclear Scenarios	
Fuel prices	High Fuel/Market Price
	Low Fuel/Market Price
Load	High Load
	Low Load
Technology cost	High Technology Cost
	Low Technology Cost
	Edison MISO Market Prices for wind and solar
Cost of carbon	High Reg Cost ($75) >2028 + High Draft EPA <2028 + (Draft EPA - Reg Cost) starting in 2028
	Low Reg Cost ($5) >2028 + Low Draft EPA <2028 + (Draft EPA - Reg Cost) starting in 2028
	Draft EPA - High ($0 Reg Cost)
	Draft EPA - Mid ($0 Reg Cost)
	Draft EPA - Low ($0 Reg Cost)
Market Access	Market access off in dispatch runs
Environmental Policy	Good Neighbor Rule applied in both Minnesota and Wisconsin + EPA Rule 111
Combination	High technology cost + high load
	Low technology cost + low load
Carbon Free 100x50	Carbon constraint to reach 100x50 carbon free goal
Special Studies on the Preferred Plan	
DG Solar Bundles	Selectable DG bundles
Advanced Technologies	Hydrogen Only
	SMRs Only
	Long-Duration Storage Only
	All three advanced technology options available for selection
Data Center Load	Data Center Load

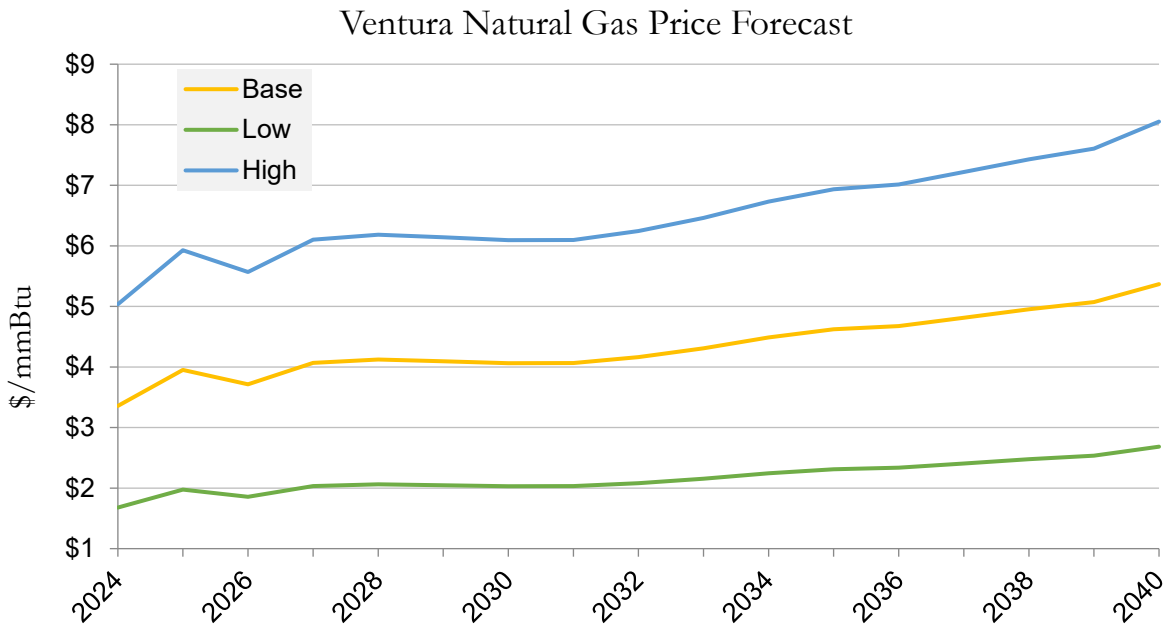
Resource Adequacy	Higher PRM (RBDC opt-out proxy)
	25% Battery ELCC
	Market Access 2,300 MW
	Wind Fleet Variability
Energy Adequacy Analysis	Scenario 3 with market access off
	Scenario 1 with market access off
	Market access 2,300 MW re-optimization for Scenario 3
	Low load scenario for Scenario 3 with market off

*Note: shaded scenarios require re-optimization of the expansion plans and redispatch of the resulting expansion plans.

Special studies on the Preferred Plan are discussed in Section VIII. A summary of the PVRR and PVSC for each sensitivity can be found in Appendix G: Scenario Sensitivity Analysis, and below we discuss additional detail for these sensitivities.

Fuel Price/Market Costs. High and low-price sensitivities were performed by adjusting the growth rate up and down, respectively, by 50 percent from the base forecast. Fuel price assumptions by base, low, and high sensitivities are depicted below in Figure 5-3.

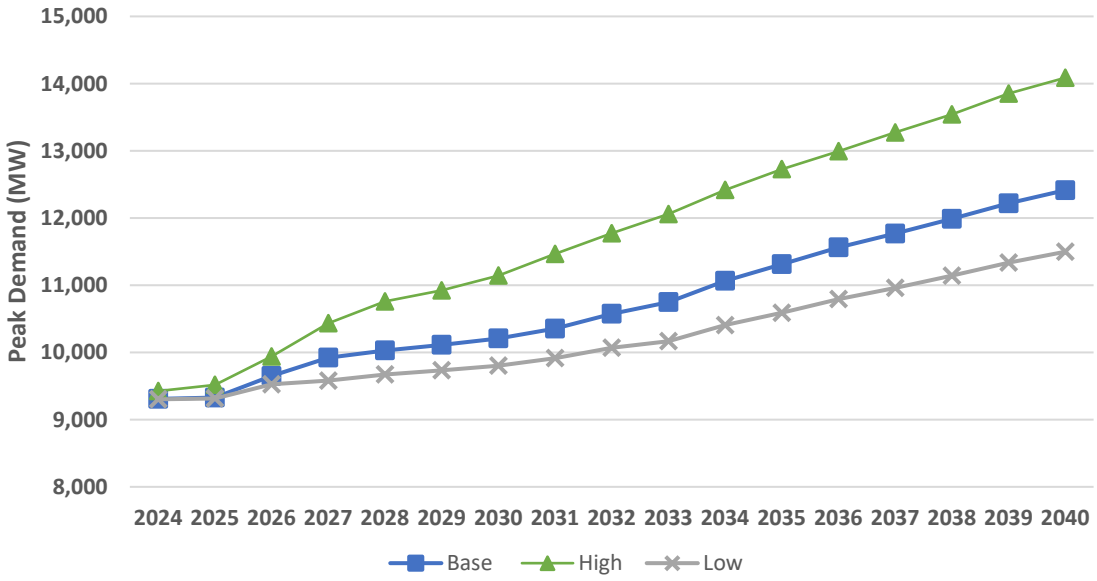
Figure 5-3: Fuel Price Assumptions, by Base, Low, High Sensitivities



Load. The low load sensitivity includes high customer adoption-based Distributed Energy Resource (DER) growth, no beneficial electrification, slower adoption of

electric vehicles (EV), and less new load from data centers. The high load sensitivity includes increased beneficial electrification, full achievement of Minnesota's "20 percent by 2030" goal for EV penetration with similar increases in EV adoption in other states served by NSP, and additional large data center loads located in Minnesota. Peak Demand, net of EE impacts, by Base, Low, and High sensitivity is shown in Figure 5-4 below.

Figure 5-4: Peak Demand, Net of EE Impacts, by Base, Low, High Sensitivities (MW)



Technology Costs. Wind, solar and battery costs, as well as battery operational characteristics such as cycle limit and Round-Trip Efficiency (RTE), are from National Renewable Energy Laboratory (NREL) 2023 *Annual Technology Baseline* (ATB) data. High and low technology cost sensitivities are created based on NREL ATB "Conservative" and "Advanced" forecasts. We also have a sensitivity where the wind, solar and solar + battery hybrid LCOEs prior to 2030 are adjusted to match the 2023 Q1-Q3 actual PPA prices in MISO, reported in the Edison Energy Global Renewable Market Update quarterly reports to align pricing with most recent market trends in MISO. We did not include any sensitivities adjusting capital costs for thermal resources such as the generic CTs or Reciprocating Engines, so all sensitivities include our base cost assumptions for those resources. New wind and solar resource cost assumptions and sensitivities with and without transmission costs are shown below in Figure 5-5 and 5-6, and new battery resource costs assumptions and sensitivities are shown below in Figure 5-7.

Figure 5-5: New Wind and Solar Resource Cost Assumptions with Transmission Cost
($/MWh)

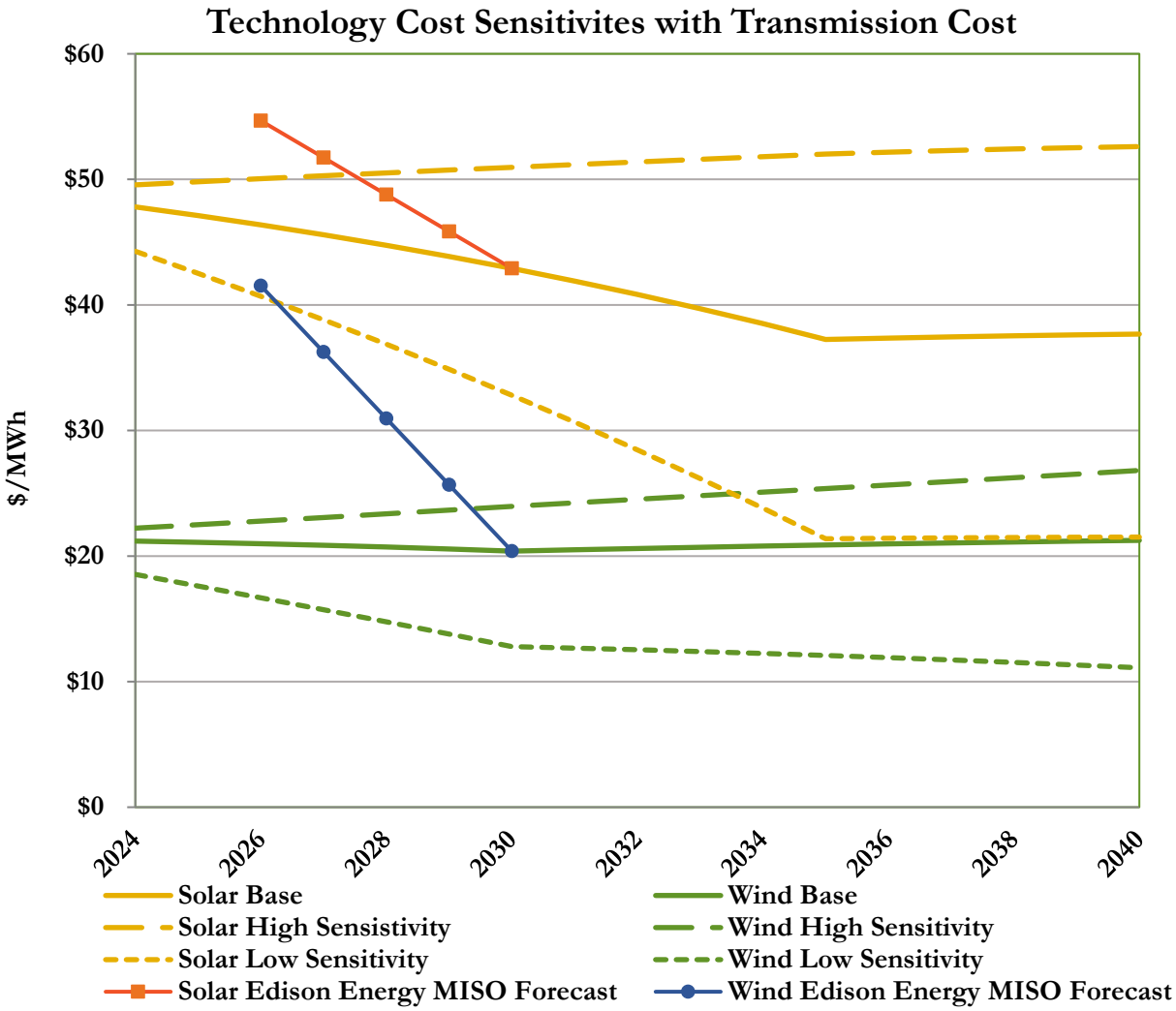


Figure 5-6: New Wind and Solar Resource Cost Assumptions without Transmission Cost($/MWh)

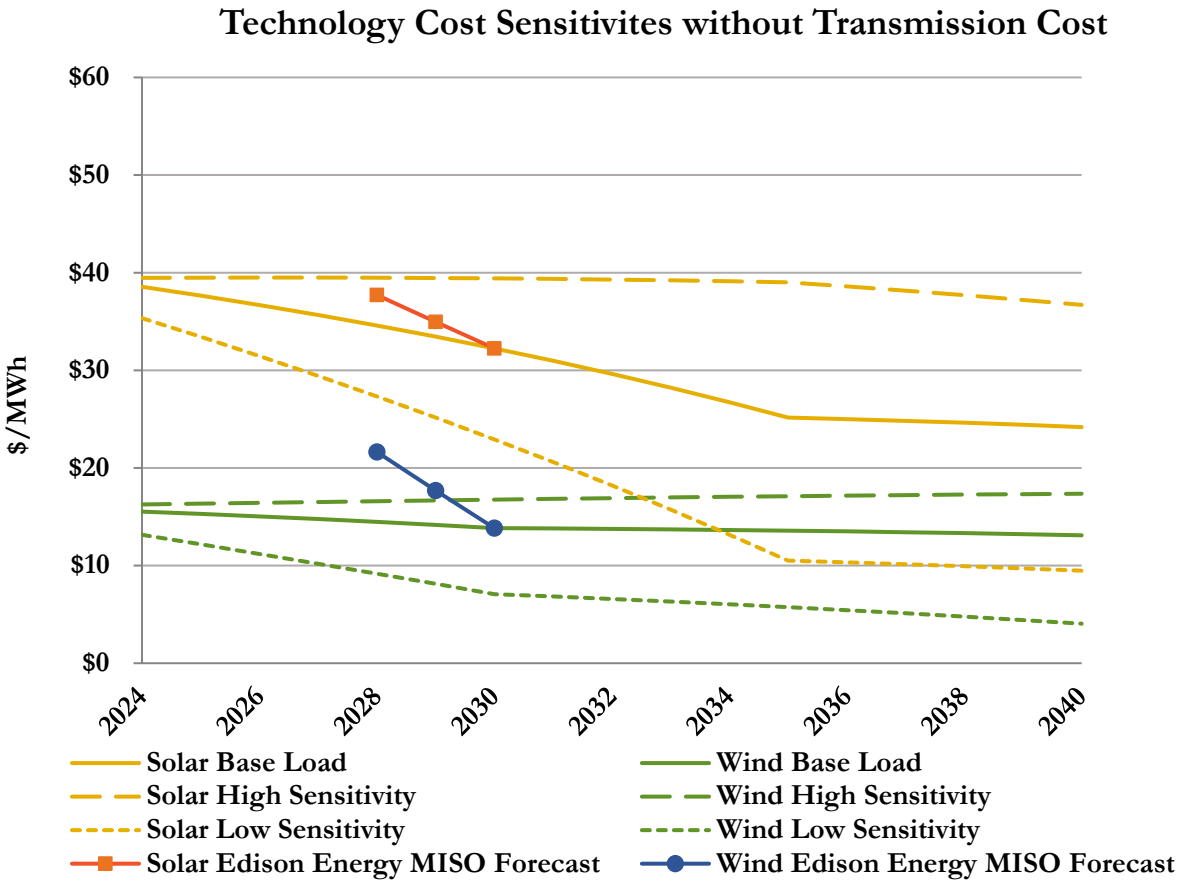
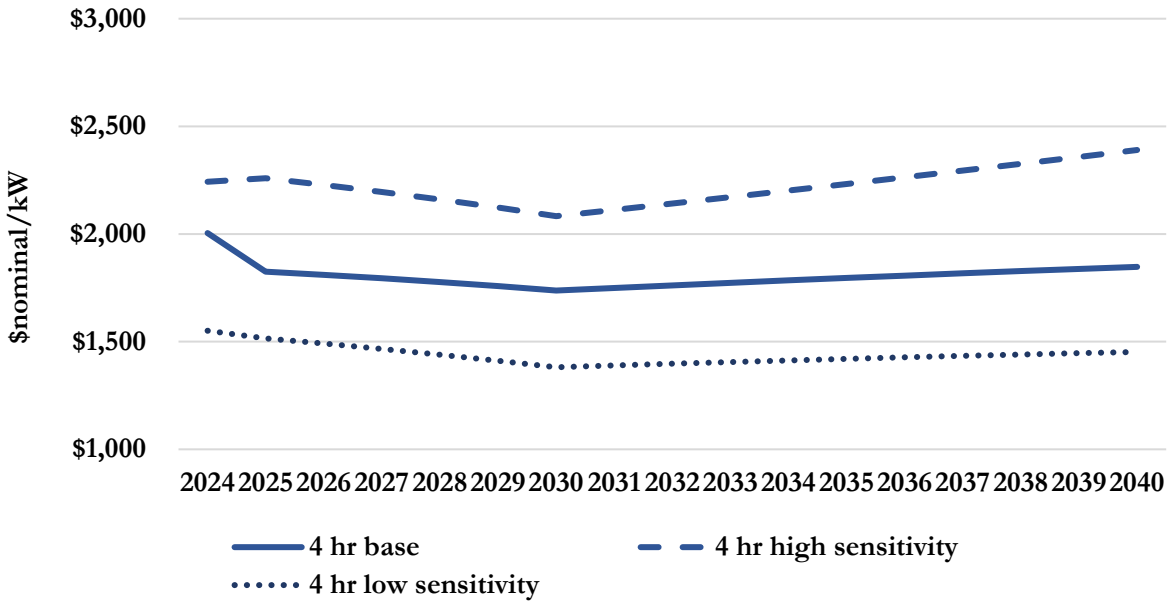


Figure 5-7: New Battery Resource Cost Assumptions with Transmission Cost (nominal $/kW)



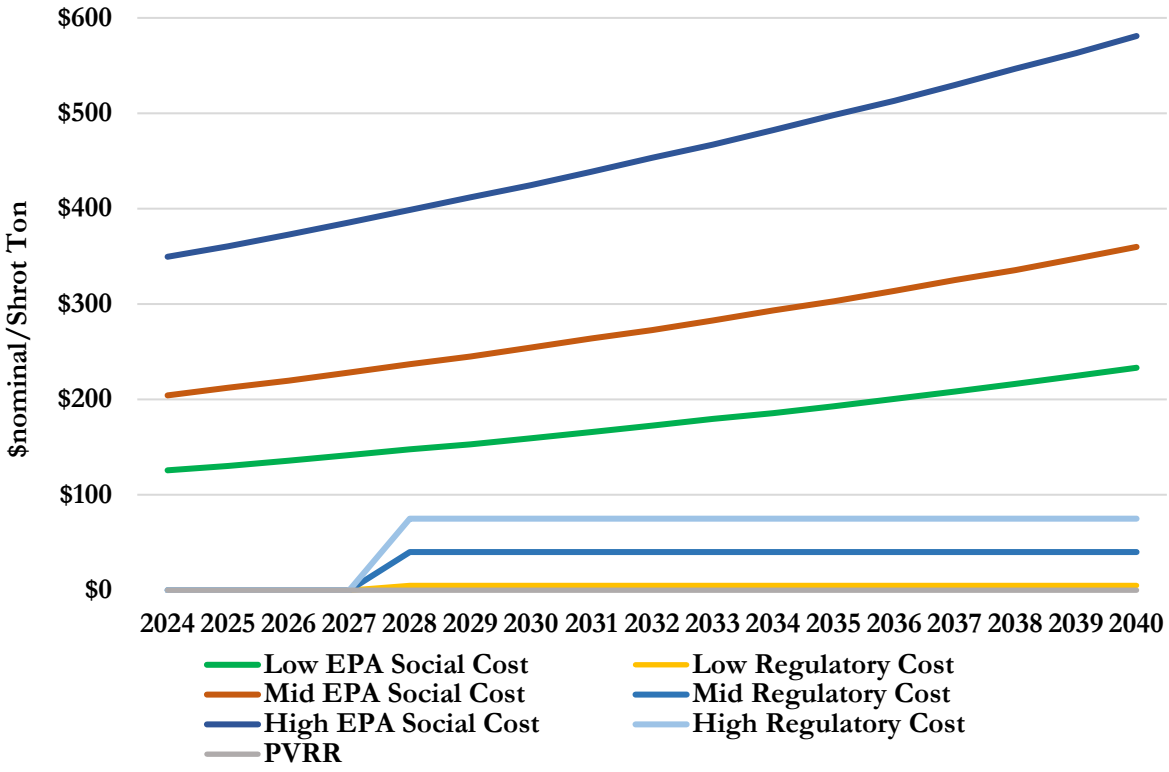
Greenhouse Gas (GHG) Costs. We applied six sensitivities to the model in compliance with the Commission's December 19, 2023 Order in Docket No. E-999/DI-22-236. In the Order, the Commission established a range of regulatory costs of carbon dioxide emissions from $5 to $75 per short ton, effective in 2028 and thereafter. The Commission also provisionally adopted and applied the draft measures of costs related to the emissions of greenhouse gasses as set forth in the EPA's External Review Draft of Report on the Social Cost of Greenhouse Gases (EPA's SC-GHG), released in September 2022,[10] and its successors, for purposes of measuring environmental and socioeconomic costs under Minn. Stat. § 216B.2422, Subd. 3. As noted above, the PVSC base value used the midpoint of the regulatory cost range of $5-$75 and the mid-range of the EPA's SC-GHG. The additional carbon sensitivities are:

High Externality, High Regulatory Cost of Carbon
Low Externality, Low Regulatory Cost of Carbon
High Externality
Mid Externality
Low Externality
PVRR, or No Externality or Regulatory Cost of Carbon

[10] We understand the EPA finalized the draft SC-GHG values in November 2023.

Both the externality and regulatory costs are applied in the regulatory cost sensitivities. To avoid double counting, in the regulatory cost sensitivity, we adjusted the EPA SC-GHG values for modeling purposes by subtracting the Regulatory Cost of Carbon from the EPA SC-GHG value (beginning in 2028). Carbon cost assumptions are depicted in Figure 5-8 below.

Figure 5-8: Carbon Cost Assumptions
($ nominal/Short Ton)



Market Access. The "all markets off" sensitivity represents a view in which we cannot access the market to sell energy outside our system.

Policy (Good Neighbor and proposed EPA Rule 111). This sensitivity requires our fleet to comply with the stayed Good Neighbor Rules and EPA Rule 111 as proposed. To address the Good Neighbor Rules implementation in both Minnesota and Wisconsin, we impose NOx allowances to all existing fossil fuel unit operations. For EPA Rule 111, we limit the annual capacity factor of existing combined cycle units to under 50 percent and any new CT annual capacity factor to under 20 percent.

Combination. For this sensitivity, we combined two different futures: (1) high technology cost and high load and (2) low technology and low load. The high/low technology and high/low load assumptions are described above.

100 Percent Carbon-Free by 2050 (100x50). For this sensitivity, we included a carbon constraint in the model to reach our 100x50 carbon free goal.

It is important to note that these sensitivities are designed to test the performance of our baseload nuclear retirement decisions under plausible future conditions. These sensitivities are not, however, intended to test which future is overall least cost for our system. We do not have full control over the level of distributed solar or electrification growth on our system and have no control over variables such as fuel prices and new resource capital costs. However, as shown in Appendix G: Scenario Sensitivity Analysis: PVRR & PVSC Summary, our Preferred Plan provides benefits under nearly all sensitivities. As demonstrated in the next section, the sensitivities analysis shows that our Preferred Plan baseload nuclear decisions to extend Prairie Island 1 and 2 and Monticello are likely to yield customer benefits relative to the Reference Case, even in a future where multiple key assumptions change.

VI. ENCOMPASS ANALYSIS RESULTS AND SELECTING THE PREFERRED PLAN

After identifying the scenarios and sensitivities for analysis, we used EnCompass to identify the expansion plans for each of the three primary scenarios, and their resulting cost and emissions impacts.

A. EnCompass Model Optimization & Challenges

In the initial round of modeling, all generic technology alternatives (wind, solar, 4-hour and 10-hour batteries, solar + battery hybrid, CTs) were made available to the model, and we developed fully-optimized expansion plans using a typical on and off-peak day per month for the optimization horizon 2027-2055. However, due to the substantial number of these alternatives, initial runs took a significant amount of time to complete (or fail completely). Furthermore, the limited dispatch duration of the 4-hour generic batteries was not evaluated due to the typical on and off-peak setting in the expansion plan. As a result, the model yielded unreliable plans with prominent levels of unserved energy. This unserved energy occurs due to the production cost runs, which are used for more granular dispatch and system cost estimates and simulate the electric system on an hourly time basis, versus the simplified time periods used during capacity expansion modeling used to determine the best mix of resources

to arrive at a least-cost portfolio for a planning period. If the production cost runs associated with certain portfolio yield unserved energy, it demonstrates that resource adequacy captured in the EnCompass modeling has not been achieved due to the disconnect between modeling steps. In this case, due to this set of initial runs reflecting unserved energy and therefore deemed unreliable, we needed to address several refinements in our modeling methodology.

1. Reduced Time Block Granularity

On average, initial runs took over 24 hours to process, and in several instances, EnCompass ran into memory issues and was unable to "solve" the problem. This is defined as the mixed integer programming ("MIP") Stop Basis tolerance defined within EnCompass never being reached and a portfolio never being presented in the modeling output. In order to address the solve time/feasibility issue, the number of daily intervals modeled was reduced to 11 total time blocks per day versus the 24 per day (i.e., every hour) initially used for the on-peak/off-peak optimization period. This additional aggregation of hours resulted in 264 (11*2*12) intervals being solved per year versus 576 (24*2*12) intervals. It should be noted that this aggregation of hours was only applied to capacity expansion modeling for selection of resources for the portfolios and not for the production costing used to estimate overall portfolio costs, which was done using the full 8,760 hours per year granularity. This aggregation was determined based on similar modeling run-time issues experienced in the Company's other jurisdictions and has been discussed/recommended by the software vendor for EnCompass, Anchor Power. They have confirmed that the aggregation proposed would not fundamentally alter the validity of the analysis results. The reason the capacity expansion process, versus production costing, requires this additional aggregation of hours is because of the much larger problem size EnCompass must solve when determining capacity selections.

2. Addressing Battery Storage

In addition to the time granularity issues discussed previously, modeling the different battery storage duration options (for example, 10-hour versus 4-hour) created additional complexities that were a challenge for the model to solve. To develop reliable portfolios which did not result in the modeling reflecting unserved energy, we first removed the 10-hour batteries and solar + battery hybrid resource options to reduce the problem size in the initial step of the capacity expansion plan optimization. We specifically removed these options because doing so was expected to have a minimal impact on any resulting expansion plan for two different reasons, namely MISO's current capacity accreditation methodology for Energy Storage Resources

(ESRs) does not differentiate between ESRs of different durations. For instance, 10-hour batteries receive the same amount of capacity accreditation as 4-hour batteries. Should MISO provide updated guidance for ESR accreditation, we will incorporate it into our model to distinguish between short-duration and long-duration resources.

Second, since the battery portion of a solar + battery hybrid resource can only be charged by the paired solar instead of the grid, the solar + battery hybrid resources do not generate the same energy benefits to the system as standalone batteries. Therefore, they are unlikely to be selected over standalone solar resources or standalone batteries. Furthermore, the IRA allows standalone batteries to receive full ITC without pairing with solar, thereby removing most of the cost advantages of solar + battery hybrid. Moreover, to verify that this simplifying assumption did not result in the elimination of any 10-hour ESR or solar + storage additions, we conducted a special study to allow the Encompass model to consider these resource options. The special study confirmed that 10-hour ESR and solar + storage resources are not selected in the planning period when included as resource options. In the special study where we allow 10-hour batteries and hybrid options in the expansion plan, the 10-hour batteries are only selected in 2052 and the hybrid resource was not selected.

3. Second step expansion plan

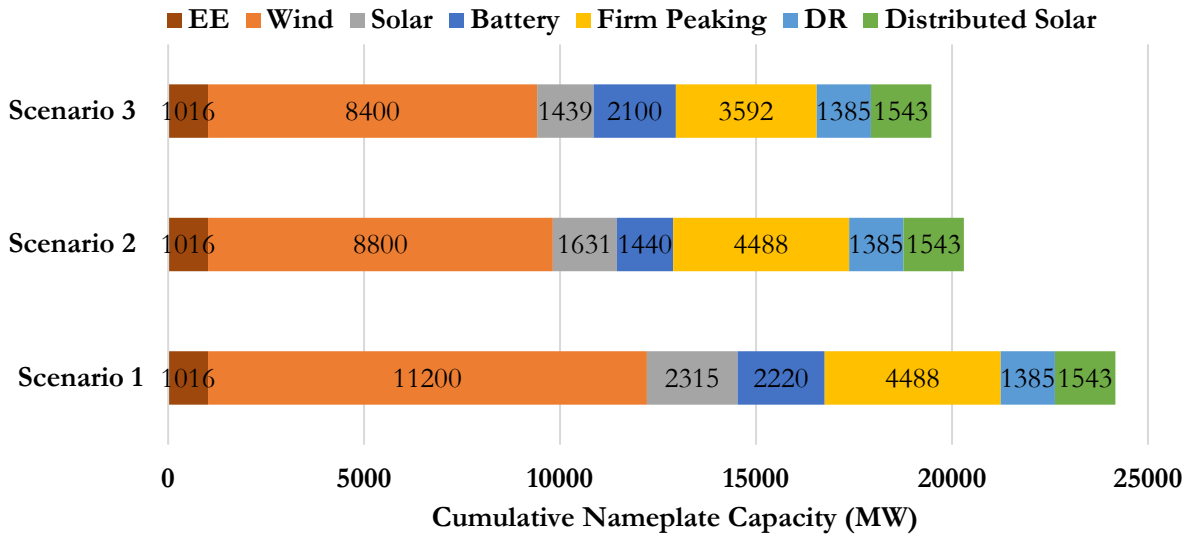
In order to address the unserved energy issue, we created a second expansion plan optimization with more granular time periods, which allowed EnCompass to better evaluate the energy adequacy of dispatchable resources (i.e. 4-hour batteries and CTs). Specifically, we used all calendar days instead of typical on- and off-peak days per month. With this increased optimization granularity, the problem size increased significantly. To allow the model to solve within a reasonable amount of time, we reduced the optimization horizon from 2024-2055 in the initial expansion plan to every four years. Further, we used the wind and solar capacity additions selected in the initial capacity expansion plan as a floor for the minimum wind and solar capacity needs. Additions of wind and solar above the floor are considered in the expansion plan developed in the second step. This second step expansion plan allows EnCompass to capture most of the hourly granularity when evaluating resource options.

B. Modeling Results and Conclusions

Completing baseload scenario runs, as described above, allows us to examine scenario outcomes side-by-side, to evaluate their benefits and drawbacks. Among other factors, we examine the resource expansion profile and carbon emissions outcomes, present value costs, and several indicators of risk for each scenario.

The cumulative expansion plan additions through the planning period for the three scenarios are shown below in Figure 5-9.

Figure 5-9: Expansion Plans by Scenario (MW, Cumulative Nameplate Capacity Resource Additions by Resource Type, 2024-2040)



As shown above in Figure 5-9, Scenario 3 results in fewer additions of firm peaking and wind capacity relative to both Scenarios 1 and 2. The extension of the nuclear units offset additions of other resources need for capacity and energy. While Scenario 2 includes the same amount of cumulative firm peaking resources through 2040, those additions are delayed by the extension of Prairie Island, and few firm peaking resources are needed over the 20-year life extension. Moreover, the nuclear extensions provide a certain and stable source of energy to our system as we transition our generation fleet.

The cost impact of the three scenarios is shown below in Table 5-3. The table shows the net present value (NPV) delta of modeled costs compared to Scenario 1 (the

Reference Scenario), with negative values representing customer savings relative to the Reference Scenario.[11]

Table 5-3: Scenario PVSC/PVRR Deltas from Reference Case ($2024 millions)

PVSC Production Cost	Delta in NPV ($m) 2024-2040	NPV ($m) 2024-2040	Delta in NPV ($m) 2024-2047	NPV ($m) 2024-2047	Delta in NPV ($m) 2024-2050	NPV ($m) 2024-2050
Scenario 1 PVSC	$0	**$51,037**	$0	**$63,635**	$0	**$68,788**
Scenario 2 PVSC	($413)	**$50,624**	($437)	**$63,198**	($513)	**$68,275**
Scenario 3 PVSC	($785)	**$50,252**	($941)	**$62,695**	($1,025)	**$67,762**
PVRR Production Cost	**Delta in NPV ($m) 2024-2040**	**NPV ($m) 2024-2040**	**Delta in NPV ($m) 2024-2047**	**NPV ($m) 2024-2047**	**Delta in NPV ($m) 2024-2050**	**NPV ($m) 2024-2050**
Scenario 1 PVRR	$0	**$34,678**	$0	**$44,948**	$0	**$48,927**
Scenario 2 PVRR	($97)	**$34,581**	$291	**$45,239**	$391	**$49,317**
Scenario 3 PVRR	($464)	**$34,215**	$46	**$44,994**	$239	**$49,166**

The Scenario 3 plan was the lowest cost plan in terms of PVSC in all time periods assessed. As our nuclear plants provide a source of carbon-free energy to our system, extension of these resource results in overwhelming benefits due to the avoidance of carbon emissions from other resources. It also is the lowest cost plan in terms of PVRR through 2040, and nearly breakeven through 2047 compared to the Reference Case. The only outlier is when PVRR is assessed through 2050, which shows Scenario 3 adds $239 million in NPV compared to the Reference Case. We note, however, that the replacement capacity added at the end of the expansion plan to replace Prairie Island in Scenario 2 and Prairie Island and Monticello in Scenario 3, significantly impacts overall cost.

Given current technologies, the model makes significant additions of firm dispatchable resources in the late 2040s in anticipation of the retirement of the nuclear fleet. Under the PVRR assumptions, no cost is included on the emissions from these resource additions. We expect technological advancements will provide resource options that are not currently available when the plants near the end of their extended lives. Therefore, the significant firm dispatchable additions in the late 2040s may not provide a reliable indication of the costs that far out in time. As a result, we provide cost comparisons over three different time horizons. The most relevant of these

[11] Note that these PVRR and PVSC deltas shown depict NPV for 2024-2040.

horizons—through 2040, when resource and cost assumptions are most known—shows the extension of our nuclear fleet provides significant economic benefits even when the benefits of avoided emission are not included.

VII. PREFERRED PLAN SELECTION AND ASSESSMENT

As described previously in this chapter and in Chapter 4: Preferred Plan, we evaluated the PVRR and PVSC results of our three baseload scenarios, and how effectively each potential plan would meet our planning objectives, to determine which Scenario should form the basis of the Preferred Plan. Based on these outcomes, we selected baseload Scenario 3. Our Preferred Plan continues on the path toward achieving ambitious carbon reduction goals and regulatory requirements, reflects substantial stakeholder input and consensus, and ensures reliability and affordability for our customers on both a PVRR and PVSC basis. The baseload aspects of this Preferred Plan include extension of our Monticello nuclear facility to 2050 and Prairie Island to 2053/2054. We discuss more detail regarding how we selected and evaluated our Preferred Plan below.

A. Extend All Nuclear

From a modeling perspective, the PVSC and PVRR results are primary indicators of the various scenarios' economic favorability. Table 5-3 shown above indicates that the Prairie Island and Monticello nuclear extension scenario, Scenario 3, yields the most attractive customer value relative to the Reference Case. Further, Scenario 3 provides the best fit for our carbon goals and helps mitigate the potential for regulatory or legislative action around carbon costs or carbon reduction levels. Maintaining nuclear generation in our resource portfolio provides fuel diversity and an ongoing source of carbon-free baseload generation. From a reliability risk perspective, baseload nuclear adds value as we transition our generation fleet away from coal assets to more intermittent, renewable resources. While all of our scenarios meet the carbon goal we established, we believe cost and risk considerations elevate Scenario 3 above the rest as an appropriate path forward.

As demonstrated in our modeling analysis, the Preferred Plan achieves customer value, not only under a PVSC basis through the mid-2040s but also nearly break-even on a PVRR basis when the cost of Scenario 3 is considered through 2047.

In addition to the beneficial cost outcomes discussed above, the Preferred Plan addresses major risks by maintaining portfolio diversity, retaining optionality, and effectively managing market exposure, as shown in the sensitivity analysis below. The

Preferred Plan incorporates significant capacity additions to replace retiring resources, consisting of a diverse portfolio of DSM, nuclear extension, solar, wind, and firm dispatchable resource additions. This approach mitigates the risk of becoming too dependent on a single fuel source.

B. Sensitivity Results

As previously discussed, a final step in our analysis process evaluated the performance of the baseload study plans under different sensitivities. As shown in Appendix G: Scenario Sensitivity Analysis: PVRR & PVSC Summary, the summary of the PVRR and PVSC for each sensitivity consistently shows the Preferred Plan, Scenario 3, as yielding the most customer benefits on a PVSC basis across nearly all sensitivities. We address key sensitivity assumptions and insights below.

1. Fuel Prices

The Preferred Plan produces savings under both High and Low Fuel Price sensitivities. Our nuclear fleet provides an effective hedge against fuel price volatility.

2. Load

Table 5-4 below provides a summary of the load sensitivity results under different planning periods. The Preferred Plan provides savings under both the high and low load sensitivities relative to the Reference Case, which suggests that the Preferred Plan is robust under a range of potential future conditions.

Table 5-4: Preferred Plan NPV Savings under Different Load Scenarios and Planning Periods ($2024 millions)

	Base PVSC	Base PVRR	High Load PVSC	Low Load PVSC
2024-2040 NPV Delta	($785)	($464)	($837)	($534)
2024-2047 NPV Delta	($941)	$46	($953)	($560)
2024-2050 NPV Delta	($1,025)	$239	($1,013)	($627)

3. Technology Cost

The Preferred Plan provides savings under the High Tech, Low Tech, Edison MISO Market Prices sensitivities conducted. While the savings are reduced under the Low

Technology cost sensitivity, the overall saving of $514 are still considerable as shown in Appendix G.

4. Cost of Carbon

As discussed above, the Preferred Plan was analyzed using six different cost of carbon assumptions. A summary of the results is shown below in Table 5-5.

Table 5-5: Preferred Plan NPV Savings under Different Environmental Regulatory Costs and Planning Periods ($2024 millions)

	PVSC	PVRR	High Reg, High SC-GHG	Low Reg Low SC-GHG	No Reg, High SC-GHG	No Reg, Mid SC-GHG	No Reg, Low SC-GHG
NPV ($m) 2024-2040							
Scenario 1	$0	$0	$0	$0	$0	$0	$0
Scenario 2	($413)	($97)	($707)	($343)	($607)	($428)	($301)
Scenario 3	($785)	($464)	($1,160)	($739)	($974)	($800)	($667)
NPV ($m) 2024-2047							
Scenario 1	$0	$0	$0	$0	$0	$0	$0
Scenario 2	($437)	$291	($1,006)	($224)	($894)	($463)	($192)
Scenario 3	($941)	$46	($1,754)	($790)	($1,565)	($982)	($612)
NPV ($m) 2024-2050							
Scenario 1	$0	$0	$0	$0	$0	$0	$0
Scenario 2	($513)	$391	($1,239)	($248)	($1,067)	($544)	($209)
Scenario 3	($1,025)	$239	($2,058)	($823)	($1,814)	($1,074)	($607)

The Preferred Plan produces the greatest level of savings under all sensitivities that consider a cost of carbon. As discussed above, costs are shown in the 2040s when a carbon cost is not considered, but even when carbon cost are not included, the Preferred Plan results in savings through 2040.

5. Market Access

As discussed above, for the Encompass dispatch runs, we allow for purchases of

market energy and energy sales to market. When market interactions are not allowed, the Preferred Plan continues to show significant benefits as shown in Appendix G.

6. Environmental Policy

The Preferred Plan provides an effective hedge against potential environmental regulations, including the Good Neighbor Rule and draft EPA 111 Rule as shown in Appendix G.

7. Combination

Under the High Technology cost + high load combination sensitivity the Preferred Plan generally results in increased benefits as shown in Appendix G. The extension of the nuclear fleet avoids cost associated with replacement resources and provides a steady source of baseload power for our system. The benefits are reduced or offset under a Low Technology cost + low load sensitivity due to the lower cost of replacement resources and lower load serving needs.

8. 100 Percent Carbon-Free by 2050 (100x50)

The Company has set a goal to generate 100 percent carbon-free energy by 2050 (100x50). Advances in technology will be critical to achieving this goal reliably and cost-effectively. To assess the benefits of our Preferred Plan compared to existing technologies, we conducted a sensitivity that reoptimizes our expansion plan to achieve a 100 percent carbon-free generation fleet by 2050. The results of the analysis are shown below.

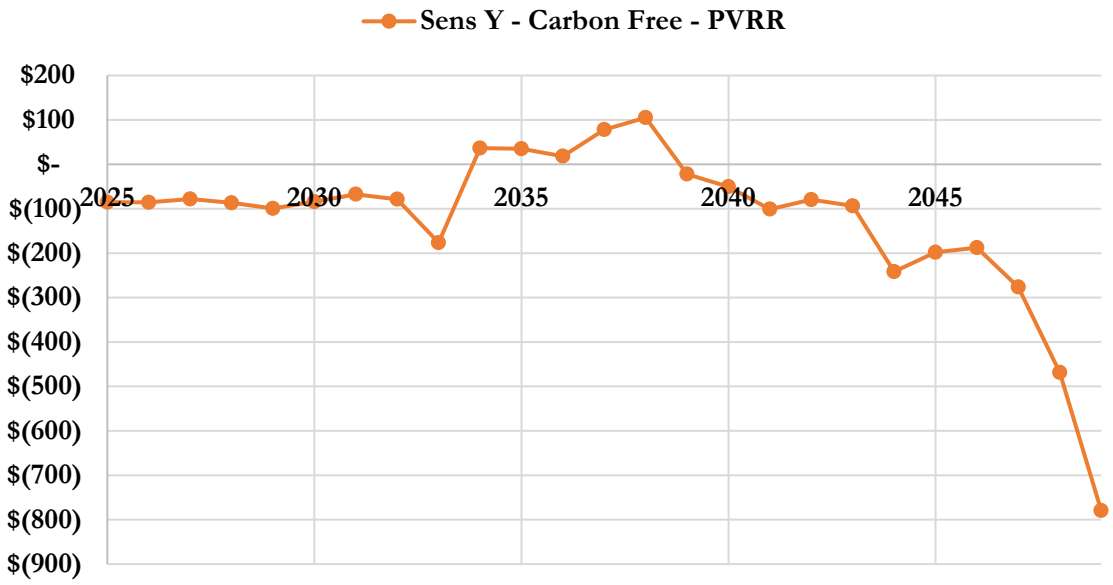
Table 5-6: NPV Savings under 100 Percent Carbon-Free by 2050 Constraint ($2024 millions)

PVSC Production Cost	Delta in NPV ($m) 2024-2040	NPV ($m) 2024-2040	Delta in NPV ($m) 2024-2047	NPV ($m) 2024-2047	Delta in NPV ($m) 2024-2050	NPV ($m) 2024-2050
Scenario 1 - Carbon Free - PVSC	**$0**	$50,703	**$0**	$62,974	**$0**	$70,930
Scenario 2 - Carbon Free - PVSC	**($298)**	$50,406	**($385)**	$62,589	**($1,003)**	$69,927

Scenario 3 - Carbon Free - PVSC	**($662)**	$50,041	**($931)**	$62,042	**($1,850)**	$69,080
PVRR Production Cost	**Delta ($m)**	**NPV ($m) 2024-2040**	**Delta ($m)**	**NPV ($m) 2024-2047**	**Delta in NPV ($m) 2024-2050**	**NPV ($m) 2024-2050**
Scenario 1 - Carbon Free - PVRR	**$0**	$34,819	**$0**	$46,314	**$0**	$54,273
Scenario 2 - Carbon Free - PVRR	**($200)**	$34,619	**($323)**	$45,991	**($947)**	$53,326
Scenario 3 - Carbon Free - PVRR	**($612)**	$34,207	**($941)**	$45,373	**($1,865)**	$52,407

As shown in the Table 5-6 above, the Preferred Plan results in dramatic savings of nearly $2 billion on both a PVSC and PVRR basis. Compared to existing technologies, the extension of our nuclear fleet provides an overwhelmingly cost-effective source of carbon-free energy. Figure 5-10 below shows the PVRR savings over time.

Figure 5-10: Preferred Plan Annual Costs or Savings Compared to the Reference Case, 100x50 Sensitivity ($ millions)



As shown above, significant savings are achieved in the late 2040s under this analysis. Further, as noted above, we expect advancements in technology will reduce the cost of reaching our 100 percent carbon-free goal. As discussed further below, long-duration storage, hydrogen, and small-module reactors could play a role in our energy future as technology evolves. The technologies and costs of alternatives that will be available in the 2040s are very uncertain today. As a result, caution should be taken when considering expect impacts twenty years from now. However, it is clear that our nuclear fleet can play a critical role in providing a source of carbon-free generation well into the future.

C. Preferred Plan and Future Load Uncertainty

We anticipate a change in the slow load growth we have experienced over the past several years. As discussed further in Appendix E: Load Forecasting, we expect to see the demand for electricity to increase at a greater pace. While further improvements in energy efficiency and demand response capabilities will continue to provide substantial value to our customers, we anticipate that emerging uses of electricity will result in greater consumption growth than we have needed to plan for in the recent past. Specifically, our base case forecasts now anticipate average annual growth rates of 1.8 percent in our peak demand, and 2 percent for our energy forecast over the 2024-2040 planning period. As discussed above, given that there is uncertainty in any long-term forecast, primarily around the potential for data center loads and their timing, accelerated EV and DG adoption, etc., we developed High and Low load sensitivities that adjusted the base outlook using discrete adjustments for these forecast components. As shown in Table 5-7 below, under all load sensitivities, Scenario 3 – the Preferred Plan, is the most economic.

Table 5-7: NPV Savings under Base, High, and Low Loads ($2024 millions)

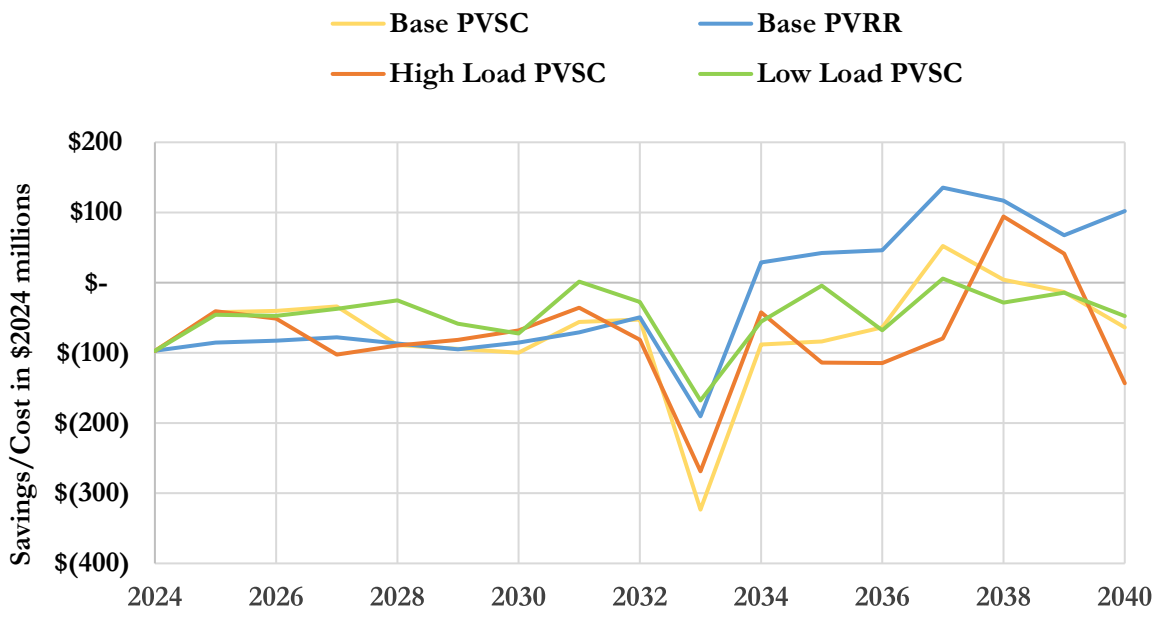
	Scenario 1	Scenario 2	Scenario 3
Delta in NPV ($m) 2024-2040 Base Load PVSC	$0	($437)	($941)
Delta in NPV ($m) 2024-2040 High Load PVSC	$0	($567)	($837)
Delta in NPV ($m) 2024-2040 Low Load PVSC	$0	($298)	($534)

	Scenario 1	Scenario 2	Scenario 3
Delta in NPV ($m) 2024-2047 Base Load PVSC	$0	($437)	($941)
Delta in NPV ($m) 2024-2047 High Load PVSC	$0	($548)	($953)
Delta in NPV ($m) 2024-2047 Low Load PVSC	$0	($143)	($560)
Delta in NPV ($m) 2024-2050 Base Load PVSC	$0	($513)	($1,025)
Delta in NPV ($m) 2024-2050 High Load PVSC	$0	($596)	($1,013)
Delta in NPV ($m) 2024-2050 Low Load PVSC	$0	($128)	($627)

As demonstrated above, the Preferred Plan offers benefits across a range of potential future scenarios. Additional analysis focused on the Preferred Plan is discussed below.

Figure 5-11 below, provides further detail on the expected savings of the Preferred Plan relative to the Reference Case through 2040. As shown, the Preferred Plan achieves customer savings through 2040 under the variations in expected load growth. In other words, load growth that is higher or lower than expected will not significantly change the benefits expected under the Preferred Plan. This demonstrates that the Preferred Plan is robust and beneficial to customers, yielding savings under a host of potential future conditions.

Figure 5-11: Preferred Plan Annual Costs or Savings Compared to the Reference Case, by Scenario ($ millions)



The detailed expansion plan for the 2027-2030 Preferred Plan is provided below.

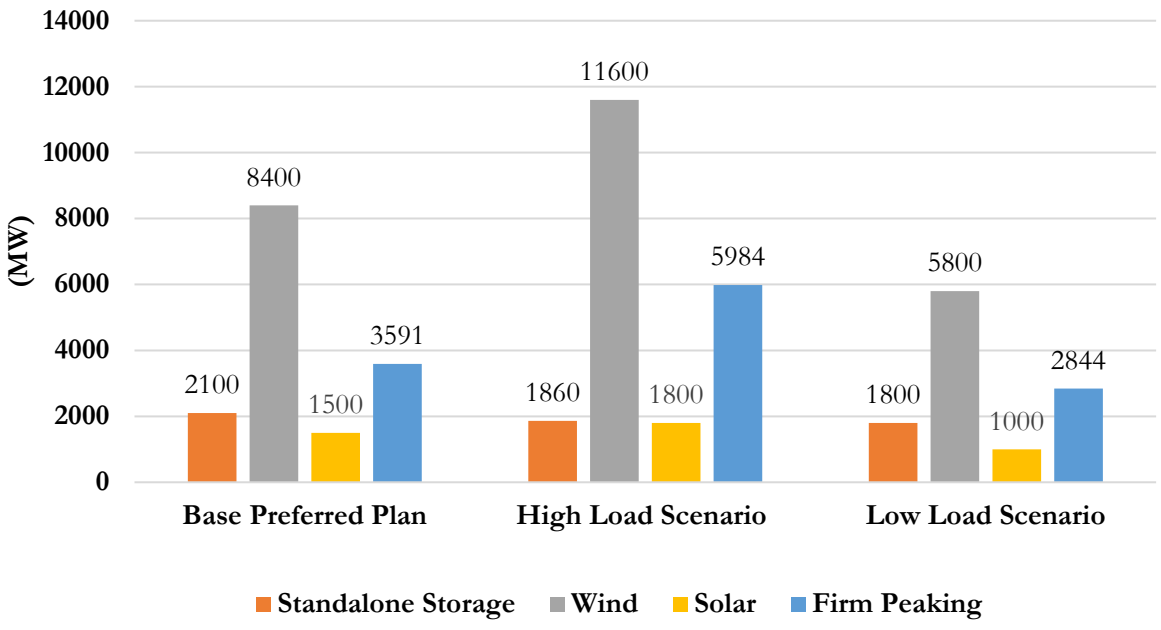
Table 5-8: Preferred Plan Expansion Plan (2027-2030) (MW)

	2027	2028	2029	2030
Standalone Storage	480	-	120	-
Wind	400	2,000	800	-
Solar	-	-	-	400
Firm Peaking	748	748	-	748
Total	**1,628**	**2,748**	**920**	**1,148**

Relative to the Preferred Plan the High Load sensitivity has the same amount of firm dispatchable added by 2030, while the Low Load sensitivity has 374 MW less. The High Load sensitivity also include more storage and wind additions in the near-term, while the Low Load sensitivity, which captures a high distributed solar assumption, includes less wind and solar in the near-term. In other words, across load sensitivities, our plans call for significant additions of renewables and firm dispatchable resources as we continue to retire units and transitions our system.

For simplicity, Figure 5-12 below shows cumulative expansion plan additions by resource type. It is important to note that while DR and EE are not reflected as separate categories, they would be considered to fill any firm dispatchable needs identified in the expansion plans. Similarly, evolving economics and value could also shift the mix of resource additions.

Figure 5-12: Cumulative 2024-2040 Additions by Resource Type and Sensitivity (MW)



D. Preferred Plan Benefits

We believe our analysis supports selection of Scenario 3, extension of Prairie Island to 2053/2054 and Monticello nuclear facility to 2050, as our Preferred Plan. While all of our scenarios meet the 2030 carbon goal we established and achieve compliance with the new 100 percent carbon-free energy by 2040 legislation, we believe cost and risk considerations elevate Scenario 3 above the rest as an appropriate path forward.

1. Cost

As demonstrated in our modeling analysis, the Preferred Plan achieves customer value under a wide variety of future conditions. The Preferred Plan achieves savings under all PVSC analysis and through the planning period on a PVRR analysis. When carbon impacts are considered, either through incorporation of a cost or an emissions constraint, our Preferred Plan results in significant savings. Further, from a customer rate impact perspective, the Preferred Plan, as modeled, results in annual rate increases of under one (1) percent, which is below the rate of inflation.[12] Altogether, we believe the Preferred Plan delivers tangible customer savings while taking industry-leading steps towards a carbon free future.

2. Risk

In addition to beneficial cost outcomes, the Preferred Plan addresses major risks by maintaining portfolio diversity, retaining optionality and effectively managing market exposure. The 2024 Plan incorporates significant capacity additions to replace retiring resources and expiring PPAs, consisting of a diverse portfolio of DSM, nuclear extension, solar, wind, storage, and firm dispatchable resource additions. Further, ensuring we do not become too dependent on a single fuel source mitigates risk.

We also evaluate factors such as energy market exposure and portfolio length. Our Preferred Plan limits our exposure to market risk and ensures we have the resources needed to serve our customers. As discussed below, we conducted extensive analysis to confirm the energy adequacy of our plan. Further, our Preferred Plan results in a portfolio length of at least 230 MWs through the planning period. We believe our Preferred Plan's portfolio length is warranted at this time, and creates an effective hedge for our customers against two key risk factors:

Capital Investment Wind Down at Retiring Plants. The retirement of our remaining coal

[12] As noted in Chapter 4: Preferred Plan and discussed further in Chapter 6: Customer Rate and Cost Impacts

assets, in addition to the expiration of other resources by 2030 exposes our customers to some risk as we wind down operations and reduce capital spend at these plants. In the event of an early outage, excess capacity will give us the option to adjust resource procurements as needed if we find that a capital investment needed to continue operation of a retiring plant is not in our customers' best interests at that time.

Capacity Accreditation. We expect further changes to the accreditation of resources in MISO as discussed Chapter 2: Planning Landscape. MISO's Direct Loss of Load (DLOL) proposal calculates accreditation based on modeled and historical performance of resources during tight margin hours. Our Preferred Plan additions position us to be able to manage the uncertainty of further changes to resource accreditation.

VIII. SPECIAL STUDIES ON THE PREFERRED PLAN

Special studies in resource planning allow for a more thorough examination of specific issues not fully covered in the general resource plan. In this 2024 Plan, we evaluated community energy goals and meeting renewable statute requirements as described below. We also conducted remodels to assess how distributed generation (DG) solar bundles and potential new technology options could impact the Preferred Plan as described below.

A. 50 Percent/75 Percent Renewables

Minn. Stat. § 216B.2422, subd. 2(c) requires that we "include the least cost plan for meeting 50 and 75 percent of all energy needs from both new and refurbished generating facilities through a combination of conservation and renewable energy resources." The Preferred Plan (Scenario 3) satisfies the statute's first requirement (50 percent of energy needs from conservation or renewables) because it is economically optimized and meets approximately 81 percent of energy needs with renewables and conservation. Our baseload scenario analysis satisfies this statute's second requirement (75 percent of energy needs from conservation or renewables), as Scenario 3 yields the least cost plan for meeting at least 75 percent of all energy needs from both new and refurbished generating facilities through a combination of conservation and renewable energy resources.

B. Remodels – DG Solar Bundles, New Technology (Hydrogen, SMRs, Long Duration Storage)

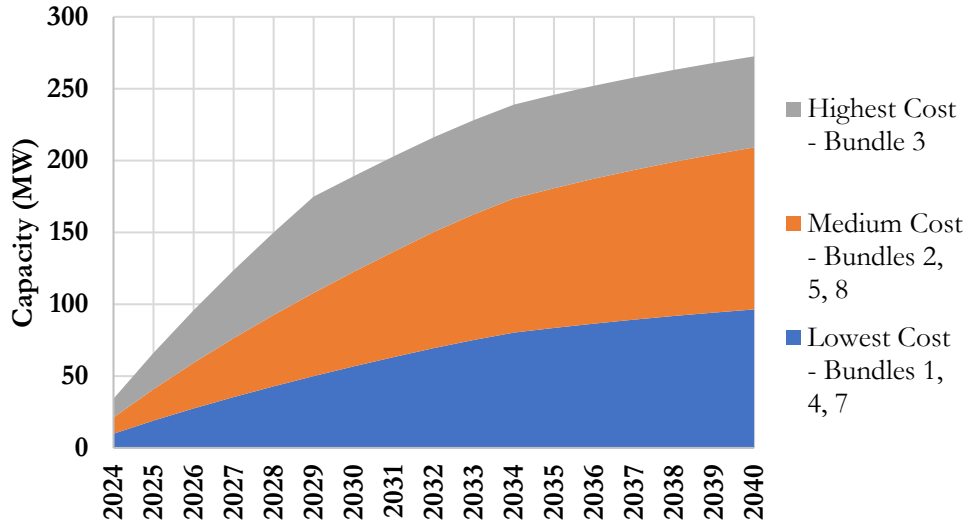
We conducted a special study on the Preferred Plan to assess the impacts of additional DG solar bundles as required by 2019 Plan, Order Point 15. Further, we conducted special studies of advanced technologies (hydrogen, SMRs, long duration storage, and a combination of the three advanced technologies), data center load, resource adequacy (higher PRM/RBDC opt-out, 25 percent battery ELCC, 2,300 MW market access, wind fleet variability), and an energy adequacy analysis—on the Preferred Plan. For each of these studies, the additional resource options are evaluated and optimized in the modeling and added when economic. The study assumptions and findings are described below. A cost analysis for these studies is not included below because the assumptions are insufficiently developed, and the current costs are too high relative to the resource options modeled in this 2024 Plan. Further, the commercial viability of some of these technologies hinders the ability to provide a detailed and reliable cost analysis.

1. DG Solar Bundles

For this special study, we created nine solar bundles as additional resource options for EnCompass to select. Appendix J: Distributed Energy Resources, contains detail on how the solar bundles were developed and about what they represent: estimates of generic customer-owned distributed solar that are economically possible, absent any 1) technical and market barriers for customers and 2) specific details about how the Company would acquire these resources.

Figure 5-13 below shows the selected DG bundle capacity by year, and the resulting cumulative capacity expansion plan is shown in Table 5-9.

Figure 5-13: Selected DG Bundles (MW)



As shown in Figure 5-13 above, solar bundle resource selection increases each year and peaks at 272 MW in 2040. Notably, half of the capacity is installed by the late 2020s. The majority of the added DG solar capacity is derived from the two lowest incentive payment bundles. As shown in Table 5-9 below, the addition of the DG solar bundle resource option results in a reduction of 900 MW of utility-scale generic solar, a slight increase in the amount of storage, and an additional 800 MW of wind. Please see Appendix J: Distributed Energy Resources, for discussion about next steps upon acceptance of each bundle.

Table 5-9: Cumulative Capacity Expansion Plan with Solar Bundle Resource Option (MW)

Resource Type	Base Preferred Plan	Selectable DG Bundles
Standalone Storage	2,100	2,160
Wind	8,400	9,200
Utility-Scale Solar (Non-Bundle)	1,500	600
Firm Peaking	3,592	3,592
Total Without Bundles	15,592	15,552
Additional DG Solar (Bundles)	0	273

Resource Type	Base Preferred Plan	Selectable DG Bundles
Total Added Capacity	15,592	15,775

2. Advanced Technology

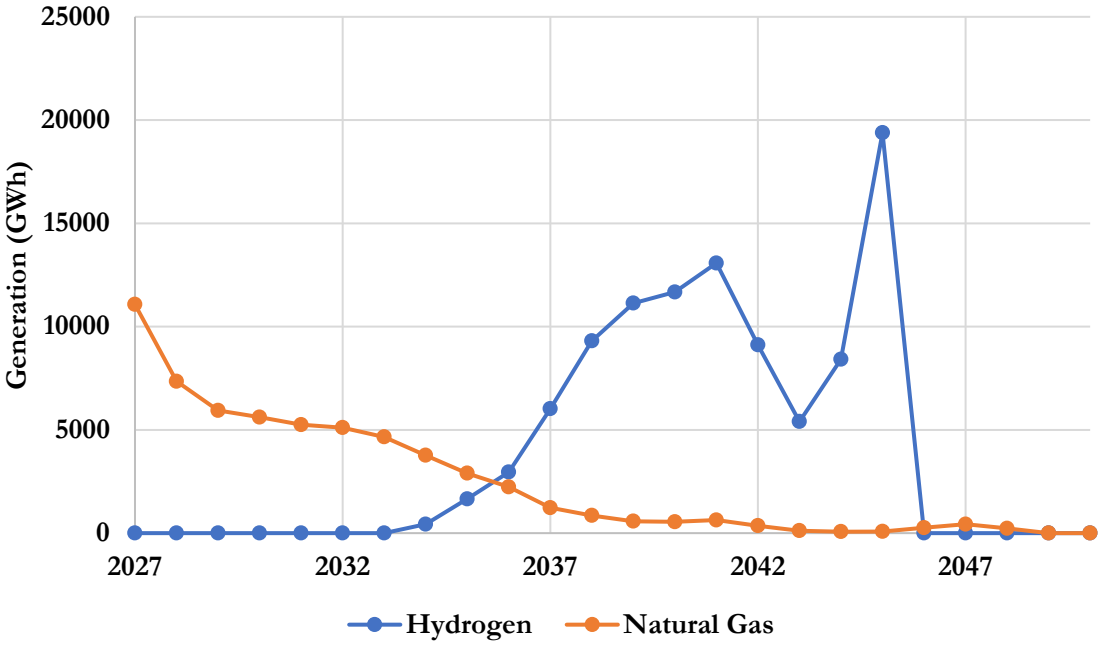
As discussed in Appendix X: Advanced Technologies, advanced and evolving technologies will play a critical role in helping us eliminate the remaining carbon emissions from our system while maintaining safe, affordable, and reliable electric service at times when renewable energy output is low. To further analyze the potential of advanced technologies to achieve our 2050 carbon-free vision, we used Encompass to perform special studies on three advanced technologies. We first study each technology—hydrogen, small modular reactors (SMRs), long duration energy storage (LDES)—individually. Finally, we conducted another study to allow EnCompass select from all three advanced technology options. For each special study, we impose a 100 percent carbon reduction by 2050 (100x50) constraint in EnCompass. We discuss our assumptions and study findings below. Additional model inputs and assumptions are included in Appendix F: EnCompass Modeling Assumptions & Inputs.

a. Hydrogen

For this study, hydrogen is the only advanced technology option available for EnCompass to select. The model allows hydrogen blending with natural gas in firm dispatchable resources (modeled as generic CTs) up to 100 percent starting in 2030 based on economic signals and the carbon constraint. The generic CT depreciation life remains at the default of 40 years due to its hydrogen blending capability.

As shown on Figure 5-14, hydrogen generation rises starting in 2034, reaching its peak in 2045, as the declining production cost and the hydrogen PTC make it a cost-effective, clean alternative to natural gas. However, the expiration of the hydrogen PTC in 2045 reduces its cost-effectiveness and the model does not rely on hydrogen after the PTC expiration based on these assumptions. Further, the use of natural gas gradually diminishes over this period.

Figure 5-14. Generation by Fuel Type in the Hydrogen Only Study (PVSC)



b. Small Modular Reactors (SMRs)

For this study, SMRs are the only available advanced technology resource option for EnCompass to select starting in 2035. The depreciation life of generic CTs is shortened to be fully depreciated in 2050.

As shown below in Table 5-10, the first SMR is selected in 2047 in anticipation of nuclear retirement and zero carbon target in 2050.

Table 5-10: Cumulative Capacity Expansion Plan in the SMR Only Study (MW)

Resource Type	2027-2035	2036-2040	2041-2045	2046-2050	2051-2055
Standalone Storage (4-hr)	1,620	900	2,040	5,640	(900)
SMRs	-	-	-	4,200	3,000
Wind	5,800	3,800	8,400	3,200	2,000
Solar	1,800	300	2,000	5,800	2,900

Resource Type	2027-2035	2036-2040	2041-2045	2046-2050	2051-2055
Firm Peaking	2,244	1,122	-	(3,366)[13]	-
Total	11,464	6,122	12,440	15,474	7,000

c. Long Duration Energy Storage (LDES)

For this study, LDES is the only advanced technology resource for EnCompass to select starting in 2035. The depreciation life of generic CTs is shortened to be fully depreciated in 2050.

The battery seasonal accreditation starts with the MISO October 2023 Resource Adequacy BPM section 4.2.9.4, which provides the five percent forced outage (95 percent accredited capacity assumptions) for new energy storage resources. The accreditation trends over several years from the 95 percent capacity accreditation to the long-term assumptions for battery storage resources in the MISO November 2022 RRA. The MISO battery accreditation is based on a four-hour battery. In the case of a 10-hour battery, we conservatively apply the same value since MISO does not provide an ELCC for a 10-hour duration.

As shown below in Table 5-11, the first LDES is selected in 2036. With significant further additions through 2050. The analysis relies on renewable additions and LDES to achieve the 100x50 goal. As shown in the table below, the model relies on LDES rather than the shorter duration standalone storage.

Table 5-11: Cumulative Capacity Expansion Plan in the LDES Only Study (MW)

Resource Type	2027-2035	2036-2040	2041-2045	2046-2050	2051-2055
Standalone Storage	1,680	-	(840)	840	-
LDES	-	3,000	1,700	7,600	5,500
Wind	6,000	2,400	8,600	-	3,000
Solar	1,800	-	-	3,700	2,100
Firm Peaking	2,244	-	-	(2,244)	-

[13] All firm peaking resources are retired by 2050 in this study.

Resource Type	2027-2035	2036-2040	2041-2045	2046-2050	2051-2055
Total	11,724	5,400	9,460	9,896	10,600

d. Three Advanced Technology Resource Options

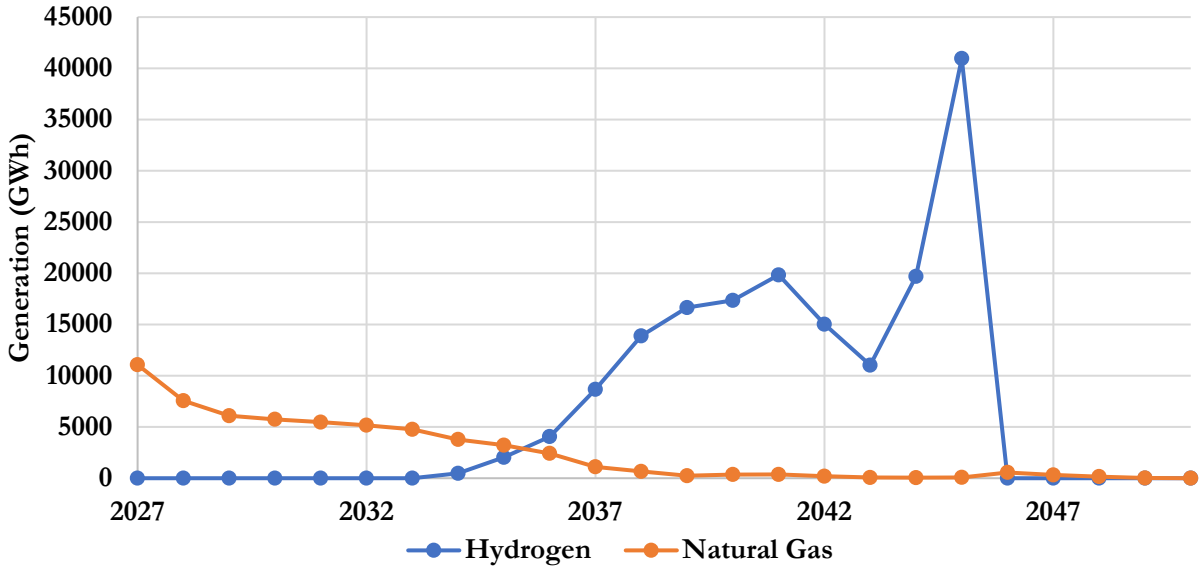
For this study, all three advanced technology resource options—hydrogen, small modular reactors (SMRs), and long duration energy storage (LDES)—were available for EnCompass to select. The SMRs and LDES resources could be selected starting in 2035. The model allows hydrogen blending with natural gas up to 100 percent in firm dispatchable resources (modeled as a CT) starting in 2030 based on economic signals and the carbon constraint. The generic CT depreciation life remains at the default of 40 years, due to its blending capability.

As shown below in Table 5-12, the first LDES resource is selected in 2036, and no SMR is selected throughout the planning period. Hydrogen blending starts in 2034 in the PVSC scenario.

Table 5-12: Cumulative Capacity Expansion Plan in the Study with Three Advanced Technology Resource Options (MW)

Resource Type	2027-2035	2036-2040	2041-2045	2046-2050	2051-2055
Standalone Storage	1,320	-	(600)	(720)	-
LDES	-	2,500	1,900	6,200	5,200
SMRs	-	-	-	-	-
Wind	6,400	800	10,000	-	3,600
Solar	1,500	-	-	3,900	2,300
Firm Peaking	2,470	-	-	-	-
Total	11,690	3,300	11,300	9,380	11,100

Figure 5-15. Generation by Fuel Type in the Scenario with Three Advanced Technology Resource Options (PVSC)



The integration of hydrogen, SMRs, and LDES onto our system has the potential to provide our customers with safe, reliable, and cost-effective benefits while helping the Company and the State of Minnesota achieve decarbonization goals. Our Preferred Plan strategically positions us to explore and integrate advanced technologies in a practical and timely manner to accelerate the clean energy transition.

3. Data Center Load

For the data center load special study, we have assumed load growth surpassing the traditional high load sensitivity to accommodate the accelerated load growth stemming from data centers. The demand for data centers has recently surged notably due to the expansion of machine learning/artificial intelligence technologies, which are more energy-intensive than traditional data processing methods. Xcel Energy's achievements in renewable energy, along with state initiatives and robust fiber connectivity, are contributing to this increased demand for data centers in our service territory. The Company is actively engaged with several hyperscale and colocation data centers, with transmission interconnection studies underway for several requests. These entities are largely seeking renewable/carbon-free energy options and are interested in forming partnerships.

The results in Table 5-13 show the impact of an increased data center load on the capacity expansion plan.

Table 5-13: Cumulative 2024-2040 Additions by Resource Type Comparison

Resource Type	Base Preferred Plan	Data Center Load
Standalone Storage	2,100	2,220
Wind	8,400	12,800
Solar	1,500	3,200
Firm Peaking	3,592	5,462
Total	15,592	23,682

4. Resource Adequacy

To assess resource adequacy, we conducted four special studies as further described below: (1) higher planning reserve margin (RBDC Opt-Out), (2) 25 percent battery ELCC, (3) 2,300 MW Market Access and (4) Wind Fleet Variability. The resulting capacity expansion plan for each resource adequacy study is shown in Table 5-14 and discussed below.

Table 5-14: Cumulative 2024-2040 Additions by Resource Type for Each Resource Adequacy Study

Resource Type	Base Preferred Plan	RBDC Opt-Out	25% Battery ELCC	2,300 MW Market Access	Wind Fleet Variability
Standalone Storage	2,100	2,100	1,320	1,620	2,160
Wind	8,400	8,400	9,200	11,400	8,000
Solar	1,500	1,400	1,700	3,100	1,600
Firm Peaking	3,592	3,592	4,488	2,618	3,592
Total	15,592	15,492	16,708	18,738	15,352

a. Higher Planning Reserve Margin (RBDC Opt-Out)

As discussed in Chapter 2: Planning Landscape, the Reliability Based Demand Curve (RBDC) is a proposed design for MISO's Planning Resource Auction that aims to reflect the value of capacity in excess of the MISO PRM and produce more efficient and stable capacity prices. The RBDC opt-out proxy represents the additional capacity necessary to opt-out of the RBDC. By opting out of the RBDC, we can avoid costs

that would otherwise be assessed to compensate other generators in MISO. This sensitivity assesses the cost of securing the excess generation needed to opt-out. As shown in Table 5-14 above, this study results indicate that the Preferred Plan capacity additions are sufficient to meet the higher planning reserve margin in most years.

b. 25 Percent Battery Effective Load Carrying Capability (ELCC)

The 25 percent battery ELCC special study evaluates the impact of a lower ELCC for battery storage, instead of the 95 percent accreditation battery storage received in the current planning year. As shown in Table 5-14 above, in this study, standalone storage resources additions are reduced by 780 MW while over 1,000 MW of capacity is added from the other resource options. In the near term, by 2030, there is no change in firm peaking capacity additions, and battery capacity additions are reduced by 60 MW relative to the Preferred Plan.

c. 2,300 MW Market Access

For this study, we allow hourly market access of 2,300 MW. As thoroughly discussed in Section IV, the model adds over 10,000 MW of wind alone during this planning period and results in a significant market exposure.

d. Wind Fleet Variability

In the 2019 Plan, the Commission ordered that the Company analyze our likely firm dispatchable need using "corrected modeling of wind fleet variability."[14] We clarify that our generic wind profile uses the average hourly wind generation from our existing wind fleet, which inherently reflect variability of the wind generation profiles. However, to address the order point, this sensitivity uses a blended profile from three representative wind profiles in Minnesota, North Dakota and South Dakota, then allows the model to re-optimize any additions of firm dispatchable resources. We note that our existing wind facilities are modeled using resource-specific wind profiles.

The results in Table 5-14 above show that the cumulative firm peaking capacity additions by 2040 in this study is the same as the Reference Case, indicating changing the generic wind profile does not reduce the need for firm dispatchable resources. However, we intend to conduct this analysis as part of evaluation of resource options in Docket No. E-002/CN-23-212.

[14] *In the Matter of the 2020-2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy*, Docket No. E-002/RP-19-368, Order (April 15, 2022), at p.32.

5. 10-hour battery and hybrid resource options

In this study, a 10-hour battery is first selected in 2052 and the hybrid resource is not selected in the modeling period. This validates our decision to remove these two resource options in the base runs to speed up the run time.

6. Energy Adequacy Analysis

We conducted a special study to test the energy adequacy of our plans. As discussed in Appendix D: Energy Adequacy Analysis, we used historical data on four plans including our Preferred Plan and Market Access Optimization, which was developed assuming 2,300 MW of hourly market access.[15] This analysis allows us to assess the capacity and energy adequacy of our plans. We evaluated these four plans on six different measures:

1. Native Capacity Shortfall: Hours of insufficient system capacity in each year.
2. Average Shortfall Intensity: Average Shortfall in MW during the shortfall events in each year.
3. Longest Shortfall Event: Longest duration in hours of the shortfall events in each year.
4. Peak Capacity Shortfall: Peak capacity shortfall in MW of the capacity shortfall events in each year.
5. MISO Market Reliance Hours: Total number of hours the plan is reliant on the market to serve load.
6. MISO Market Reliance Energy: Total amount of MWh the plan is reliant on the market to serve load.

A summary of the results for each scenario in 2030 and 2040 is shown in Table 5-15 below. The highest values in each category are in bold.

[15] As discussed in Appendix D, which also analyzed the Reference Case and Low Load Scenario.

Table 5-15: Summary of 2030 Energy Adequacy Special Study Scenario

		Capacity Adequacy Metrics				Energy Adequacy Metrics**	
Plan	**Historical Year - Hourly Conditions in 2030**	**Native Capacity Shortfall (Hrs.)**	**Average Shortfall Intensity (MW)**	**Longest Shortfall Event (Hrs.)**	**Peak Capacity Shortfall (MW)**	**MISO Market Reliance Hours**	**MISO Market Reliance (MWh)**
Preferred Plan (Scenario 3)	**2016 Historical**	1	83	1	83	1	83
	2017 Historical	0	0	0	0	0	0
	2018 Historical	0	0	0	0	0	0
	2019 Historical	0	0	0	0	0	0
	2020 Historical	1	219	1	219	2	590
	2021 Historical	0	0	0	0	1	204
	2022 Historical	0	0	0	0	0	0
Market Access Optimization (Scenario 3 Market On Expansion Plan)	**2016 Historical**	**54**	**484**	**7**	**1,684**	**61**	**32,204**
	2017 Historical	**48**	**272**	**5**	**953**	**69**	**25,023**
	2018 Historical	**65**	**344**	**6**	**1,312**	**102**	**40,769**
	2019 Historical	**74**	**463**	**6**	**1,368**	**94**	**45,356**
	2020 Historical	**83**	**415**	**7**	**1,479**	**109**	**57,072**
	2021 Historical	**61**	**269**	**5**	**1,082**	**100**	**41,205**
	2022 Historical	**20**	**290**	**3**	**1,144**	**24**	**7,254**
	**** LOLH is higher than capacity shortfall due to batteries having available capacity, but no stored energy (MWh)**						

As shown in Table 5-15 above, the Preferred Plan performs well across energy adequacy metrics. There are only two hours of native capacity shortfall in 2030 across the seven historic years tested and applied to our Preferred Plan, resulting in limited dependence on the market. There are only four hours across the seven historical test

years where the Preferred Plan requires market purchases in order to meet load serving needs.

In contrast, under the Market Access Optimization, assumes market access of 2,300 MW in all hours of the year, the results plan exposes our customers to excessive risk. There are 405 hours across the seven historic years where the plan has insufficient capacity to meet needs. This results in 509 hours where the plan cannot meet load serving needs and must rely on market purchases of nearly 250,000 MWh of energy.

IX. CONCLUSION

Considering the above, we believe our modeling and analysis fully supports selection of the Preferred Plan and strikes a strong balance in meeting our planning objectives, in service of our customers' needs. The Preferred Plan sets us on a path to meet both our 2030 carbon reduction objectives and longer-term carbon-free goals and achieve compliance with the new 100 percent carbon-free energy by 2040 legislation, all while providing affordable and reliable service. Further, the Preferred Plan is bolstered by comprehensive reliability and sensitivity analysis, which scrutinize a wide variety of factors and contingencies. This thorough examination provides confidence in the plan's resilience to uncertainties and its ability to meet future energy demands reliably. The combination of robust sensitivity analysis and the multifaceted advantages of nuclear plant extensions underscore the soundness of the Preferred Plan.

CHAPTER 6 – CUSTOMER RATE AND COST IMPACTS

I. INTRODUCTION

Minn. R. 7843.0500, subp. 3, requires that the Minnesota Public Utilities Commission evaluate resource plans on, among other things, their ability to "keep the customers' bills and the utility's rates as low as practicable, given regulatory and other constraints." In this chapter we present rate and bill impacts of our Preferred Plan for our Residential, Commercial, and Industrial customer classes.[1] Overall, our Preferred Plan results in an estimated annual rate increase of 0.5 percent for Minnesota customers, which is less than the expected national average increase of 2.1 percent for electricity prices.

Producing a detailed analysis of rate impacts in a resource planning process with long time horizons is challenging due to the potential changes in our rates and resource needs over time. Factors that can impact the estimated rate impacts in the planning period include generation ownership structure, tax treatment, regulatory decisions, large customer load additions, changes in customer class allocations, and others. The simplifying assumptions made in both the calculation methodology and the input variables mean that these estimated impacts may not align with the actual rates set by the Commission for various customer classes in the future. We caution that this information should not be interpreted as directly comparable to the customer rate impact information we would provide as part of a rate case filing.

Our customer cost impact analysis shows that the Preferred Plan does not materially increase costs for our customers. The Preferred Plan results in an estimated average annual increase in retail rates of 0.9 percent across our system, compared to the Reference Case results of 0.7 percent and the EIA forecasted national average electricity rate increase of 2.1 percent. In other words, we can achieve significant CO_2 emissions reductions, with cost impacts that are less than half of the expected national average increase in electricity prices. Both the Reference Case and the Preferred Plan are designed to meet the Company's clean energy goals, and state policy objectives. As shown below, our Preferred Plan maintains affordability and reliability while continuing our trend of carbon reduction benefits relative to our Reference Case.

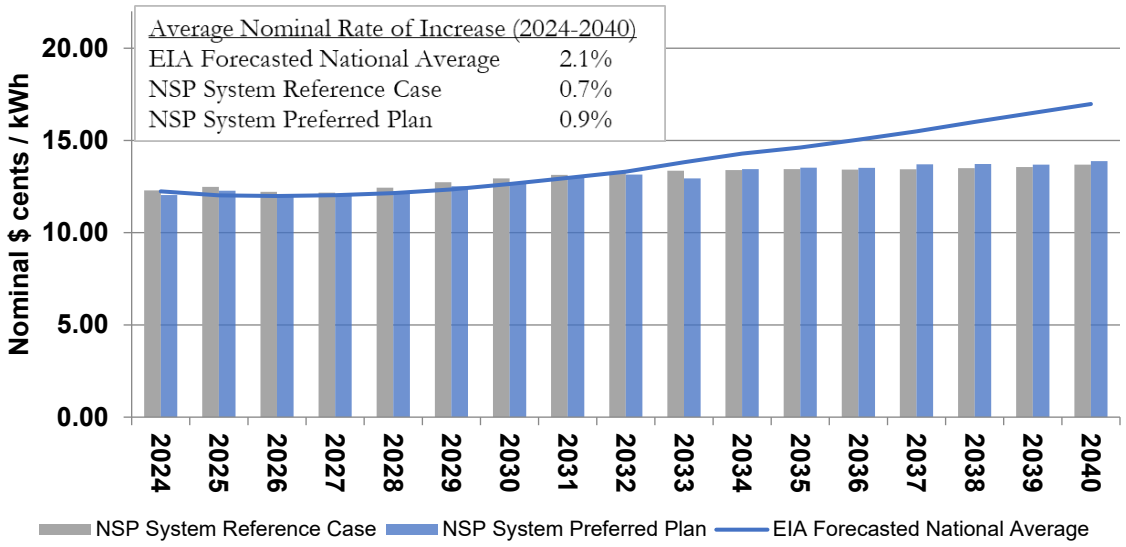
A. Preferred Plan Average Nominal Cost Comparison to National Average

We begin by showing our Reference Case and Preferred Plan's average nominal cost as compared to the national average as forecasted by the Energy Information

[1] See *In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy*, Order Approving Plan with Modifications and Establishing Requirements for Future Filings, MN PUC Docket No. E-002/RP-19-368, Order Point 18 (April 15, 2022).

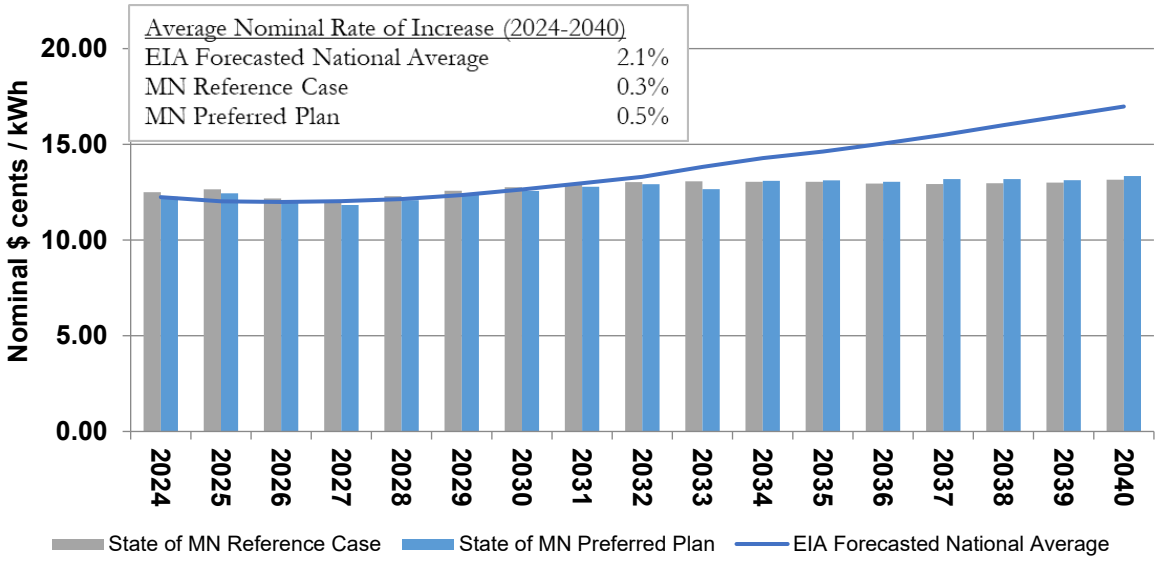
Administration. To show the cost impact of our proposal over the long-term, we provide a compound average growth rate (CAGR) comparison of our Preferred Plan compared to the national average nominal cost CAGR for the NSP System in Figure 6-1, and Minnesota in Figure 6-2, below. As can be seen in these figures, our Preferred Plan remains lower than the national average.

Figure 6-1: Average Nominal Cost Comparison
NSP System



** Notes: National energy cost forecast from Energy Information Administration (EIA) Annual Energy Outlook 2023, Table Energy Supply, Disposition, Prices and Emissions – Reference Case. End use prices, all sector average.*[2] The Preferred Plan and Reference Plan lines include the costs of Solar Rewards*Community.

Figure 6-2: Average Nominal Cost Comparison
State of Minnesota



The results above indicate that the CAGR for average rates is higher for the Preferred Plan than for the Reference Case. To be clear, however, this should not be interpreted to mean that the Reference Case is more beneficial to customers than the Preferred

Plan. The CAGR simply measures the growth rate from one end point to another, in this case the average rate in 2024 versus the average rate in 2040. The Preferred Plan average rate in 2024 begins at a slightly lower point than in the Reference Case, and ends slightly higher in 2040, resulting in a higher growth rate. In contrast, the PVRR analysis takes into account each year of the annual revenue requirement stream, and not just the end points in 2024 and 2040. As discussed earlier in this filing, the Preferred Plan results in a lower PVRR than the Reference Case, making the Preferred Plan the overall least cost option for our customers.

The results in Figures 6-1 and 6-2 also show that the Minnesota CAGR is lower than the NSP system average CAGR for the time period of 2024 through 2040. This is due to the way each CAGR is calculated. The annual NSP system average rates are calculated as the annual revenue requirement for the entire NSP system divided by NSP system sales. The annual Minnesota rates are calculated the same way using the jurisdictional revenue requirement and the jurisdictional annual sales forecast. Since Minnesota sales are forecasted to grow more quickly than the NSP average, they make up a larger portion of the total NSP sales mix in 2040 than they do in 2024. Therefore, the average rates in 2040 (and thereby the CAGR to reach those rates) for Minnesota are lower than for the NSP system as a whole.

II. REVENUE REQUIREMENTS FORECAST METHODOLOGY

To calculate the long-term rate impacts of the Preferred Plan as compared to the Reference Case, we first developed a forecast of revenue requirements for the Reference Case. This forecast leverages retail revenue requirements from the Company's most recent rate case test years approved by each Commission in our five jurisdictions: Minnesota,[3] North Dakota,[4] South Dakota,[5] Wisconsin,[6] and Michigan[7] to create an NSP System revenue requirement for 2024. We identified annual costs through the end of the planning period (2040) using the CAGR of generation and fuel costs from the EnCompass model Reference Case. This approach avoids speculation

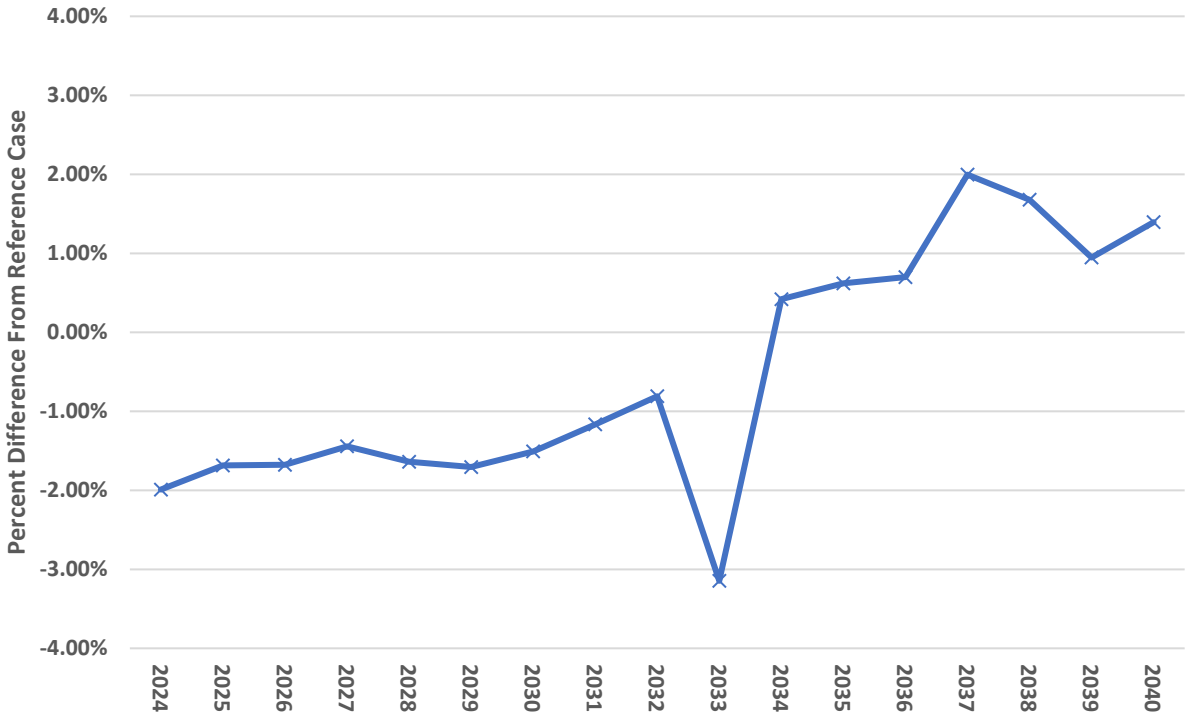
[2] *See* U.S. Energy Information Administration - EIA - Independent Statistics and Analysis The EIA's Annual Energy Outlook was published in 2023.
[3] *In the Matter of the Application of Northern States Power Company, dba Xcel Energy, for Authority to Increase Rates for Electric Service in the State of Minnesota*, Findings of Fact, Conclusions, and Order, MN PUC Docket No. E-002/GR-21-630 (July 17, 2023).
[4] *Northern States Power Company 2021 Electric Rate Increase Application*, Order on Settlement, Case No. PU-20-441 (August 18, 2021).
[5] *In the Matter of the Application of Northern States Power DBA Xcel Energy for Authority to Increase Its Electric Rates*, Order Granting Joint Motion for Approval of Settlement Stipulation; Order Approving Refund Plan, Docket No. EL22-017 (June 8, 2023).
[6] *Application of Northern States Power Company-Wisconsin for Authority to Adjust Electric and Natural Gas Rates,* Final Decision, 4220-UR-126 (December 20, 2023).
[7] *Id.*

on areas of the business not related to resource planning and modeling, while still using the detailed generation-related information from the EnCompass model to create a "business as usual" long term rate projection.

To determine the revenue requirement impact of the Preferred Plan, we identified the differential in annual expenses and capital spend of the Preferred Plan compared to the Reference Case Encompass model results. This annual differential was added to the annual Reference Case revenue requirements to create the Preferred Plan annual revenue requirements.

Figure 6-3 below illustrates the estimated revenue requirement impacts of the Preferred Plan compared to the Reference Case over the planning period, while Figure 6-4 localizes the impacts to Minnesota.

Figure 6-3: Annual Percent Change in Revenue Requirements (2024-2040)
Preferred Plan Compared to Reference Case
NSP System

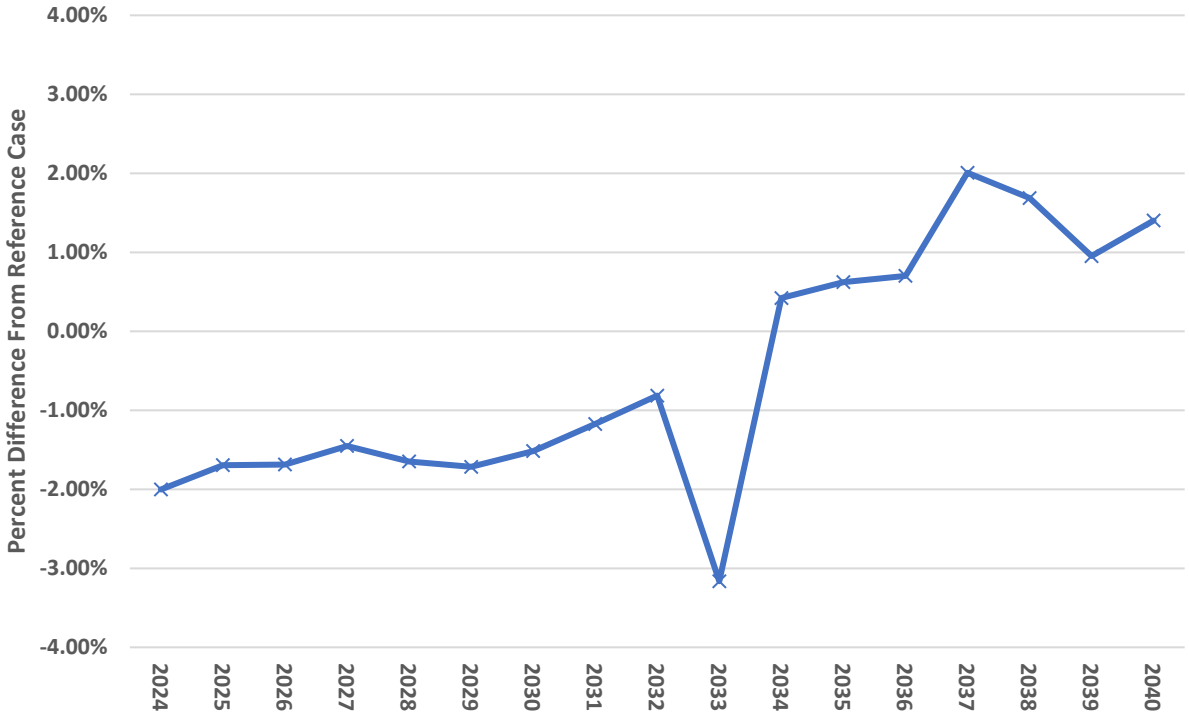


The annual revenue requirements for the Reference Case and Preferred Plan were jurisdictionalized using allocators from the Company's 2022-2024 Minnesota Electric Rate Case (Docket No. E-002/GR-21-630). Table 6-1 and Figure 6-4 below provide the estimated impact of the Preferred Plan for Minnesota.

Table 6-1: Estimated Incremental Impact of Preferred Plan State of Minnesota – All Customers

Year	Reference Case Revenue Req ($000)	Incremental Impact of Preferred Plan ($000)	Preferred Plan Revenue Req ($000)	Incremental Impact (%)
2024	$3,537,894	-$70,821	$3,467,074	-2.00%
2025	$3,628,567	-$61,488	$3,567,079	-1.69%
2026	$3,721,563	-$62,756	$3,658,808	-1.69%
2027	$3,816,943	-$55,396	$3,761,547	-1.45%
2028	$3,914,768	-$64,499	$3,850,268	-1.65%
2029	$4,015,099	-$68,867	$3,946,232	-1.72%
2030	$4,118,002	-$62,422	$4,055,580	-1.52%
2031	$4,223,542	-$49,503	$4,174,039	-1.17%
2032	$4,331,788	-$35,259	$4,296,529	-0.81%
2033	$4,442,807	-$140,536	$4,302,271	-3.16%
2034	$4,556,672	$19,193	$4,575,865	0.42%
2035	$4,673,454	$29,110	$4,702,565	0.62%
2036	$4,793,230	$33,664	$4,826,895	0.70%
2037	$4,916,076	$98,679	$5,014,755	2.01%
2038	$5,042,070	$85,061	$5,127,131	1.69%
2039	$5,171,293	$49,226	$5,220,520	0.95%
2040	$5,303,828	$74,393	$5,378,222	1.40%

Figure 6-4: Annual Percent Change in Revenue Requirements (2024-2040)
Preferred Plan Compared to Reference Case
State of Minnesota



III. KEY DRIVERS

The major inflection points in the delta of revenue requirements (and rates) are driven by the differences in the set of resources that comprise the Preferred Plan and Reference Case; these points coincide with differences in the retirement dates for Prairie Island. Compared to the Reference Case, the Preferred Plan results in lower cost through 2033 due to the extension of Prairie Island and corresponding reduction in depreciation expense. The Prairie Island extension results in fewer resources added in 2033, including the offset of a firm dispatchable addition, compared to the Reference Case, and therefore lower costs reflected in the downward spike in 2033 reflected in Figures 6-3 and 6-4 above. The slightly higher costs in 2034 and beyond reflect the relative costs associated with the Prairie Island extension and the costs of resources added in the Reference Case after Prairie Island retires based on our assumptions for generic resource additions. The generic resource additions are modeled assuming a levelized cost over the life of the asset.

IV. ESTIMATED ANNUAL RATE IMPACTS

After determining the revenue requirement of the Reference Case and the incremental impacts from the Preferred Plan, we determined customer class revenue requirement impacts using cost allocation principles described below. We calculated rate impacts in $ per kWh by dividing each customer class's revenue requirement in each year by the annual forecasted sales.

Figure 6-5 and 6-6 provide the incremental rate impacts of the Preferred Plan for retail customers and by customer class, respectively.

Figure 6-5: Incremental Rate Impact of Preferred Plan
State of Minnesota – All Customers

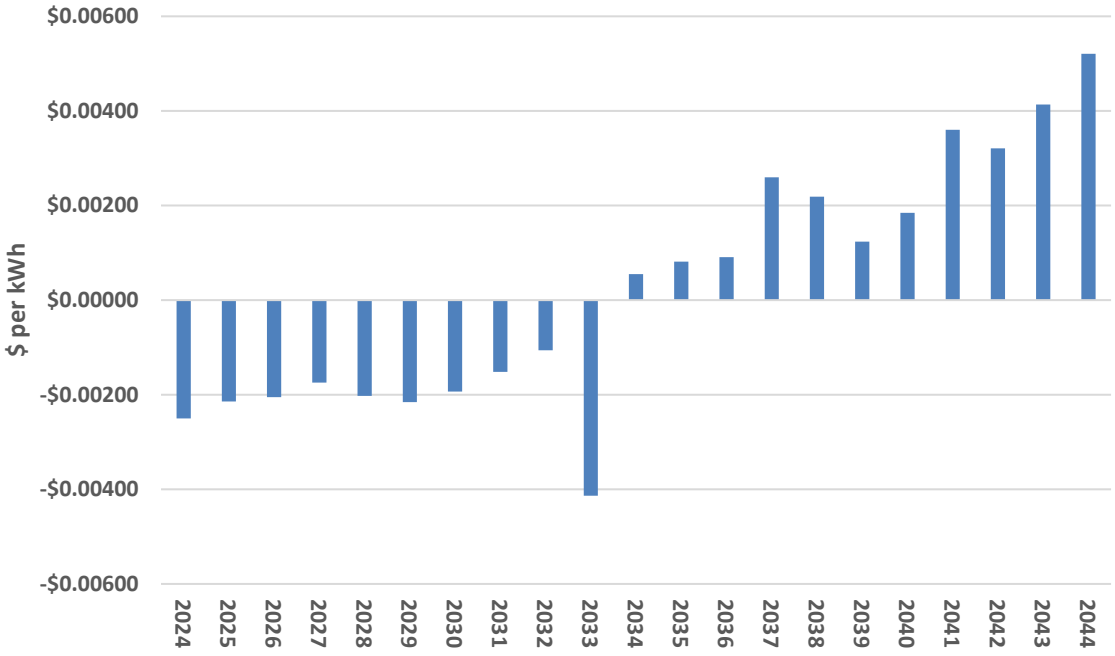
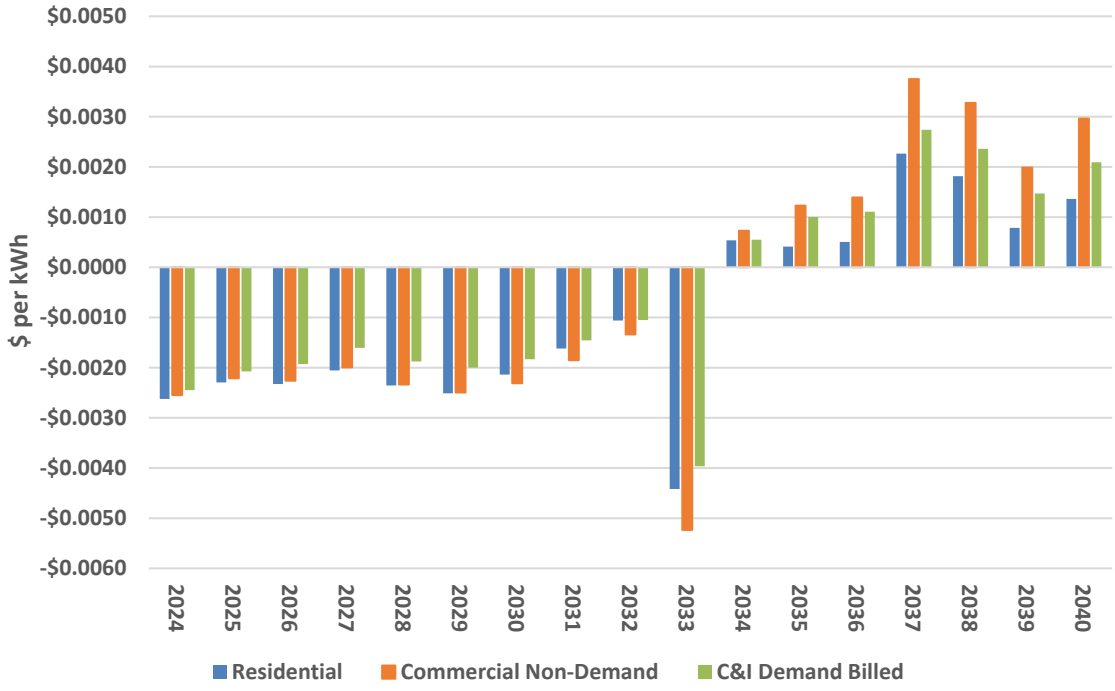


Figure 6-6: Incremental Rate Impact of Preferred Plan
by Customer Class – State of Minnesota



As noted above, we determine customer class revenue requirement impacts of the Preferred Plan by allocating incremental costs to customer classes for each year in the planning period (2024-2040). To do this, we apply ratemaking treatments to expense items for each generation resource type that is impacted by the 2024 Plan. Items include fuel costs and purchased energy, fixed O&M, variable O&M, and the revenue requirement associated with capital investments.

Costs for fuel, purchased energy, and variable O&M are allocated to customer classes using the E8760 energy allocator approved in our most recent Minnesota rate case, as provided below:[8]

Table 6-2: E8760 Energy Allocator

MN	Residential	Commercial Non-Demand	C&I Demand	Lighting
100.00%	31.69%	2.94%	65.03%	0.35%

The E8760 allocator is calculated by taking the forecast hourly load for each of the 8,760 hours of the test year for each customer class, then weighting the hourly load by the forecasted hourly marginal energy cost in each respective hour.

Fixed O&M and the revenue requirement related to capital investments are split into energy-related and capacity/demand-related components using the Company's plant stratification analysis approved in our most recent Minnesota rate case.[9] We provide the plant stratification analysis for each plant type below:

[8] See Docket No. E002/GR-21-630, *In the Matter of the Application of Northern States Power Company for Authority to Increase Rates for Electric Service in the State of Minnesota*, Findings of Fact, Conclusions, and Order , (July 17, 2023).
[9] *Id.*

Table 6-3: Stratification Analysis by Plant Type

Plant Type	Replacement Value $/kW	Capacity Ratio	Capacity/Demand Percentage	Energy Percentage
Combustion Turbine	$1,026	$1,026 / $1,026	100.0%	0.0%
Fossil	$2,458	$1,026 / $2,458	41.8%	58.2%
Nuclear	$5,109	$1,026 / $5,109	20.1%	79.9%
Wind	$11,262	$1,026 / $11,262	9.1%	90.9%
Solar	$3,736	$1,026 / $3,736	27.5%	72.5%

The plant stratification approach begins by comparing the replacement cost of each type of generation plant (fossil, nuclear, etc.) to the replacement cost of a Combustion Turbine (CT). CTs are 100 percent capacity/demand-related since they are the generation source with the lowest capital cost and the highest operating cost. For each generation type, the percent of total generation costs that exceeds the cost of a CT peaking plant are classified as being energy related. These costs are in excess of the capacity/demand-related portion, and as such, were not incurred to obtain capacity, but rather to obtain lower cost energy.

After fixed O&M costs and the capital-related revenue requirement originating from each type of generation plant are split into capacity-related and energy-related components based on the percentages shown in Table 6-3 above, those costs that have been classified as being energy-related are allocated to customer class using the E8760 energy allocator provided in *part 1* above.

The capital costs that have been classified as being capacity- or demand-related are allocated to customer class using the D10S capacity allocator utilized in our most recent rate case.[10] The D10S allocator is simply each customer class's load that is coincident with the NSP system peak load. We provide the D10S customer class allocator percentages below:

Table 6-4: D10S Capacity Allocator

MN	Residential	Commercial Non-Demand	C&I Demand	Lighting
100.00%	39.55%	2.77%	57.68%	0.00%

[10] *Id.*

V. ESTIMATED NEAR-TERM RATE IMPACTS

Table 6-5 below provides a more detailed view of near-term estimated rate impacts for Minnesota customer classes.

Table 6-5: Preferred Plan Minnesota Estimated Rate Impacts by Customer Class per Year

Rate Class Impacts	2024	2025	2026	2027	2028	2029	2030	Comp'd Incr/Yr
Residential (avg rate, ¢/kWh)	15.467¢	15.248¢	15.607¢	15.961¢	16.192¢	16.456¢	15.911¢	N/A
Cumul Increase (¢/kWh)		-0.219	0.140	0.494	0.725	0.989	0.444	N/A
Cumulative Increase (%)		-1.42%	0.90%	3.19%	4.69%	6.39%	2.87%	0.47%
$ Impact/Month, @ 650 kWh		($1.42)	$0.91	$3.21	$4.71	$6.43	$2.89	N/A
Sm Non-Dmd (avg rate, ¢/kWh)	14.501¢	14.301¢	14.672¢	15.122¢	15.522¢	15.949¢	16.743¢	N/A
Cumul Increase (¢/kWh)		-0.200	0.171	0.621	1.021	1.448	2.242	N/A
Cumulative Increase (%)		-1.38%	1.18%	4.28%	7.04%	9.99%	15.46%	2.43%
$ Impact/Month, @ 1,000 kWh		($2.00)	$1.71	$6.21	$10.21	$14.48	$22.42	N/A
Demand (avg rate, ¢/kWh)	10.879¢	10.447¢	9.739¢	9.477¢	9.706¢	9.953¢	10.331¢	N/A
Cumul Increase (¢/kWh)		-0.432	-1.141	-1.403	-1.173	-0.927	-0.548	N/A
Cumulative Increase (%)		-3.97%	-10.48%	-12.89%	-10.79%	-8.52%	-5.04%	-0.86%
$ Impact/Month, @ 37,500 kWh		($162.01)	($427.72)	($526.04)	($440.02)	($347.47)	($205.45)	N/A
Street Ltg (avg rate, ¢/kWh)	26.983¢	26.673¢	27.082¢	27.690¢	28.200¢	28.681¢	29.236¢	N/A
Cumul Increase (¢/kWh)		-0.310	0.099	0.708	1.217	1.698	2.254	N/A
Cumulative Increase (%)		-1.15%	0.37%	2.62%	4.51%	6.29%	8.35%	1.35%
$ Impact/Month, @ 60 kWh		($0.19)	$0.06	$0.42	$0.73	$1.02	$1.35	N/A

Using the methodologies described above, the incremental costs in the last year of the period (2030) for the Preferred Plan would be expected to have the following impacts:

- Residential rate increases by about 0.47 percent on a compounded annual basis through 2030, equivalent to a total increase of $2.89 per month above the current rate level;
- Commercial rate increases by about 2.43 percent on a compounded annual basis through 2030, equivalent to a total increase of $22.42 per month above the current rate level; and
- Industrial rate decreases by about 0.86 percent on a compounded annual basis through 2030, equivalent to a total decrease of $205.45 per month below the current rate level.

As noted above, this is not intended to be a prediction of what rate or bill increases will actually be over this time (which will be impacted by numerous factors, including,

among other things, the specific costs of actual generation additions rather than generic assumptions used here, non-generation related costs, actual sales growth, and cost allocation decisions). Instead, this is intended to serve as an indicative look at the incremental rate and monthly bill impacts of the modeling results for the Preferred Plan.

VI. RATE IMPACTS OF STANDARD OBLIGATIONS

Each electric utility must submit to the Commission a report containing an estimation of the rate impact of activities necessary to comply with Minn. Stat. § 216B.1691, subd. 2e. The report must be updated and submitted as part of each integrated resource plan or plan modification filed under section Minn. Stat.§ 216B.2422.

We have been adding cost-effective renewable resources to our system to reduce emissions consistent with the analysis in our resource plans and acquisitions. Our analysis in the 2024 Plan considers the costs and impacts of the renewable additions but does not require any additions to meet our standard obligations. Therefore, our standard obligations do not impact our rates. For further details please see Appendix N: Standard Obligations.

VII. CONCLUSION

Based on the totality of these metrics, we believe that our Preferred Plan keeps customers' bills and rates as lows as practicable while continuing our transition to a carbon-free system. As we continue our transition to a carbon-free system, we remain committed to being the energy provider of choice for our customers, and keeping rates low is a key part of that commitment.

CERTIFICATE OF SERVICE

I, Christine Schwartz, hereby certify that I have this day served copies of the foregoing document on the attached list of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States mail at Minneapolis, Minnesota

or

xx electronic filing

Docket Nos. E002/RP-24-67
E002/RP-19-368
E002/GR-21-630
Xcel Energy Miscellaneous Service List

Dated this 1st day of February 2024

/s/

_____

Christine Schwartz
Regulatory Administrator

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First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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Alice	Madden	alice@communitypowermn.org	Community Power	2720 E 22nd St Minneapolis, MN 55406	Electronic Service	No	OFF_SL_19-368_19-368_Official
Kavita	Maini	kmaini@wi.rr.com	KM Energy Consulting, LLC	961 N Lost Woods Rd Oconomowoc, WI 53066	Electronic Service	No	OFF_SL_19-368_19-368_Official
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First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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Joseph	Meyer	joseph.meyer@ag.state.mn.us	Office of the Attorney General-RUD	Bremer Tower, Suite 1400 445 Minnesota Street St Paul, MN 55101-2131	Electronic Service	No	OFF_SL_19-368_19-368_Official
Stacy	Miller	stacy.miller@minneapolismn.gov	City of Minneapolis	350 S. 5th Street Room M 301 Minneapolis, MN 55415	Electronic Service	No	OFF_SL_19-368_19-368_Official
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First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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Carol A.	Overland	overland@legalectric.org	Legalectric - Overland Law Office	1110 West Avenue Red Wing, MN 55066	Electronic Service	No	OFF_SL_19-368_19-368_Official
Jessica	Palmer Denig	jessica.palmer-Denig@state.mn.us	Office of Administrative Hearings	600 Robert St N PO Box 64620 St. Paul, MN 55164	Electronic Service	No	OFF_SL_19-368_19-368_Official
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First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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Generic Notice	Residential Utilities Division	residential.utilities@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012131	Electronic Service	Yes	OFF_SL_19-368_19-368_Official
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First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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Generic Notice	Residential Utilities Division	residential.utilities@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012131	Electronic Service	Yes	OFF_SL_21-630_Official
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APPENDIX A: COMPLIANCE MATRIX

Xcel Energy is committed to complying fully with all applicable statutes, rules and orders. We believe our 2024-2040 Upper Midwest Integrated Resource Plan reflects appropriate implementation of all related requirements. The matrix below reflects our inventory of requirements to be met in the 2024-2040 Upper Midwest Integrated Resource Plan and cross-references to the portion of the IRP that fulfills each compliance item.

Rules, Statutes, and Orders			
Statute, Rule or Order	**Subdivision or Order Point**	**Information Required by Statute, Rule or Order**	**2024-2040 IRP Location of Required Content**
Minn. Stat. § 216B.1691 Renewable Energy Objectives	Subdivision 2a	**Eligible energy technology standard**. Each electric utility shall generate or procure sufficient electricity generated by an eligible energy technology to provide its retail customers in Minnesota, or the retail customers of a distribution utility to which the electric utility provides wholesale electric service, so that the electric utility generates or procures an amount of electricity from an eligible energy technology that is equivalent to at least the following standard percentages of the electric utility's total retail electric sales to retail customers in Minnesota are generated by eligible energy technologies by the end of the year indicated: (1) 2012 12 percent (2) 2016 17 percent (3) 2020 20 percent (4) 2025 25 percent (5) 2035 55 percent	Appendix N: Standard Obligations
Minn. Stat. § 216B.1691 Renewable Energy Objectives	Subdivision 2e	**Rate impact of standard compliance; report**. Each electric utility must submit to the commission and the legislative committees with primary jurisdiction over energy policy a report containing an estimation of the rate impact of activities of the electric utility necessary to comply with this section. In consultation with the Department of Commerce, the commission shall determine a uniform reporting system to ensure that individual utility reports are consistent and comparable, and shall, by order, require each electric utility subject to this section to use that reporting system. The rate impact estimate must be for wholesale rates and, if the electric utility makes retail sales, the estimate shall also be for the impact on the electric utility's retail rates. Those activities include, without limitation, energy purchases, generation facility acquisition and construction, and transmission improvements. A report must be updated and submitted as part of each integrated resource plan or plan modification filed by the electric utility under section 216B.2422. The reporting obligation of an electric utility under this subdivision expires December 31, 2040.	Chapter 6: Customer Rate and Cost Impacts
Minn. Stat. § 216B.1691 Renewable Energy Objectives	Subdivision 2g	**Carbon-free standard.** In addition to the requirements under subdivisions 2a and 2f, each electric utility must generate or procure sufficient electricity generated from a carbon-free energy technology to provide the electric utility's retail customers in Minnesota, or the retail customers of a distribution utility to which the electric utility provides wholesale electric service, so that the electric utility generates or procures an amount of electricity from carbon-free energy technologies that is equivalent to at least the following standard percentages of the electric utility's total retail electric sales to retail customers in Minnesota by the end of the year indicated: (1) 2030 - 80 percent for public utilities; 60 percent for *other* electric utilities (2) 2035 - 90 percent for all electric utilities (3) 2040 -100 percent for all electric utilities.	Appendix N: Standard Obligations
Minn. Stat. § 216B.1691 Renewable Energy Objectives	Subdivision 3a	**Utility plans filed with commission**. (a) Each electric utility shall report on its plans, activities, and progress with regard to the standard obligations under this section in its filings under section 216B.2422, or in a separate report submitted to the commission every two years, whichever is more frequent, demonstrating to the commission the utility's effort to comply with this section. In its resource plan or a separate report, each electric utility shall provide a description of: (1) the status of the utility's renewable energy mix relative to the standard obligations; (2) efforts taken to meet the objective and standard obligations; (3) any obstacles encountered or anticipated in meeting the standard obligations; and (4) potential solutions to the obstacles. (5) the number of Minnesotans employed to construct facilities designed to meet the utility's standard obligations under this section; (6) efforts taken to retain and retrain workers employed at electric generating facilities that the utility has ceased operating or designated to cease operating for new positions constructing or operating facilities used to meet a utility's standard obligation; (7) the impacts of facilities designed to meet the utility's standard obligations under this section on environmental justice areas; (8) efforts made to increase the diversity of both the utility's workforce and vendors; and (9) for an electric utility utilizing renewable energy credits to satisfy any portion of its obligations under this section, the following information: (i) the name and location of energy facilities that generated the energy associated with the credits; (ii) the dates when the energy associated with the credits was generated; (iii) the type of fuel that generated the energy associated with the credits; and (iv) whether the energy associated with the credits was purchased by the utility purchasing the credits.	Appendix N: Standard Obligations

Rules, Statutes, and Orders			
Statute, Rule or Order	**Subdivision or Order Point**	**Information Required by Statute, Rule or Order**	**2024-2040 IRP Location of Required Content**
Minn. Stat. § 216B.1691 Renewable Energy Objectives	Subdivision 10	A competitive resource acquisition process established by the commission prior to June 1, 2007, shall not apply to a utility for the construction, ownership, and operation of generation facilities used to satisfy the requirements of this section unless, upon a finding that it is in the public interest, the commission issues an order on or after June 1, 2007, that requires compliance by a utility with a competitive resource acquisition process. A utility that owns a nuclear generation facility and intends to construct, own, or operate facilities under this section shall file with the commission as part of the utility's filing under section 216B.2422 a renewable energy plan setting forth the manner in which the utility proposes to meet the requirements of this section	N/A - we are not proposing any specific resource acquisitions in this Resource Plan
Minn. Stat. § 216B.2422 Resource Planning; Renewable Energy	Subdivision 2	(c) As a part of its resource plan filing, a utility shall include the least cost plan for meeting 50 and 75 percent of all energy needs from both new and refurbished generating facilities through a combination of conservation and renewable energy resources.	Chapter 5: Economic Modeling Framework
Minn. Stat. § 216B.2422 Resource Planning; Renewable Energy	Subdivision 2a	**Historical data and Advance Forecast.** Each utility required to file a resource plan under this section shall include in the filing all applicable annual information required by section 216C.17, subdivision 2, and the rules adopted under that section. To the extent that a utility complies with this subdivision, it is not required to file annual advance forecasts with the department under section 216C.17, subdivision 2.	Appendix AA: 2022 Electric Utility Annual Report
Minn. Stat. § 216B.2422 Resource Planning; Renewable Energy	Subdivision 2c	**Long-range emission reduction planning.** Each utility required to file a resource plan under subdivision 2 shall include in the filing a narrative identifying and describing the costs, opportunities, and technical barriers to the utility continuing to make progress on its system toward achieving the state greenhouse gas emission reduction goals established in section 216H.02, subdivision 1, and the technologies, alternatives, and steps the utility is considering to address those opportunities and barriers.	Chapter 2: Planning Landscape Chapter 4: Preferred Plan Appendix K: Environmental Regulations Review Appendix T: MISO Grid Congestion
Minn. Stat. § 216B.2422 Resource Planning; Renewable Energy	Subdivision 3	**Environmental Costs**. (a) A utility shall use the values established by the commission in conjunction with other external factors, including socioeconomic costs, when evaluating and selecting resource options in all proceedings before the commission, including resource plan and certificate of need proceedings.	Chapter 5: Economic Modeling Framework Appendix F: EnCompass Modeling Assumptions & Inputs
Minn. Stat. § 216B.2422 Resource Planning; Renewable Energy	Subdivision 3(a)	**Environmental costs.**(a) The commission shall, to the extent practicable, quantify and establish a range of environmental costs associated with each method of electricity generation. A utility shall use the values established by the commission in conjunction with other external factors, including socioeconomic costs, when evaluating and selecting resource options in all proceedings before the commission, including resource plan and certificate of need proceedings.	Chapter 5: Economic Modeling Framework Appendix F: EnCompass Modeling Assumptions & Inputs Appendix K: Environmental Regulations Review
Minn. Stat. § 216B.2422 Resource Planning; Renewable Energy	Subdivision 4	**Preference for renewable energy facility.** The commission shall not approve a new or refurbished nonrenewable energy facility in an integrated resource plan or a certificate of need, pursuant to section 216B.243, nor shall the commission allow rate recovery pursuant to section 216B.16 for such a nonrenewable energy facility, unless the utility has demonstrated that a renewable energy facility is not in the public interest. When making the public interest determination, the commission must consider: (1) whether the resource plan helps the utility achieve the greenhouse gas reduction goals under section 216H.02, the renewable energy standard under section 216B.1691, or the solar energy standard under section 216B.1691, subdivision 2f.; (2) impacts on local and regional grid reliability; (3) utility and ratepayer impacts resulting from the intermittent nature of renewable energy facilities, including but not limited to the costs of purchasing wholesale electricity in the market and the costs of providing ancillary services; and (4) utility and ratepayer impacts resulting from reduced exposure to fuel price volatility, changes in transmission costs, portfolio diversification, and environmental compliance costs.	Chapter 4: Preferred Plan Chapter 5: Economic Modeling Framework Appendix F: EnCompass Modeling Assumptions & Inputs
Minn. Stat. § 216B.2422 Resource Planning; Renewable Energy	Subdivision 4a	**Preference for local job creation**. As part of a resource plan filing, a utility must report on associated local job impacts and the steps the utility and the utility's energy suppliers and contractors are taking to maximize the availability of construction employment opportunities for local workers. The commission must	Appendix O: 2023 Workforce Transition Plan Summary Appendix O1: 2023 Workforce Transition Plan Appendix R: Equity
Minn. Stat. § 216B.2422 Resource Planning; Renewable Energy	Subdivision 7	**Energy storage systems assessment.** (a) Each public utility required to file a resource plan under subdivision 2 must include in the filing an assessment of energy storage systems that analyzes how the deployment of energy storage systems contributes to: (1) meeting identified generation and capacity needs; and (2) evaluating ancillary services. (b) The assessment must employ appropriate modeling methods to enable the analysis required in paragraph (a).	Appendix F: EnCompass Modeling Assumptions & Inputs Appendix H: Resource Options Appendix I: Minnesota Energy Storage Systems Assessments Appendix L: System Planning Integration
Minn. Stat. § 216B.2426 Opportunities for Distributed Generation		The commission shall ensure that opportunities for the installation of distributed generation, as that term is defined in section 216B.169, subdivision 1, paragraph (c), are considered in any proceeding under section 216B.2422, 216B.2425, or 216B.243.	Chapter 5: Economic Modeling Framework
Minn. Stat. § 3.8851 Legislative Energy Commission	Subdivision 4	**Nuclear reports**. The public utility that owns the Prairie Island and Monticello nuclear generation facilities shall update the reports required under section 116C.772, subdivisions 3 to 5, and shall submit those updates periodically to the Public Utilities Commission with the utility's resource plan filing under section 216B.2422 and to the Legislative Energy Commission.	Appendix M: Nuclear Appendix BB: 2022-2024 Triennial Nuclear Plant Decommissioning Study and Assumptions

Rules, Statutes, and Orders			
Statute, Rule or Order	**Subdivision or Order Point**	**Information Required by Statute, Rule or Order**	**2024-2040 IRP Location of Required Content**
Minn. Rule 7843.0300 Filing Requirements and Procedures	Subpart 3	**Completeness of filing.** The resource plan must contain the information required by part 7843.0400, unless an exemption has been granted under subpart 4.	See below:
Minn. Rule 7843.0400 Contents of Resource Plan Filings	Subpart 1	**Advance forecasts.** A utility shall include in the filing identified in Subpart 2 its most recent annual submission to the Minnesota Department of Commerce and the Minnesota Environmental Quality Board under Minnesota Statutes, sections 216B.2422, subdivision 2a, and 216C.17, and parts 7610.0000 to 7610.0600.	Appendix AA: 2022 Electric Utility Annual Report
Minn. Rule 7843.0400 Contents of Resource Plan Filings	Subpart 2	**Resource Plan.** A utility shall file a proposed plan for meeting the service needs of its customers over the forecast period. The plan must show the resource options the utility believes it might use to meet those needs. The plan must also specify how the implementation and use of those resource options would vary with changes in supply and demand circumstances. Utility is only required to identify a resource option generically, unless a commitment to a specific resource exists at the time of the filing. Utility shall also discuss plans to reduce existing resources through sales, leases, deratings, or retirements.	Chapter 4: Preferred Plan Chapter 5: Economic Modeling Framework Appendix G: Scenario Sensitivity Analysis--PVRR & PVSC
Minn. Rule 7843.0400 Contents of Resource Plan Filings	Subpart 3	**Supporting Information.** A utility shall include in its resource plan filing information supporting selection of the proposed resource plan.	Entire IRP
Minn. Rule 7843.0400 Contents of Resource Plan Filings	Subpart 3A	A) When a utility's existing resources are inadequate to meet the projected level of resource needs, the supporting information must contain a complete list of resource options considered for addition to the existing resources. At a minimum, the list must include new generating facility of various types and sizes and with various fuel types, cogeneration, new transmission facilities of various types and sizes, upgrading of existing generation and transmission equipment, life extensions of existing generation and transmission equipment, load-control equipment, utility-sponsored conservation programs, purchases from non-utilities, and purchases from other utilities. The utility may seek additional input from the commission regarding the resource options to be included in the list. For a resource option that could meet a significant part of the need identified by the forecast, the supporting information must include a general evaluation of the option, including its availability, reliability, cost, socioeconomic effects, and environmental effects.	Chapter 4: Preferred Plan Chapter 5: Economic Modeling Framework Appendix H: Resource Option
Minn. Rule 7843.0400 Contents of Resource Plan Filings	Subpart 3B	B) The supporting information must include descriptions of the overall process and of the analytical technique used by the utility to create its proposed resource plan from the available options.	Chapter 5: Economic Modeling Framework
Minn. Rule 7843.0400 Contents of Resource Plan Filings	Subpart 3C	C) The supporting information must include an action plan, a description of the activities the utility intends to undertake to develop or obtain noncurrent resources identified in its proposed plan. Action plan must cover a five-year period beginning with the filing date. Action plan must include a schedule of key activities, including construction and regulatory filings.	Chapter 4: Preferred Plan
Minn. Rule 7843.0400 Contents of Resource Plan Filings	Subpart 3D	D) For the proposed resource plan as a whole, the supporting information must include a narrative and quantitative discussion of why the plan would be in the public interest, considering the factors listed in part 7843.0500, subpart 3.	Chapter 4: Preferred Plan
Minn. Rule 7843.0400 Contents of Resource Plan Filings	Subpart 4	**Nontechnical summary.** A utility shall include in its resource plan filing a non-technical summary, not exceeding 25 pages in length and describing the utility's resource needs, the resource plan created by the utility to meet those needs, the process and analytical techniques used to create the plan, activities required over the next five years to implement the plan, and the likely effect of plan implementation on electric rates and bills. Minn. Stat. §216B.1612,	Appendix Z: Non-Technical Summary
Docket No. E999/CI-06-159 In the Matter of Commission Investigation and Determination under the Electricity Title, Section XII, of the Federal Energy Policy Act of 2005 **August 10, 2007 Order**	Order Point 2	**(Fossil Fuel Efficiency Standard)** Investor-owned utilities shall include information in their Resource Plans generically describing how the utility is planning to address fossil fuel efficiency to meet the goals of this standard.	Chapter 5: Economic Modeling Framework Appendix F: Encompass Modeling Assumptions & Inputs
Docket No. E999/CI-06-159 In the Matter of Commission Investigation and Determination under the Electricity Title, Section XII, of the Federal Energy Policy Act of 2005 **August 10, 2007 Order**	Order Point 3	Investor-owned utilities shall include information in their Resource Plans with respect to: a. The heat rates of existing plants; b. Their efforts to maintain or improve heat rates over time; and c. Modeling runs(s) of ways to improve the heat rates of either the largest existing or the lowest heat rate generation plants.	Appendix F: EnCompass Modeling Assumptions & Inputs
Docket No. E002/RP-10-825 In the Matter of Northern States Power Company d/b/a/Xcel Energy's Application for Approval of its 2011-2025 Resource Plan **August 5, 2013 Notice**	Page 1	The public interest determination must include whether the resource plan helps the utility achieve the greenhouse gas reduction goals under section 216H.02, the renewable energy standard under section 216B.1691, or the solar energy standard under section 216B.1691, 2f.	Chapter 4: Preferred Plan Appendix N: Standard Obligation
Docket No. E002/RP-10-825 In the Matter of Northern States Power Company d/b/a/Xcel Energy's Application for Approval of its 2011-2025 Resource Plan August 5, 2013 Notice	Page 2, Para 1	The Commission expects utilities to include in their resource plans filed after August 1, 2013 an explanation how the resource plan helps the utility achieve the greenhouse gas reduction goals, renewable energy standard, and solar energy standard.	Chapter 4: Preferred Plan Appendix N: Standard Obligations

Rules, Statutes, and Orders			
Statute, Rule or Order	**Subdivision or Order Point**	**Information Required by Statute, Rule or Order**	**2024-2040 IRP Location of Required Content**
Docket No. E002/RP-10-825 In the Matter of Northern States Power Company d/b/a/Xcel Energy's Application for Approval of its 2011-2025 Resource Plan **August 5, 2013 Notice**	Page 2, Para 3	Utilities shall consider convening a stakeholder meeting prior to filing their initial IRPs to answer questions about assumptions used in the filing, for the purpose of responding to questions which could enhance parties' understanding of the filing and reducing the number of information requests parties may need to file.	Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-15-21 In the Matter of Northern States Power Company d/b/a/Xcel Energy's Application for Approval of its 2016-2030 Resource Plan **January 11, 2017 Order**	Order Point 10	10. Xcel shall acquire no less than 400 MW of additional demand response by 2023.	Appendix J: Distributed Energy Resources
Docket No. E002/RP-15-21 In the Matter of Northern States Power Company d/b/a/Xcel Energy's Application for Approval of its 2016-2030 Resource Plan **January 11, 2017 Order**	Order Point 12	12. Xcel shall investigate the potential for an energy-efficiency competitive bidding process for customers that have opted out of the statewide Conservation Improvement Program (CIP) under Minn. Stat. § 216B.241, subd. 1a(b).	Appendix J: Distributed Energy Resources
Docket No. E002/RP-15-21 In the Matter of Northern States Power Company d/b/a/Xcel Energy's Application for Approval of its 2016-2030 Resource Plan **January 11, 2017 Order**	Order Point 15	15. In future resource plan filings, analysis and inputs must, to the extent possible, be consistent with Xcel's distribution system planning.	Chapter 5: Economic Modeling Framework Appendix F: EnCompass Modeling Assumptions & Inputs
Docket No. E999/CI-07-1199 and E999/DI-17-53 In the Matter of Establishing an Estimate of the Costs of Future Carbon Dioxide Regulation on Electricity Generation Under Minnesota Statutes § 216H.06 & In the Matter of Establishing an Updated 2016 Estimate of the Costs of Future Carbon Dioxide Regulation on Electricity Generation Under Minn. Stat. § 216H.06 **June 11, 2018 Order**	Order Point 1	The Commission hereby quantifies and establishes the range of regulatory costs of carbon dioxide emissions as $5 to $25 per short ton effective 2025 and thereafter.	Chapter 5: Economic Modeling Framework Appendix F: EnCompass Modeling Assumptions & Inputs Appendix G: Scenario Sensitivity Analysis--PVRR & PVSC
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 2A2.	2) Xcel shall continue to acquire 400 megawatts of incremental demand response by 2023 as ordered in the company's last resource plan.	Appendix J: Distributed Energy Resources
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 5	5. Xcel shall consider opportunities to deploy renewable resources, storage technologies, and resources powered by hydrogen or clean fuel alternatives on a schedule faster than in its Alternate Plan. If deployment would be cost-effective, maintain reliability, and aid in achieving compliance with decarbonization policies, Xcel shall pursue them.	Chapter 4: Preferred Plan
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 9A	9. Xcel shall take steps to better align distribution and resource planning, including: A. Set the forecasts for distributed energy resources consistently in its resource plan and its Integrated Distribution Plan.	Appendix E: Load and DER Forecasting Appendix L: System Planning Integration
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 9B	B. Conduct advanced forecasting to better project the levels of distributed energy resource deployment at a feeder level, using Xcel's advanced planning tool.	Appendix E: Load and DER Forecasting Appendix L: System Planning Integration Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 9C	C. Proactively plan investments in hosting capacity and other necessary system capacity to allow distributed generation and electric vehicle additions consistent with the forecast for distributed energy resources.	Appendix E: Load and DER Forecasting Appendix L: System Planning Integration
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 9D	D. Improve non-wires alternatives analysis, including market solicitations for deferral opportunities to make sure Xcel can take advantage of distributed energy resources to address discrete distribution system costs.	Appendix L: System Planning Integration
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 9E	E. Plan for aggregated distributed energy resources to provide system value including energy/capacity during peak hours.	Appendix L: System Planning Integration

Rules, Statutes, and Orders			
Statute, Rule or Order	**Subdivision or Order Point**	**Information Required by Statute, Rule or Order**	**2024-2040 IRP Location of Required Content**
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 10	10. In its next resource plan Xcel shall, either through its Integrated Distribution System Plan proceedings or through another stakeholder process, develop and/or improve its forecasts of the adoption rate for the following technologies, to be used in Xcel's base case scenario and its overall demand forecast. A. Adoption of light-, medium-, and heavy-duty electric vehicles. B. Adoption of electric space heating. C. Adoption of electric water heating. D. Electrification of other end uses. E. Increased potential for demand response and load flexibility from an increase in electrification of the technologies in A–D. F. Adoption of distributed solar-powered generators—including generators sited by customers, community solar gardens organized under Minn. Stat. § 216B.1641, and generators that are neither sited by customers nor related to community solar gardens.	Appendix E: Load and DER Forecasting Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 12	12. Xcel shall include in its next resource plan a deeper analysis of (1) storage options, including options combining solar generation and battery storage, and (2) the role of hydrogen and clean fuel alternatives in Xcel's resource mix. In preparation, Xcel shall work with stakeholders to develop a fair basis for comparing the full supply-chain and life-cycle carbon impacts of the generation and storage resource options under consideration to help the Commission evaluate the "adverse socioeconomic effects and adverse effects upon the environment" of each option, pursuant to Minn. R. 7843.0500, subp. 3.C.	Appendix F: EnCompass Modeling Assumptions & Inputs Appendix H: Resource Options Appendix I: MN Energy Storage Systems Assessment Appendix X: Advanced Technologies Appendix Y: Life Cycle Emissions Impact
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 13	13. In its next resource plan, Xcel shall account for anticipated effects of advanced rate design, demand response, and any other efforts to shift customer demand.	Appendix J: Distributed Energy Resources
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 15A	15. Xcel shall work with stakeholders to develop a modeling construct that enables Xcel, as part of its next resource plan, to model solar-powered generators connected to the company's distribution grid as a resource. Xcel and stakeholders shall address the following factors in developing the modeling construct: A. Using a "bundled" approach as is used to model energy efficiency and demand response.	Appendix H: Resource Options Appendix J: Distributed Energy Resources Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 15B	B. The costs borne by the utility and the costs borne by the customer.	Appendix J: Distributed Energy Resources Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 15C	C. Cost effectiveness tests.	Appendix J: Distributed Energy Resources Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 15D	D. Other topics as identified by stakeholders.	Appendix J: Distributed Energy Resources Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 15	Xcel shall include improved load flexibility and demand response modeling methodologies prospectively, including in its next resource plan.	Appendix E: Load and DER Forecasting
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 16	16. In its next resource plan, Xcel shall account for local clean energy goals, in aggregate, in forecasting and modeling. In particular, the plan should include consideration of local community generation goals for distributed generation.	Appendix E: Load and DER Forecasting Appendix V: Community Goals
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 18	18. In its next resource plan filing, Xcel shall include an analysis of rate and bill impacts for the residential, commercial, and industrial classes.	Chapter 6: Customer Rate and Cost Impacts
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 20B	B. Xcel shall conduct stakeholder meetings regarding the site with interested parties including the city of Becker; adjacent cities and townships including Becker Township and the city of Monticello; Sherburne and Wright counties; the Minnesota Department of Commerce, the Minnesota Department of Natural Resources, the Minnesota Pollution Control Agency, the Center for Energy and Environment, the Clean Energy Organizations, the Minnesota Energy Transition Office,41 and labor unions. By January 1, 2023, Xcel shall file in the new docket details describing updates on the site and the stakeholder outreach and meetings.	Appendix P: 2023 Sherco Remediation Report Summary Appendix P1: 2023 Sherco Remediation Report

Rules, Statutes, and Orders			
Statute, Rule or Order	**Subdivision or Order Point**	**Information Required by Statute, Rule or Order**	**2024-2040 IRP Location of Required Content**
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 20C1	C. Following these stakeholder meetings, by December 31, 2023, or in its next resource plan if earlier—and annually thereafter—Xcel shall submit to the Commission and to the city of Becker a detailed report describing the company's plans for the disposition of the Sherco site, equipment, and buffer property. The report shall include at least the following items: 1) A detailed description and timeline of any demolition, environmental cleanup, or similar work that will be required by the impending retirement of Sherco Unit 2.	Appendix P: 2023 Sherco Remediation Report Summary Appendix P1: 2023 Sherco Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 20C2	2) To the extent possible, a description of the company's plans and a detailed timeline to decommission and demolish electric generating equipment related to Sherco Units 1 and 3.	E002/M-22-263 Appendix P: 2023 Sherco Remediation Report Summary Appendix P1: 2023 Sherco Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 20C3	3) A detailed description of the timeline, estimated costs, and steps necessary to remediate pollution at the Sherco site.	E002/M-22-263 Appendix P: 2023 Sherco Remediation Report Summary Appendix P1: 2023 Sherco Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 20C4	4) A section detailing how the company is working to ensure that plans for site remediation, economic development, or future development and maintenance of power generation, transmission, or distribution infrastructure are consistent with the community's long-range planning and vision.	E002/M-22-263 Appendix P: 2023 Sherco Remediation Report Summary Appendix P1: 2023 Sherco Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 20C5	5) A description of any ongoing efforts by the company to evaluate future uses for the plant site, any buffer property owned by the company, or any adjacent property, including a description of how the company is involving interested stakeholders in those efforts.	E002/M-22-263 Appendix P: 2023 Sherco Remediation Report Summary Appendix P1: 2023 Sherco Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 20C6	6) An update to the Commission on the status of efforts to support the city's and region's economic development efforts, including—to the extent possible—specific projects and investments the company is assisting the city and region in attracting.	E002/M-22-263 Appendix P: 2023 Sherco Remediation Report Summary Appendix P1: 2023 Sherco Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 20C7	7) A description of the company's efforts to work with local governments and other stakeholders to assess and account for local land use and planning impacts. Before starting any additional regulatory process to determine the final length and route of the Sherco gen-tie line, Xcel shall consult with stakeholders to discuss the plans.	E002/M-22-263 Appendix P: 2023 Sherco Remediation Report Summary Appendix P1: 2023 Sherco Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 20C8	8) Any other items the Commission or the company sees fit to include.	E002/M-22-263 Appendix P: 2023 Sherco Remediation Report Summary Appendix P1: 2023 Sherco Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 20C	If Xcel cannot obtain the necessary information at the time of each filing, the company shall submit a detailed timeline on which it anticipates it will be able to provide the city and stakeholders with additional information.	E002/M-22-263 Appendix P: 2023 Sherco Remediation Report Summary Appendix P1: 2023 Sherco Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 21A	21. Regarding remediation plans for the King site: A. The Commission authorizes its Executive Secretary to open a new docket on this topic.	E002/M-22-264 Appendix Q: 2023 King Remediation Report Summary Appendix Q1: 2023 King Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 21B	B. Xcel shall conduct quarterly stakeholder meetings regarding the King site with interested parties including the city of Oak Park Heights, Washington County, the Department, DNR, the Energy Transition Office, PCA, the National Park Service, CEOs, CEE, the Wild Rivers Conservancy, and labor unions. Xcel shall file in the new docket by January 1, 2023, details describing the stakeholder outreach and updates for the efficient demolition of the King plant and remediation of the site and impacted land.	E002/M-22-264 Appendix Q: 2023 King Remediation Report Summary Appendix Q1: 2023 King Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 21C1	C. Following these stakeholder meetings, by December 31, 2023, or in its next resource plan if earlier—and annually thereafter—Xcel shall submit to the Commission, the city of Oak Park Heights, and interested stakeholders a detailed report describing the company's plans for the disposition of the King site, equipment, and buffer property. This report should include the following: 1) The company's plans, estimated costs, and a detailed timeline to decommission and demolish the electric generation facility.	E002/M-22-264 Appendix Q: 2023 King Remediation Report Summary Appendix Q1: 2023 King Remediation Report

Rules, Statutes, and Orders			
Statute, Rule or Order	**Subdivision or Order Point**	**Information Required by Statute, Rule or Order**	**2024-2040 IRP Location of Required Content**
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 21C2	2) A detailed description of the timeline and steps necessary to remediate pollution at the King site.	E002/M-22-264 Appendix Q: 2023 King Remediation Report Summary Appendix Q1: 2023 King Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 21C3	3) A description of any ongoing efforts by the company to evaluate future uses for the plant site, any buffer property owned by the company, or any adjacent property, including a description of coordination with or involvement of the city and stakeholders in those efforts.	E002/M-22-264 Appendix Q: 2023 King Remediation Report Summary Appendix Q1: 2023 King Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 21C4	4) The status of efforts to support the region's and city's economic development efforts, including—to the extent possible—specific projects and investments the company is helping the city to attract.	E002/M-22-264 Appendix Q: 2023 King Remediation Report Summary Appendix Q1: 2023 King Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 21C5	5) An update on conservation efforts to reflect the uniqueness of the site and surrounding property located in and along the St. Croix National Scenic Riverway.	E002/M-22-264 Appendix Q: 2023 King Remediation Report Summary Appendix Q1: 2023 King Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 21C6	6) Any other items the Commission or the company sees fit to include.	E002/M-22-264 Appendix Q: 2023 King Remediation Report Summary Appendix Q1: 2023 King Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 21C	If Xcel cannot obtain the necessary information at the time of each filing, the company shall submit a detailed timeline on which it anticipates it will be able to provide the city and stakeholders with additional information.	E002/M-22-264 Appendix Q: 2023 King Remediation Report Summary Appendix Q1: 2023 King Remediation Report
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 22	22. Xcel shall immediately begin stakeholder discussions exploring the future of the Prairie Island Nuclear Generating Plant.	Appendix M: Nuclear Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 23A	23. In its next resource plan, Xcel shall file a report explaining the following: A. Planned investments at the Prairie Island and Monticello, and future plans for Prairie Island.	Appendix M: Nuclear
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 23B	B. Any aging management issues that may arise from continued operation.	Appendix M: Nuclear
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 23C	C. Expectations regarding future nuclear workforce.	Appendix M: Nuclear
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 23D	D. Cyber-security issues or concerns as plants move from analog to digital systems.	Appendix M: Nuclear
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 23E	E. True comprehensive cost-benefit analysis, which includes potential environmental and economic impacts to the neighboring communities—in particular, the Prairie Island Indian Community and its Treasure Island Resort & Casino.	Appendix M: Nuclear
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 23F	F. Additional spent nuclear fuel generated over a 10- or 20-year period.	Appendix M: Nuclear
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 23G	G. How fuel stored on-site will be removed during the next integrated resource plan period.	Appendix M: Nuclear

Rules, Statutes, and Orders			
Statute, Rule or Order	**Subdivision or Order Point**	**Information Required by Statute, Rule or Order**	**2024-2040 IRP Location of Required Content**
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 23H	H. Which additional state permits, Certificates of Need, or federal licenses will be required.	Appendix M: Nuclear
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 23I	I. The full supply chain and life-cycle carbon impacts of the ongoing nuclear generation and storage at each of the facilities.	Appendix Y: Life Cycle Emissions Impacts
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 24	24. The Commission authorizes the Executive Secretary to open a new docket regarding workers at retiring generating facilities in Minnesota, including Sherco and King.	E002/M-22-265 Appendix O: 2023 Workforce Transition Plan Summary Appendix O1: 2023 Workforce Transition Plan
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 24A	A. Xcel—working with the Minnesota Department of Employment and Economic Development and the Energy Transition Office; the International Brotherhood of Electrical Workers, Locals 23, 160, and 949; the Minnesota Building Trades; and the Center for Energy and Environment—shall develop a comprehensive plan for supporting transitioning workers. The plan shall consider the measures outlined in the IBEW comments dated March 17, 2020, and March 21, 2021, including skills inventories, training and education, worker placement and potential early retirement buy-out scenarios. Xcel shall file the plan with the Commission no later than December 31, 2022. The plan shall include an estimated budget for each measure, timeline for implementation, and a description of additional funding needed by DEED or the Energy Transition Office, if applicable, to implement the plan.	E002/M-22-265 Appendix O: 2023 Workforce Transition Plan Summary Appendix O1: 2023 Workforce Transition Plan
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 24B	B. Beginning on December 31, 2023, and annually thereafter, Xcel shall file a detailed update on its efforts to implement the plan in coordination with CEE, DEED and the Energy Transition Office, and IBEW.	E002/M-22-265 Appendix O: 2023 Workforce Transition Plan Summary Appendix O1: 2023 Workforce Transition Plan
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 25A	25. Xcel shall engage in community outreach and establish a stakeholder group to do the following: A. Design for the equitable delivery of electricity services and programs for energy burdened customers in the company's next resource plan.	E002/M-22-266 Appendix R: Equity Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 25B	B. Create new options to improve customer access to energy efficiency and renewable energy.	E002/M-22-266 Appendix R: Equity Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 25C	C. Draft a plan to be submitted in Xcel's next resource plan to bring the racial and gender diversity of the company's workforce in line with the utility's stated goals.	E002/M-22-266 Appendix R: Equity Appendix R1: Workforce Diversification Plan Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 25D	D. Design incentives to ensure that communities of low-income, Black, Indigenous, and People of Color that have disproportionately borne costs of unjust and inequitable energy decisions have equitable access to programs promoting distributed generation.	E002/M-22-266 Appendix R: Equity Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 25E	E. Adopt practices in furtherance of procedural justice—including deeper engagement with renters; affordable rental property owners; communities of Black, Indigenous, and People of Color; and under-resourced individuals—providing resources for engagement and participation, and providing financial support for impacted individuals to participate in dockets and decision-making processes.	E002/M-22-266 Appendix R: Equity Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 25F	F. Form an environmental justice accountability board which shall develop environmental justice-focused initiatives to be incorporated throughout the utility.	E002/M-22-266 Appendix R: Equity Appendix S: Stakeholder Engagement Summary
Docket No. E002/RP-19-368 In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy **April 15, 2022 Order**	Order Point 25	By January 1, 2023, and annually thereafter, Xcel shall file details describing stakeholder outreach and progress in its next resource planning docket, and in a separate docket to be established by the Executive Secretary.	E002/M-22-266 Appendix R: Equity Appendix S: Stakeholder Engagement Summary

Rules, Statutes, and Orders			
Statute, Rule or Order	**Subdivision or Order Point**	**Information Required by Statute, Rule or Order**	**2024-2040 IRP Location of Required Content**
Docket No. E002/M-21-694 In the Matter of Xcel Energy's 2021 Integrated Distribution System Plan and Request for Certification of Distributed Intelligence and the Resilient Minneapolis Project **July 26, 2022 Order**	Order Point 6	Xcel shall hold a series of stakeholder meetings to collaborate with interested parties, obtain input, and generate new ideas around a shared vision of the distribution grid of the future. This stakeholder series is intended to provide transparency into the Company's distribution planning process and explore how Minnesota's public policy goals will be realized on the distribution system and impact the Company's future plans. This stakeholder series should be timed such that stakeholder input can be incorporated into the Company's next IDP filing and next IRP filing and include at least four meetings. The topics will include, but not be limited to, the following: a. Integrated Distribution Planning 101 b. Identify the public policy goals that are changing the expectations of the distribution grid and how each public policy is expected to be realized on the grid in the near- and long-term. [For example, examine transportation, building and industrial electrification forecasts and the effects on load profiles in the near-term and long-term.] c. How energy efficiency, demand response, and other DER might impact Xcel's planning processes. d. How Xcel should consider and incorporate local clean energy goals in its planning processes. e. What investments are necessary to achieve the distribution grid of the future, and the criteria Xcel should use to plan and prioritize those investments. f. Prioritizing the use of "net load" in its load forecasts and system planning, including developing a methodology for incorporating the load reducing impact of distributed generation into its load forecasts and system planning processes. g. Develop a methodology for valuing the load-modifying impacts of demand response in load forecasts and present a load forecast that includes demand response contributions. h. Identify appropriate transportation, building, and industrial end use electrification scenarios for inclusion in the 2023 IDP load forecasts. i. How Xcel anticipates proactively planning for grid investments to allow distributed generation and EV additions consistent with the DER forecast. j. Estimate the potential synergies between interconnection upgrades and planned distribution capital investments, and discuss the anticipated overlap between planned investments and capacity constrained locations on Xcel's distribution system. Xcel shall make a compliance filing with a summary of the stakeholder process and a list of next steps by August 1, 2023. Xcel shall include a summary of the stakeholder series in its next IDP and relevant summary in its next IRP, including how it considered and incorporated stakeholder input.	Appendix S: Stakeholder Engagement Summary November 1, 2023 Integrated Distribution Plan E002/M-23-452
E999/CI-14-643 In the Matter of the Further Investigation into Environmental and Socioeconomic Costs Under Minnesota Statutes Section 216B.2422, Subdivision 3 **1/3/2018 Order**	Order Point 1	1. The Commission hereby quantifies and establishes the range of environmental cost of carbon dioxide emissions associated with electricity generation as follows: •The low end of the range shall reflect the global damage of the last (marginal) short ton emitted, calculated through the year 2100, with a 5.0% discount rate. •The high end of the range shall reflect the global damage of the last (marginal) short ton emitted, calculated through the year 2300, with a 3.0% discount rate.	Chapter 5: Economic Modeling Framework Appendix F: EnCompass Modeling Assumptions & Inputs
E999/CI-14-643 In the Matter of the Further Investigation into Environmental and Socioeconomic Costs Under Minnesota Statutes Section 216B.2422, Subdivision 3 **1/3/2018 Order**	Order Point 3	3. In resource-selection proceedings, utilities shall continue to analyze potential resources under a range of assumptions about environmental values—including at least one scenario that excludes consideration of environmental externalities.	Appendix G: Scenario Sensitivity Analysis--PVRR & PVSC
Docket No. E999/CI-22-624 In the Matter of a Joint Investigation into the Impacts of the Federal Inflation Reduction Act **September 12, 2023 Order**	Order Point 1	The utilities shall maximize the benefits of the Inflation Reduction Act in future resource acquisitions and requests for proposals in the planning phase, petitions for cost recovery through riders and rate cases, resource plans, gas resource plans, integrated distribution plans, and Natural Gas Innovation Act innovation plans. In such filings, utilities shall discuss how they plan to capture and maximize the benefits from the Act, and how the Act has impacted planning assumptions including (but not limited to) the predicted cost of assets and projects and the adoption rates of electric vehicles, distributed energy resources, and other electrification measures. Reporting shall continue until 2032.	Appendix U: Inflation Reduction Act
Docket No. E002/M-19-33 In the Matter of Northern States Power Company's, d/b/a Xcel Energy, Petition to Expand its Renewable*Connect Program **August 12, 2019 Order**	Order Point 3	In current and future resource plans, Xcel must identify the resources dedicated to the Renewable*Connect program and must provide a thorough discussion of the present and forecasted resources that are necessary to meet its present and future demand for the program.	Chapter 2: Planning Landscape Chapter 3: Minimum System Needs

APPENDIX B – ACRONYMS AND TERMS

ACRONYM / TERM	DEFINITION
AABE	American Association of Blacks in Energy
AAPI	Asian American and Pacific Islander
ABLE	Accessibility, Be an Ally, Lead, and Empower
AC	Alternating Current
ACE	Affordable Clean Energy rule
ACEEE	American Council for Energy Efficient Economy
ACI	Activated Carbon Injection
ADMS	Advanced Distribution Management System
ADP	Advanced Determination of Prudence
AEO	Annual Energy Outlook
AFC	Accelerated Fleet Change
AIOIC	American Indian Opportunities Industrialization Center
ALJ	Administrative Law Judge
AMI	Advanced Metering Infrastructure
AMP	Aging Management Program
ANL	Argonne National Laboratory
APC	Adjusted Production Costs
ARDP	Advanced Reactor Demonstration Program
ARR	Avoided Revenue Requirements
A.S. King	Allen S. King Generating Plant
ASHP	Air-Source Heat Pumps
ATB	Annual Technology Baseline
AUAR	Alternative Urban Areawide Review
AWEA	American Wind Energy Association
BA	Balancing Authority
BACT	Best Available Control Technology
BART	Best Available Retrofit Technology
BLAX	Black Employees at Xcel Energy
BE	Beneficial Electrification
BESS	Battery Energy Storage System
BGEPA	Bald and Golden Eagle Protection Act
BIL	Bipartisan Infrastructure Law
BIPOC	Black, Indigenous, and People of Color
BO	Buildout Scenario
BPM	Business Practice Manual
BRD	Business Research Division
BRG	Business Resource Groups
BSER	Best System of Emission Reduction
BWCA	Boundary Waters Canoe Area
C&I	Commercial and Industrial (Customers)
CAA	Clean Air Act
CAGR	Compound Annual Growth Rate

ACRONYM / TERM	DEFINITION
CAIDI	Net capacity factor of power plant, typically expressed as percentage, is ratio of its actual output over period of time to its potential output if it were possible for it to operate at full nameplate capacity indefinitely.
CAIR	Clean Air Interstate Rule
CAP	Competitive Acquisition Process
Capacity Factor	Measure of how often an electric generator runs for a specific period of time. Indicates how much electricity a generator actually produces relative to the maximum it could produce at continuous full power operation during the same period.
CapX2020	Coordinated transmission development effort by group of 11 regional utilities (the CapX2020 Utilities) in MN, ND, SD and WI.
CARB	California Air Resources Board
CBA	Cost-Benefit Analysis
C-BED	Community-Based Energy Development
CBECS	Commercial Buildings Energy Consumption Survey
CBP	Community Benefits Plan
CC	Combined Cycle
CCGT	Combined Cycle Gas Turbine
CCOSS	Class Cost of Service Study
CCRs	Coal Combustion Residuals (often referred to as coal ash)
CCS	Carbon Capture and Sequestration
CDL	Commercial Driver's License
CEE	Center for Energy and Environment
CEI	Center for Economic Inclusion
CEL	Capacity Export Limit
CEMS	Continuous Emissions Monitoring Systems
CEO	Clean Energy Organizations
CER	Capital Project Module
CERA	Cambridge Energy Research Associates
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CEWD	Center for Energy Workforce Development
CF	Coincidence Factor
CF2050	Carbon-Free 2050
CFC	Continued Fleet Change
CFPP	NuScale Power's Carbon Free Power Project
CFS	Carbon-Free Standard
CFTI	Carbo-Free Technology Institute
CH_4	Methane
CHP	Combined Heat and Power
CI or C&I	Commercial/Industrial

ACRONYM / TERM	DEFINITION
CIL	Capacity Import Limit
CIP	Conservation Improvement Program
Circuit Breaker	An electromechanical device used to configure the flow of electricity on the distribution grid. A circuit breaker is designed to open or close while electricity is flowing through the circuit. When a circuit breaker is open, no electricity is flowing through the circuit.
CISF	Consolidated Interim Storage Facility
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_{2e}	Carbon Dioxide Equivalents
CON	Certificate of Need
CONE	Cost of New Entry
CPD	Coincident Peak Demand
CP Node	Commercial Pricing Node
CRP	Certified Renewable Percentage
CSAPR	Cross-State Air Pollution Rule
CSG	Community Solar Garden
CT	Combustion Turbine
CWA	Clean Water Act
CWIP	Construction Work in Progress
DA	Day Ahead
DAV	Disabled American Veterans
DEED	Department of Employment and Economic Development
DEI	Diversity, Equity , ad Inclusion
DEM	Drive Electric Minnesota
DER	Distributed Energy Resources
DERMS	Distributed Energy Resource Management Systems
DG	Distributed Generation
DIC	Disproportionately Impacted Communities
DIGT	Digester
DIR	Dispatch Intermittent Resource Protocol
DLOL	Direct Loss of Load
DNR	Department of Natural Resources
DOC	Department of Commerce
DOE	U.S. Department of Energy
DOI	Department of the Interior
DPP	Definitive Planning Process
DR	Demand Response
DSD	Minnesota Deemed Savings Database
DSM	Demand Side Management
DSP	Distributed Solar Parties
DSES	Distributed Solar Energy Standard
EAW	Environmental Assessment Worksheet

ACRONYM / TERM	DEFINITION
E3	Energy and Environmental Economics, Inc.
ECC	Economic Carrying Charge
ECN	Employee Connection Network
ECO	Energy Conservation and Optimization
EE	Energy Efficiency
EERC	Energy & Environmental Research Center
EERE	Office of Energy Efficiency and Renewable Energy
eGRID	Emissions and Generation Resource Integrated Database
EGU	Electric Generating Unit
EJ	Environmental Justice
EJAB	Environmental Justice Advisory Board
EIA	Energy Information Administration
ELCC	Effective Load Carrying Capability
ELGs	Effluent Limitation Guidelines
EPA	Environmental Protection Agency
EPA Clean Air Act 111d Rule	Draft regulation to reduce carbon dioxide gas emissions from existing power plants that burn coal and other fossil fuels.
EPA SC-GHG	Environmental Protection Agency Social Cost of Greenhouse Gases
EPE	Energy Production Estimate
EPRI	Electric Power Research Institute
EQB	Environmental Quality Board
ERIS	Energy Resource Interconnection Service
ESA	Endangered Species Act
ESAG	Equity Stakeholder Advisory Group
ETAC	Energy Transition Advisory Committee
EVs	Electric Vehicles
Externality Values	Range of environmental costs.
FAN	Field Area Networks
Fault	Abnormal condition on electric system, such as short circuit, broken wire or intermittent connection.
Feeder	Lines connecting distribution substations to taps.
FERC	Federal Energy Regulatory Commission
FERC Order 1000	Rule mandating how public utility transmission providers plan for and allocate costs of new projects on regional and interregional basis.
FGD	Flue-Gas Desulfurization
FIPs	Federal Implementation Plans
FTE	Full-Time Equivalent
FL&U	Fuel Lost and Unaccounted
FLISR	Fault Location, Isolation, and Service Restoration

ACRONYM / TERM	DEFINITION
FOM	Fixed Operation & Maintenance Costs
FTR	Financial Transmission Right
FWS	U.S. Fish and Wildlife Service
Gas Burn	Energy from New Natural Gas Generation
GAF	Generation Module
GALL-SLR	Generic Aging Lessons Learned for Subsequent License Renewal
GHG	Greenhouse Gas
GREET	Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation
GRIP	Grid Resilience and Innovation Partnership
GROW	Growth and Retention of Women
GW	Gigawatt
GWh	Gigawatt Hour
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant
HDVs	Heavy-Duty Vehicles
HI	Hazardous Index
HFPO-DA	Hexafluoropropylene Oxide Dimer Acid
HVAC	High-Voltage Alternating Current
HVDC	High-Voltage Direct Current
IB MACT	Hazardous Air Pollutants from Industrial Boilers
IBEW	International Brotherhood of Electrical Workers
ICAP	Installed Capacity Value
ICE	Internal Combustion Engine
IDP	Integrated Distribution Plan
IDS	Interdepartmental Sales
IGCC	Integrated Gasification Combined Cycle
IIJA	Infrastructure Investment Jobs Act
ILR	Inverter Loading Ratios
ILSR	Institute for Local Self-Reliance
ILTF	Indian Land Tenure Foundation
INPO	Institute of Nuclear Power Operations
IPaC	Information for Planning and Consultation
IPCC	Intergovernmental Panel on Climate Change
IPPs	Independent Power Producers
IRA	Inflation Reduction Act
IRP	Integrated Resource Plan
ISFSI	Independent Spent Fuel Storage Installations
ISO	Independent System Operators
ISP	Integrated System Planning
ISP	Interim Storage Partners
ITC	Investment Tax Credit
ISOs	Independent System Operators
JCOSS	Jurisdictional Cost of Service Study

ACRONYM / TERM	DEFINITION
JTIQ	Joint Targeted Interconnection Queue
kV	Kilovolt
kVA	Kilovolt Amps: 1,000 Volt-Amps. Volt is measure of force of electricity. Amp (Ampere) is measure of flow of electricity.
kWh	Kilowatt
LAF	Load Module
LBA	Load Balancing Authorities
LCA	Life Cycle Assessments
LCM	Life Cycle Management
LCOE	Levelized Cost of Energy
LCOS	Levelized Cost of Storage
LCR	Local Clearing Requirement
LCRI	Low-Carbon Resources Initiative
LDES	Long Duration Energy Storage
LDVx	Light-Duty Vehicles
LEAP	Long-range Energy Alternatives Planning
LED	Solid State Lighting
LFC	Limited Fleet Change
LMF	Load Management Forecast
LMPs	Locational Marginal Prices
LND	Landfill
LOLE	Loss of Load Expectation
LOLP	Loss of Load Probability
LR	License Renewal
LRR	Local Reliability Requirement
LRTP	Long Range Transmission Plan
LRZ	Local Resource Zone or Zone
LSE	Load Serving Entities
LTRA	Long Term Reliability Assessment
MATS	National Emission Standards for Hazardous Air Pollutants for Coal- and Oil-Fired Power Plants. This rule is often referred to as the Mercury and Air Toxics Standard.
MBTA	Migratory Bird Treaty Act
MCLG	Maximum Containment Level Goal
MCPS	Market Congestion Planning Study
MDVs	Medium-Duty Vehicles
MEC	Mankato Energy Center
MEFF	Minnesota Energy Future Framework
MGP	Manufactured Gas Plants

ACRONYM / TERM	DEFINITION
MISO	Midcontinent Independent System Operator, Inc.: Non-profit organization providing reliable coordination and regional planning services including: regional planning, generation interconnection, maintenance coordination, market monitoring and dispute resolution.
MLBO	Mille Lacs Band of Ojibwe
MMBTU	Million British Thermal Units
MMERA	Minnesota Mercury Emissions Reduction Act
MNDNR	Minnesota Department of Natural Resources
MNEC	Minnesota Energy Connection
MNGP	Monticello Nuclear Generating Plant
MPCA	Minnesota Pollution Control Agency
MPUC	Minnesota Public Utilities Commission
M-RETS	Midwest Renewable Energy Tracking System
MSW	Municipal Solid Waste
MTEP	MISO Transmission Expansion Plan
MTO	Minnesota Transmission Owners
MW	Megawatt
MWh	Megawatt Hour
MVA	Mega Volt Amps: 1,000,000 amps or 1,000 kVA
MVP	Multi Value Project: Regional transmission solutions that meet one or more of three goals: reliably and economically enable regional public policy needs, provide multiple types of regional economic value, and provide a combination of regional reliability and economic value.
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NaVOBA	National Veteran-Owned Business Association
NAYGN	North American Young Generation in Nuclear
NCP	Non-MISO Coincident Peak
NDPSC	North Dakota Public Service Commission
NEEP	Northeast Energy Efficiency Partnerships
NEI	Nuclear Energy Institute
NERC	North American Electric Reliability Corporation
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGEA	Minnesota's Next Generation Energy Act
NGIA	Natural Gas Innovation Act
NGLCC	National Gay & Lesbian Chamber of Commerce
NHRG	Nuclear Human Resource Group

ACRONYM / TERM	DEFINITION
NMFS	National Marine Fisheries Service
NMSDC	National Minority Supplier Development Council
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxide
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NPV	Net Present Value
NRC	Nuclear Regulatory Commission
NREL	National Renewable Energy Laboratory
NRIS	Network Resource Interconnection System
NSPM	Northern States Power Company-Minnesota
NSPW	Northern States Power Company-Wisconsin
NSPS	New Source Performance Standards
NSR	New Source Review Section of the Clean Air Act
NSRDB	National Solar Radiation DataBase
NWA	Non-Wires Alternatives
NYMEX	New York Mercantile Exchange
O&M	Operating and Maintenance
O_3	Ozone
OCED	Office of Clean Energy Demonstrations
OFA	Over-Fire Air
OSPA	Sales to Public Authorities
Pb	Lead
PCBs	Polychlorinated Biphenyls
PCOR	U.S. Department of Energy's Plains Carbon Dioxide Reduction Partnership
PFAS	Polyfluoroalkyl Substances
PFBA	Perfluorobutanoic Acid
PFBS	Perfluorobutanesulfonic Acid
PFDA	Perfluorodecanoic Acid
PFHxA	Perfluorohexanoic Acid
PFHxS	Perfluorohexanesulfonic Acid
PFNA	Perfluorononanoic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PI	Prairie Island
PiE	Partners in Energy
PINGP	Prairie Island Generating Plant
PIIC	Prairie Island Indian Community
PINGP	Prairie Island Nuclear Generation Plant
PIRA	Petroleum Industry Research Associates

ACRONYM / TERM	DEFINITION
Plume Blight	Smoke, dust, colored gas plumes, or layered haze emitted from stacks which obscure the sky or horizon and are relatable to a single source or small group of sources.
PM	Particulate Matter
$PM_{2.5}$	Fine Particulate Matter under 2.5 micrometers
PM_{10}	Coarse Particulate Matter under 10 micrometers
POI	Point of Interconnection
POTW	Publicly-Owned Treatment Works
PP	Park Potential
PPA	Power Purchase Agreement
PPB	Parts Per Billion
PPM	Parts Per Million
PPT	Parts Per Trillion
PRA	Planning Resource Auction
Prairie Island	Prairie Island Nuclear Generating Plant
PRC	Planning Resource Credits
PRPs	Potentially Responsible Parties
PRM	Planning Reserve Margin
PRMR	Planning Reserve Margin Requirement
Proview	Expansion Planning Module
PSD	Prevention of Significant Deterioration Section of the Clean Air Act
PSHL	Public Street and Highway Lighting
PTC	Production Tax Credit
PV	Photovoltaic
PVRR	Present Value Revenue Requirement
PVSC	Present Value of Societal Costs
PY	Planning Year
RA	Resource Adequacy
RAC	Reliability Assessment Commitment
RAVI	Reasonably Attributable Visibility Impairment
RBDC	Reliability-Based Demand Curve
RCC	Regulatory Cost of Carbon
RCR	Reconnect Rondo
RCRA	Resource Conservation and Recovery Act
RDF	Refuse Derived Fuel or Renewable Development Fund
RDF	Renewable Development Fund
Recloser	Circuit breaker that includes mechanism to automatically close (reconnect) after set period of time. Reclosers are used to restore service after momentary fault.
RECAP	E3's Renewable Energy Capacity model

ACRONYM / TERM	DEFINITION
RECs	Renewable Energy Credits: A certificate representing all of the environmental attributes of one MWh of generation from a renewable resource.
Reference Case	Baseline scenario identifying necessary resource additions.
REMI	Regional Economic Models, Inc.
REO	Renewable Energy Objective
REPI	Renewable Energy Production Incentive
RES	Renewable Energy Standard
RESOLVE	E3's Renewable Energy Solutions model
Retrofill	Remove contaminated oil and replace with clean oil.
RFP	Request For Proposal
RGGI	United States' Regional Greenhouse Gas Initiative
RGU	Responsible Government Units
RHR	Regional Haze Rule
RICE	Reciprocating Internal Combustion Engines
RIIA	Renewable Integration Impact Assessment
RIM	Rate Impact Measure
RLB	Rondo Land Bridge
RMP	Resilient Minneapolis Project
ROE	Return on Equity
RPS	Renewable Portfolio Standard
RRA	Regional Resource Assessment
RSG	Revenue Sufficiency Guarantee (Charges): Direct result of production shortfalls relative to earlier forecasts.
RTE	Round-Trip Efficiency
RTF	Resource Treatment Framework
RTO	Regional Transmission Organization
RTR	Risk and Technology Review
S*R	Solar Rewards (Company's Program)
S*RC	Solar Rewards Community (Company's Community Solar Gardens Program)
SAC	Seasonal Accredited Capacity
SAIDI	System Average Interruption Frequency Index: Measures average number of times customer is interrupted over given period (usually monthly or annually). Lower values are better.
SAIFI	System Average Interruption Frequency Index: Measures average number of times customer is interrupted over given period (usually monthly or annually). Lower values are better.
SB	Senate Bill
SCADA	Supervisory Control and Data Acquisition

ACRONYM / TERM	DEFINITION
SCC	Social Cost of Carbon
SC-GHG	Social Cost of Greenhouse Gases
SCORE	Select Committee on Recycling and Environment
SCR	Selective Catalytic Reduction
SDPUC	South Dakota Public Utilities Commission
SEA	Strategic Energy Assessment
SEPA	Solar Electric Power Association
SES	Minnesota Solar Energy Standard: Minn. Stat. § 216B.1691, subd. 2f, which requires 1.5% of retail sales to be sourced from new solar resources. SES is incremental to the Renewable Energy Standard (RES).
SFH	Single Family Housing
SHAW	Shoulder Average Winds
SIP	State Implementation Plan
SLR	Subsequent License Renewal
SMR	Small Module Nuclear Reactor
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxide
SolarTAC	Solar Technology Acceleration Center
SPP	Southwest Power Pool
SQ	Status Quo
S-RECs or SREC	Solar Renewable Energy Credits: Created from a solar resource installed after August 1, 2013 and eligible to be used for compliance with the MN Solar Energy Standard.
SRO	Senior Reactor Operator
SRREN	Special Report on Renewable Energy Sources and Climate Change Mitigation
STEM	Science, Technology, Engineering, and Mathematics
Switch	Electromechanical devise used to configure the flow of electricity on distribution grid. A switch is designed to be opened or closed when electricity is not flowing through circuit. When switch is open, no electricity is flowing through circuit.
Tap	Final leg of distribution system before connecting to customer premises.
TCCRI	Twin Cities Climate Resiliency Initiative
TDEC	Tennessee Department of Environment and Conservation
TEP	Transportation Electrification Plan
TES	Thermal Energy Storage
THI	Temperature Humidity Index
TIR&C	Treasure Island Resort & Casino
TO	Transmission Owners

ACRONYM / TERM	DEFINITION
TOU	Time-of-Use
TPS	Technical Planning Study
Transcos	Transmission-only entities designed to respond to the FERC Order 1000.
Transformer	Electromechanical devise that converts alternating current to higher or lower voltage.
Transmission Inadequacies	Identified deficiencies in the transmission system that need to be upgraded to keep the transmission system within its defined limits.
TRC	Total Resource Cost
TSD	Technical Support Document
UAMPS	Utah Associated Municipal Power Systems
UCAP	Production Capability Value
UDEQ	Utah Department of Environmental Quality
USACE	U.S. Army Corps of Engineers
USGS	United States Geological Survey
V2G	Vehicle-To-Grid
VAR	Voltage and Reactive Power
VETS	Veterans and Employees Together in Service
VMT	Vehicle Miles Traveled
VNP	Voyageurs National Park
VOCs	Volatile Organic Compounds
VPP	Virtual Power Plants
W2B	Wind2Battery Project
WACC	Weighted Average Cost of Capital
WBENC	Women Business Enterprise National Council
WCS	Waste Control Specialists
WDNR	Wisconsin Department of Natural Resources
WEG	Wind Energy Guidelines
WIN	Women's Interest Network
WOTUS	Waters of the United States
WRC	Wild Rivers Conservancy
WTP	Worker Transition Plan
XE WiN	Women in Nuclear
YPN	Young Professionals Network
ZRC	Zonal Resource Credit

APPENDIX C – ABOUT XCEL ENERGY

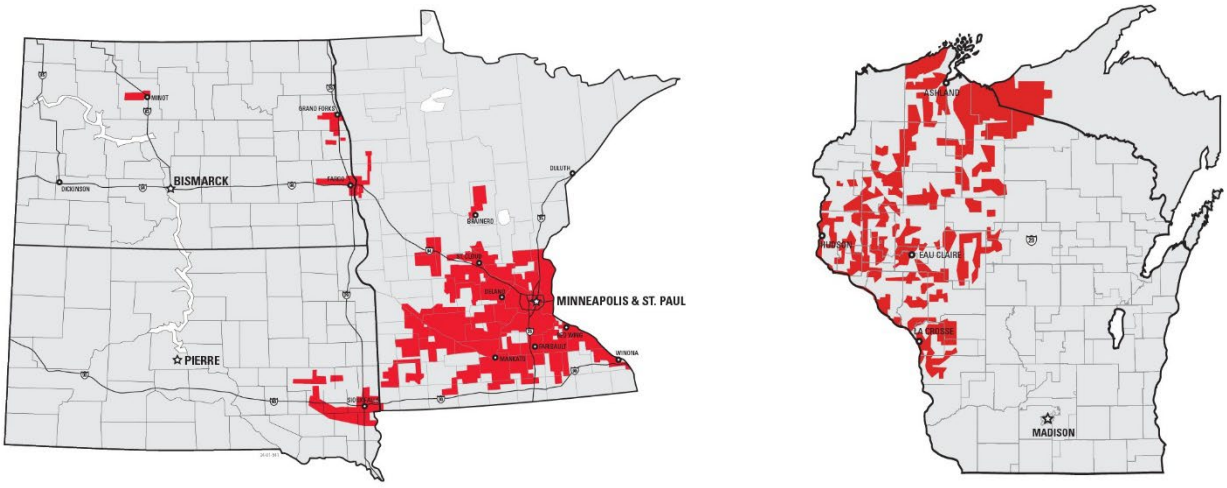
Based in Minneapolis, Xcel Energy serves 3.8 million electricity and 2.1 million natural gas customers through four regulated operating companies that generate electrical power, and transmits, distributes, and sells it to residential and business customers within service territories assigned by state regulators:

- Public Service Company of Colorado
- Northern States Power Company-Minnesota
- Northern States Power Company-Wisconsin
- Southwestern Public Service Company

Northern States Power Company-Minnesota (NSPM), and Northern States Power Company-Wisconsin (NSPW), collectively the NSP Companies, are public utilities organized under the laws of the state of Minnesota, and Wisconsin. The NSP Companies own and operate the five-state integrated NSP System pursuant to the terms of the Federal Energy Regulatory Commission (FERC) approved Interchange Agreement. The NSP Companies have about 1.8 million electricity customers in the upper Midwest.

Figure C-1 shows the Company's upper Midwest service territories in the states of Minnesota, Wisconsin, Michigan, North Dakota, and South Dakota.

Figure C-1: NSP Companies' Upper Midwest Service Territory

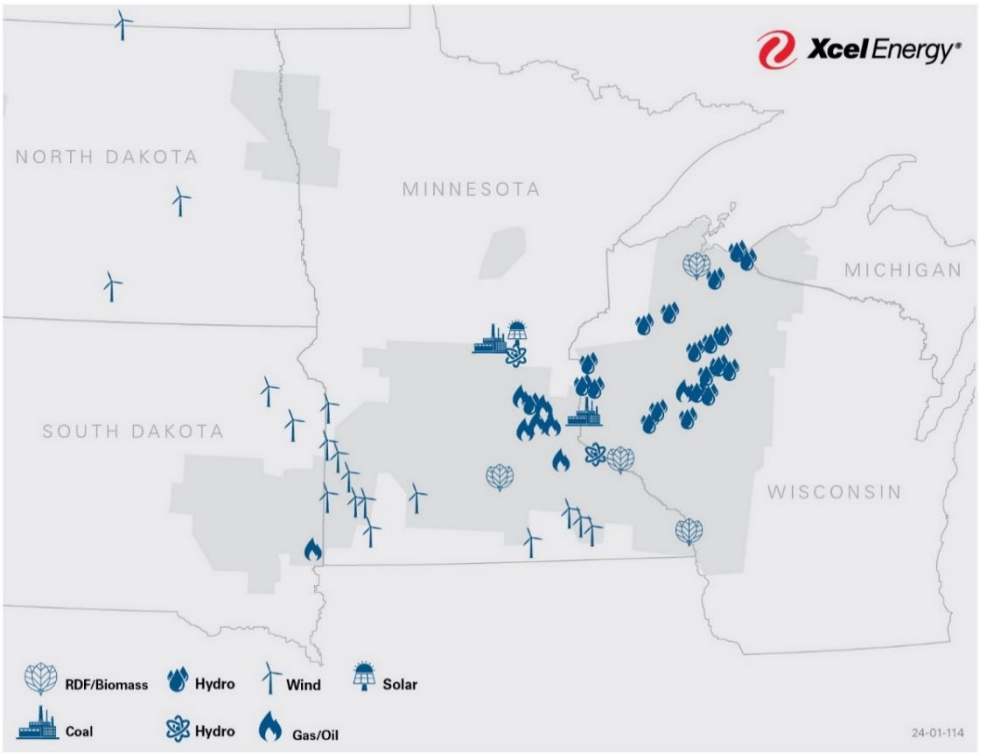


Approximately 89 percent of our NSP customers are residential, with commercial and industrial customers comprising most of the remaining 11 percent. The distribution of electricity sales by type of customer, however, is significantly different. Residential customers make up approximately 23 percent of electricity sales, with commercial, industrial, and other customers making up most of the remaining 77 percent.

NSP currently provides jobs to about 6,500 people[1] in the Upper Midwest. In 2023, we initiated 18 economic development projects for our local communities, which are projected to create more than $2.4 billion in capital investments and 1,400 new jobs in those communities. Our Vision is to be the preferred and trusted provider of the energy our customers need and with a mission to provide our customers with the safe, clean, reliable energy services they want and value at a competitive price.

The Company owns and operates multiple electric generation facilities serving this area using a variety of technologies and fuels including, coal, natural gas, wind, solar, hydro, refuse derived fuel, and nuclear. The map in Figure C-2 illustrates this fleet of generation resources.

Figure C-2: NSP System Generation Resources



[1] Includes employees and contract workers.

The NSP System includes power plants with a net maximum capacity of approximately 9,500 MW, 45,000 conductor miles of transmission lines, and approximately 558 transmission and distribution substations. We also have over 3,700 MW of Purchase Power Agreements (PPAs).

APPENDIX D – ENERGY ADEQUACY ANALYSIS

I. INTRODUCTION

The electric grid is undergoing a significant transformation, moving away from traditional thermal baseload sources to more variable energy sources like wind, solar, and battery energy storage. This shift brings new challenges and complexities in maintaining grid resilience and reliability.

We are increasingly focused on ensuring that our system remains reliable, so that we can continue to deliver the power our customers demand, while responsibly meeting the State's carbon reduction goals. Our focus on reliability is particularly important because, as we are planning to retire our entire coal fleet (over 2,000 MW of baseload generation), we have nearly 1,700 MW of power purchase agreements (PPAs) set to expire between 2025 and 2028. At the same time, our neighbors are also retiring firm capacity, which makes relying on the market more difficult. Given these challenges, traditional reserve margins and capacity-based estimates are no longer sufficient to ensure our system is prepared for the challenges of extreme weather and changing grid dynamics. To ensure reliability, enhanced planning and energy adequacy assessments are necessary.

In addition to planning to meet our planning obligations without reliance on MISO, we have taken steps to further refine our energy adequacy analysis. We conducted energy adequacy back casting analysis to ensure our system has the reliable energy it needs to serve all customers at every hour of every day. We also examined the inertial floor of our system to assess how the grid would perform in the absence of traditional baseload generation. Our studies go beyond traditional EnCompass modeling to verify the need for firm dispatchable resources and inertia to ensure reliable service for our customers.

II. UTILITY PLANNING FOR SYSTEM NEEDS

Minnesota law requires that we demonstrate that we have sufficient capacity to meet our obligations for a five-year period consistent with Minn. Stat. § 216B.2422. Historically, we planned to have enough resources to meet our load serving needs. Though MISO plays a critical role in ensuring the reliable and efficient operation of the electric grid in the Midwest region of the United States by managing the grid and determining the availability and need for capacity, energy, and ancillary services, we cannot simply rely on MISO to address our capacity needs and ensure the reliability of our system.

MISO's Resource Adequacy (RA) construct will not necessarily ensure there is sufficient firm capacity online to cover the needs of load serving entities. The MISO region relies on Load Serving Entities (LSEs) and market participants to supply the generation resources needed to serve load. MISO also oversees a market to ensure the resources that are available are used efficiently to serve load across the MISO footprint. While MISO can manage the distribution of resources, it cannot ensure that there is enough power generation to meet demand and does not guarantee that there will be enough firm capacity to meet the needs of LSEs.

MISO's role in generation planning is limited. Generation planning is reserved for the states (except in IL). MISO has the ability to set a reserve margin but not the ability to determine what resources will be procured to meet it. While we utilize MISO market energy purchases when they are more cost-effective than our own resources, these purchases are non-firm and do not contribute to our capacity for meeting our seasonal Planning Reserve Margin Requirements (PRMR) obligations as a MISO market participant. Compliance with PRMR obligations is for single-year periods, and the acquisition of new generation capacity often spans multiple years. Our most cost-effective and responsible strategy is to plan for the acquisition of generation capacity several years in advance.

Relying on the MISO Planning Resource Auction (PRA) for securing capacity for single-year periods is not a viable resource planning option. Therefore, it is crucial that we continue to plan for a system with sufficient capacity to meet our customer's energy needs.

A. Navigating the Challenges of Changing Energy Landscapes and Extreme Weather Conditions

The challenges and considerations for maintaining reliability in the face of changing energy landscapes and extreme weather conditions underscores the importance of long-term planning and the integration of new technologies and resources into the grid. Utilities are facing mounting pressure to keep pace with accelerating electricity demand, energy needs, and transmission system adequacy as the resource mix transitions.[1] Extreme weather events continue to pose the greatest risk to its reliability and stability. The North American Reliability Corporation (NERC) concluded that much of North America is again at an elevated risk of having insufficient energy supplies to meet

[1] 2023 Long-Term Reliability Assessment (LTRA): North American Electric Reliability Corporation, 2023 Long-Term Reliability Assessment (2023). https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_Infographic_2023.pdf.

demand in extreme operating conditions.[2] As the resource mix on the grid continues to evolve, the risk associated with continuity of energy supply must be managed.

For many years, the regional energy supply has relied on large generators located near large load centers. However, in recent years, there has been a marked shift toward renewable and distributed resources that may be distant from major load centers or may provide variable production profiles. This transition toward more variable resources located far away from load has only increased in recent years.

Consistent with our 2019 Plan, we recently retired Sherco Unit 2, and will retire Sherco Unit 1 in 2026, King in 2028, and Sherco 3 in 2030. Ultimately, the retirements of all the Sherco and King units will remove a total of 2,400 MWs of from our system by 2030. Others are also removing base load from their system. For example, according to the most recent MISO Regional Resource Assessment (RRA)[3] in LRZ1, coal generation is expected to decline by more than 3,200 MWs from 2027 to 2037. This generation is being replaced by less than 1.5 GWs of dispatchable generation. While a substantial amount of non-dispatchable resources is also replacing this retiring generation, MISO is still forecasting a 1 GWs reduction in accredited capacity from 2027-2032 for LRZ1. These forecasted replacements create a systemic risk that the market for capacity and energy in MISO LRZ1 will not be enough to serve the load in LRZ1—including that of Xcel Energy—under certain weather conditions. This situation could lead to an energy shortfall, disrupting the supply to consumers and potentially causing widespread outages. Moreover, similar risk extends to areas immediately adjacent to LRZ1 – LRZ2 and LRZ3 – as shown in Figure D-1 below.

[2] 2023–2024 Winter Reliability Assessment: North American Electric Reliability Corporation, 2023-2024 Winter Energy Market and Electric Reliability Assessment (2023), https://www.nerc.com/news/Pages/Generator-Fuel-Supplies,-Power-Plant-Winterization,-Load-Forecasting-Complexity-Increase-Reliability-Risk-in-North-America-.aspx

[3] 2023 Regional Resource Assessment, MISO. (November 2023). RAN Reliability Requirements and Sub-annual Construct (misoenergy.org)

Figure D-1: Local Resource Zones[4]

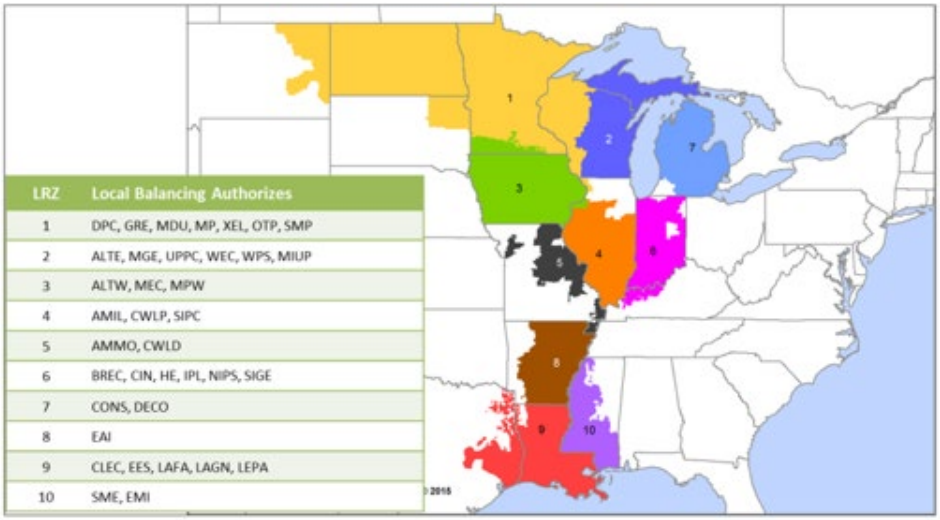


Table D-1 shows RRA projections of no excess capacity in LRZ3 and an even larger capacity shortfall than LRZ1 in the same period. These adjacent LRZs are critical for the Company's market interactions and reduction of available capacity in these locations further threatens the reliability of the energy supply for LRZ1, as it suggests they may not always be able to provide support to LRZ1 if needed. This scenario underscores the need for strategic planning and robust risk management measures to ensure the uninterrupted operation of the energy market.

Table D-1: Estimated Net Change in Resource Type for Surrounding Load Balancing Authorities

	2027 GW Surplus or (Gap) in Accredited Capacity	2032 GW Surplus or (Gap)
LRZ 1 (Company's LRZ)	**1.0**	**(1.0)**
LRZ 2	**(1.0)**	**(3.0)**
LRZ 3	**1.0**	**0.0**

In the face of these challenges, it is imperative that we explore and implement solutions that can effectively mitigate these risks. The amount of dispatchable capacity that is scheduled to retire from our system in the next several years requires that we earnestly analyze the reliability of our system to ensure that we can continue to be resilient and that our customers continue to experience the high levels of reliability they expect. It is

[4] Source, MTEP18 Book 2 Resource Adequacy264875.pdf (misoenergy.org)

important that we plan to meet our energy and capacity obligations without overreliance on the market or exposing our customers to excessive risk.

III. ENERGY ADEQUACY ANALYSIS

To ensure we would have sufficient capacity on our system to meet our customers' needs across hours of the year, we stress tested our Preferred Plan against historical hourly load and renewable production data using Encompass modeling software. The Encompass modeling reflects actual system and market conditions and hourly production cost analysis. We use the model's full chronological modeling capabilities to run dispatch and cost analyses for the years 2027 to 2030, 2033, 2034 and 2040.

Using each historical year from 2016 to 2022, we developed an 8,760-hour historical demand shape, along with monthly peak and energy forecasts, to calculate the future system level demand and shape to use in the Encompass model. All existing wind and solar resources were dispatched based on their actual historical 8,760-hour production profiles or an 8,760-hour profile from a nearby facility. Generic facilities were given a random 8,760-hour profile. Using this historical data, we conducted a special study on four plans to ensure we would have sufficient capacity on our system to meet our customers' needs under varying weather conditions:

(1) Reference Case (Scenario 1),
(2) Preferred Plan (Scenario 3),
(3) Low Load (Scenario 3), and
(4) Market Access Optimization (Scenario 3 optimized with 2,300 MW of hourly market access).

This analysis allows us to assess the capacity and energy adequacy of our plans. We evaluated these plans on six different measures:

1. Native Capacity Shortfall: Hours of insufficient system capacity in each year.
2. Average Shortfall Intensity: Average Shortfall in MW during the shortfall events in each year.
3. Longest Shortfall Event: Longest duration in hours of the shortfall events in each year.
4. Peak Capacity Shortfall: Peak capacity shortfall in MW of the capacity shortfall events in each year.
5. MISO Market Reliance Hours: Total number of hours the plan is reliant on the market to serve load.
6. MISO Market Reliance Energy: Total amount of MWh the plan is reliant on the market to serve load.

The results for each scenario in 2030 and 2040 are shown below in Table D-2:

Table D-2: Summary of 2030 Energy Adequacy Special Study Scenario

		Capacity Adequacy Metrics				Energy Adequacy Metrics**	
Plan	**Historical Year - Hourly Conditions in 2030**	**Native Capacity Shortfall (Hrs.)**	**Average Shortfall Intensity (MW)**	**Longest Shortfall Event (Hrs.)**	**Peak Capacity Shortfall (MW)**	**MISO Market Reliance Hours**	**MISO Market Reliance (MWh)**
Reference Case (Scenario 1)	**2016 Historical**	**2**	**76**	**1**	**94**	**2**	**153**
	2017 Historical	**0**	**0**	**0**	**0**	**0**	**0**
	2018 Historical	**0**	**0**	**0**	**0**	**0**	**0**
	2019 Historical	**0**	**0**	**0**	**0**	**0**	**0**
	2020 Historical	**0**	**0**	**0**	**0**	**0**	**0**
	2021 Historical	**0**	**0**	**0**	**0**	**1**	**192**
	2022 Historical	**0**	**0**	**0**	**0**	**0**	**0**
Preferred Plan (Scenario 3)	**2016 Historical**	**1**	**83**	**1**	**83**	**1**	**83**
	2017 Historical	**0**	**0**	**0**	**0**	**0**	**0**
	2018 Historical	**0**	**0**	**0**	**0**	**0**	**0**
	2019 Historical	**0**	**0**	**0**	**0**	**0**	**0**
	2020 Historical	**1**	**219**	**1**	**219**	**2**	**590**
	2021 Historical	**0**	**0**	**0**	**0**	**1**	**204**
	2022 Historical	**0**	**0**	**0**	**0**	**0**	**0**
Low Load (Scenario 3)	**2016 Historical**	**1**	**33**	**1**	**33**	**1**	**33**
	2017 Historical	**0**	**0**	**0**	**0**	**0**	**0**
	2018 Historical	**0**	**0**	**0**	**0**	**0**	**0**
	2019 Historical	**2**	**94**	**2**	**174**	**2**	**188**
	2020 Historical	**2**	**150**	**2**	**294**	**2**	**736**
	2021 Historical	**0**	**0**	**0**	**0**	**2**	**487**
	2022 Historical	**0**	**0**	**0**	**0**	**0**	**0**

		Capacity Adequacy Metrics				Energy Adequacy Metrics**	
Plan	**Historical Year - Hourly Conditions in 2030**	**Native Capacity Shortfall (Hrs.)**	**Average Shortfall Intensity (MW)**	**Longest Shortfall Event (Hrs.)**	**Peak Capacity Shortfall (MW)**	**MISO Market Reliance Hours**	**MISO Market Reliance (MWh)**
Market Access Optimization (Scenario 3 Market On Expansion Plan)	**2016 Historical**	**54**	**484**	**7**	**1,684**	**61**	**32,204**
	2017 Historical	**48**	**272**	**5**	**953**	**69**	**25,023**
	2018 Historical	**65**	**344**	**6**	**1,312**	**102**	**40,769**
	2019 Historical	**74**	**463**	**6**	**1,368**	**94**	**45,356**
	2020 Historical	**83**	**415**	**7**	**1,479**	**109**	**57,072**
	2021 Historical	**61**	**269**	**5**	**1,082**	**100**	**41,205**
	2022 Historical	**20**	**290**	**3**	**1,144**	**24**	**7,254**
	**** LOLH is higher than capacity shortfall due to batteries having available capacity, but no stored energy (MWh)**						

As shown in the table above, the Preferred Plan performs well across energy adequacy metrics. There are only two hours of native capacity shortfall across the seven historic years tested, resulting in limited dependence on the market. There are only four hours across the seven historical test years where the Preferred Plan requires market purchases in order to meet load serving needs. The Reference Case and Low Load scenarios also result in limited market dependence.

In contrast, under the Market Access Optimization, which allows the capacity expansion to optimize assuming market access of 2300 MWs in all hours of the year, the results show that the plan exposes our customers to excessive risk. There are 405 hours across the seven historic years where the plan has insufficient capacity to meet needs. This results in 509 hours where the plan cannot meet load serving needs and must rely on market purchases of nearly 250,000 MWhs of energy.

Our analysis of 2040, below, shows similar results as displayed in Table D-3 below:

Table D-3: Summary of 2040 Energy Adequacy Special Study Scenario

		Capacity Adequacy Metrics				Energy Adequacy Metrics**	
Plan	Historical Year - Hourly Conditions in 2040	Native Capacity Shortfall (Hrs.)	Average Shortfall Intensity (MW)	Longest Shortfall Event (Hrs.)	Peak Capacity Shortfall (MW)	MISO Market Reliance Hours	MISO Market Reliance (MWh)
Reference Case (Scenario 1)	2016 Historical	5	202	2	335	17	7,037
	2017 Historical	0	0	0	0	0	0
	2018 Historical	2	182	1	317	9	3,543
	2019 Historical	0	0	0	0	2	44
	2020 Historical	0	0	0	0	18	8,348
	2021 Historical	1	554	1	554	19	15,476
	2022 Historical	2	20	1	40	2	40
Preferred Plan (Scenario 3)Scenario 3	2016 Historical	5	190	2	310	14	4,622
	2017 Historical	0	0	0	0	0	0
	2018 Historical	1	271	1	271	5	1,667
	2019 Historical	0	0	0	0	0	0
	2020 Historical	0	0	0	0	7	1,671
	2021 Historical	1	323	1	323	22	10,166
	2022 Historical	1	6	1	6	1	6
Low Load (Scenario 3)	2016 Historical	5	249	3	489	5	1,436
	2017 Historical	0	0	0	0	0	0
	2018 Historical	2	171	1	299	3	1,026
	2019 Historical	2	298	2	489	2	595
	2020 Historical	2	98	1	135	9	787
	2021 Historical	1	45	1	45	15	3,527
	2022 Historical	2	118	1	158	2	237
Market Access Optimization	2016 Historical	31	667	4	1,557	58	45,347
	2017 Historical	12	210	3	387	40	18,674

		Capacity Adequacy Metrics				Energy Adequacy Metrics**	
Plan	**Historical Year - Hourly Conditions in 2040**	**Native Capacity Shortfall (Hrs.)**	**Average Shortfall Intensity (MW)**	**Longest Shortfall Event (Hrs.)**	**Peak Capacity Shortfall (MW)**	**MISO Market Reliance Hours**	**MISO Market Reliance (MWh)**
	2018 Historical	**38**	**347**	**6**	**1,461**	**122**	**67,535**
	2019 Historical	**41**	**410**	**4**	**1,164**	**77**	**41,561**
	2020 Historical	**32**	**318**	**4**	**954**	**100**	**69,543**
	2021 Historical	**34**	**452**	**7**	**1,627**	**91**	**64,575**
	2022 Historical	**12**	**299**	**2**	**1,153**	**13**	**5,380**
	** LOLH is higher than capacity shortfall due to batteries having available capacity, but no stored energy (MWh)						

Similar to the results for 2030, the Preferred Plan performs well across energy adequacy metrics in 2040. There are only 8 hours of native capacity shortfall across the seven historic years tested, resulting in limited dependence on the market. There are 36 hours across the seven historical test years where the Preferred Plan requires market purchases in order to meet load serving needs. The Reference Case and Low Load scenarios also result in limited market dependence.

In contrast, under the Market Access Optimization, which allows the capacity expansion to optimize assuming market access of 2300 MWs in all hours of the year, the results exposes our customers to excessive risk. There are 200 hours across the seven historic years where the plan has insufficient capacity to meet needs. This results in 501 hours where the plan cannot meet load serving needs and must rely on market purchases of over 300,000 MWhs of energy.

Limiting market dependence is important for both cost and reliability. During hours when system resources cannot meet load serving needs, purchases from the market are the only option to meet needs. During these hours, we are exposed to the prevailing Locational Marginal Energy Prices (LMPs) at load. If LMPs are high, those high cost will increase customer bills. If LMPs are high over multiple hours, those impact could be significant. More importantly, if resources are not available in the market, customers may be subjected to reliability impacts. As one of the largest utilities in MISO Zone 1, the potential for reliability impacts in the region are greater if we have insufficient resources to meet our load serving needs.

Figures D-2 through D-5 below provide additional insight into the energy adequacy of the four plans analyzed.

Figure D-2: Reference Case (Scenario 1)

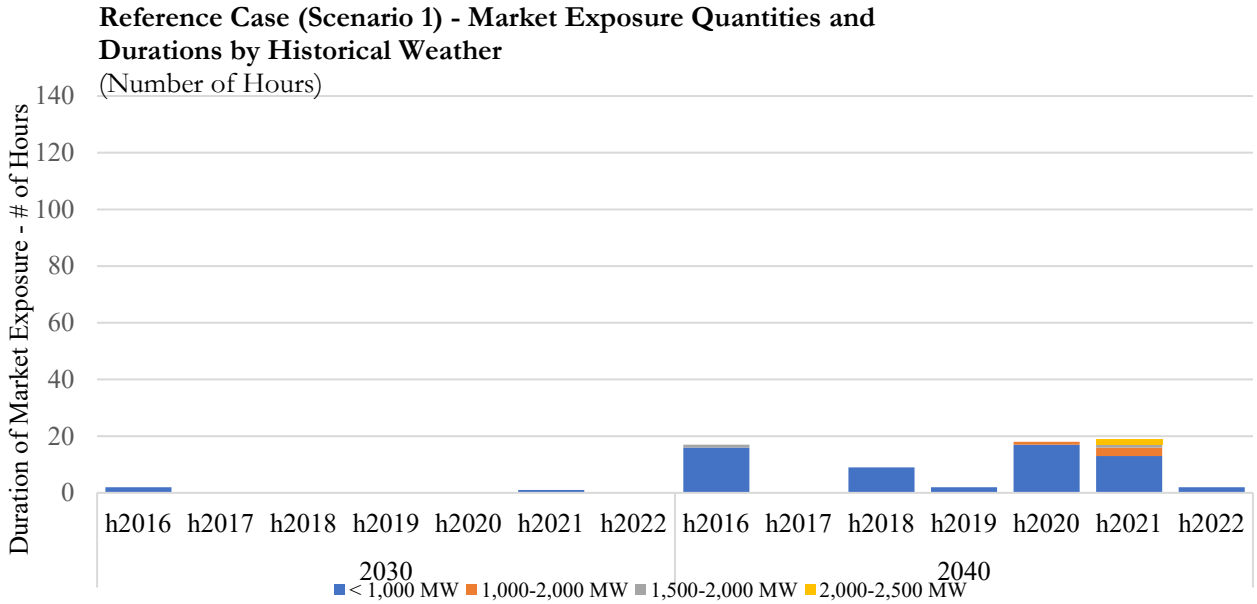


Figure D-3: Preferred Plan (Scenario 3)

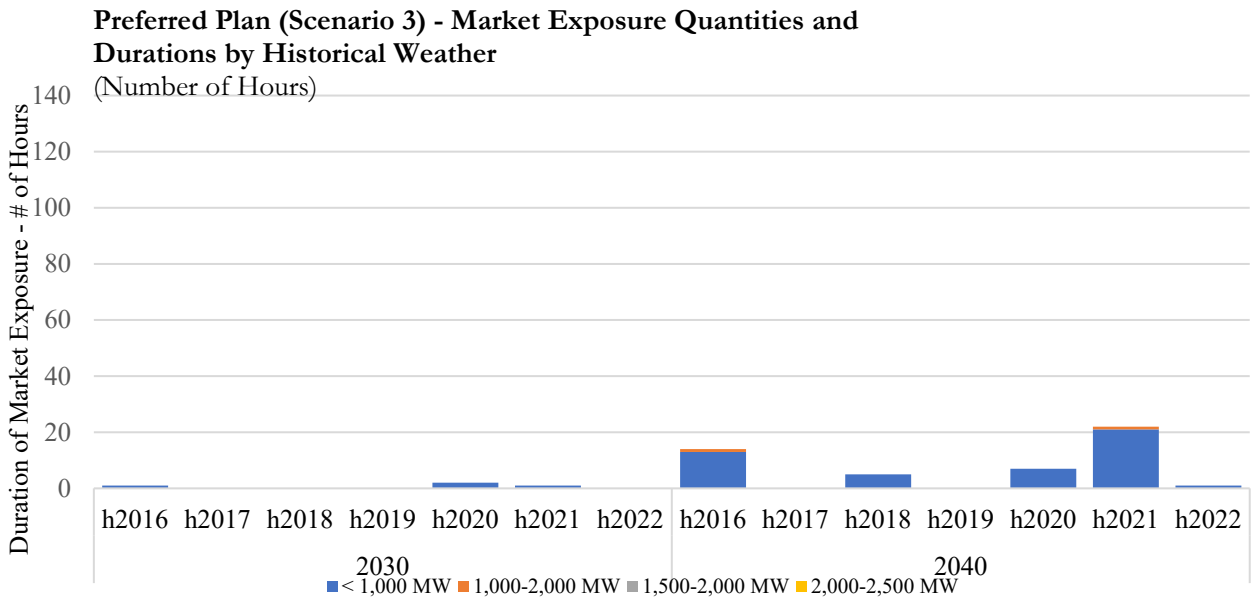


Figure D-4: Low Load (Scenario 3)

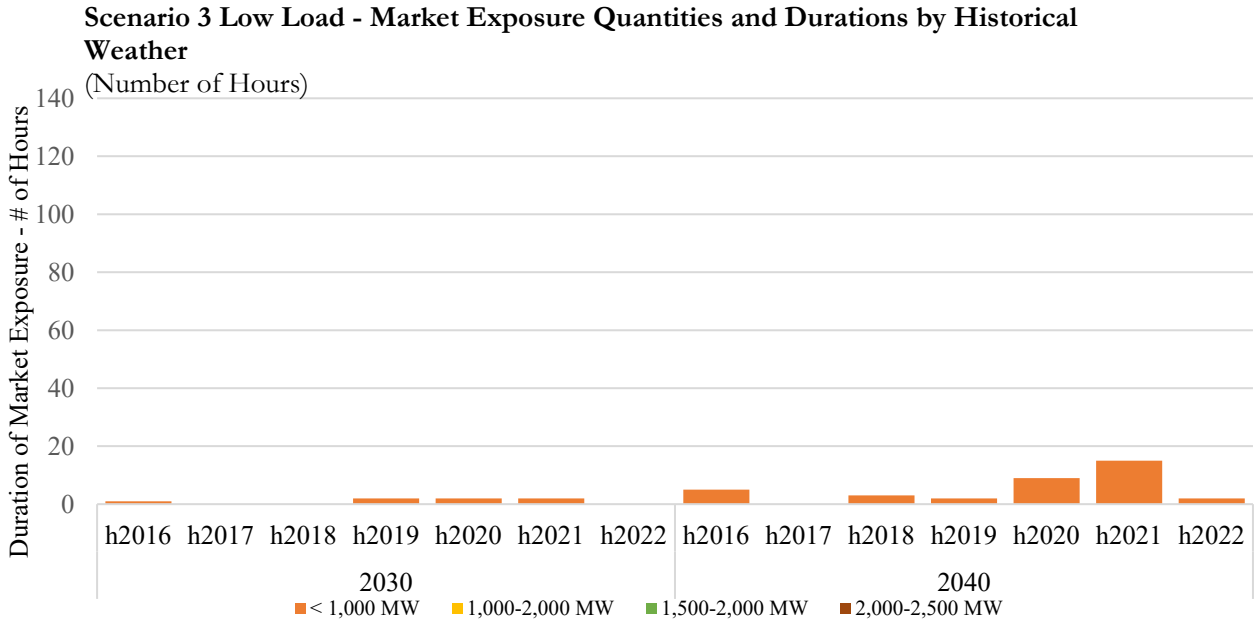
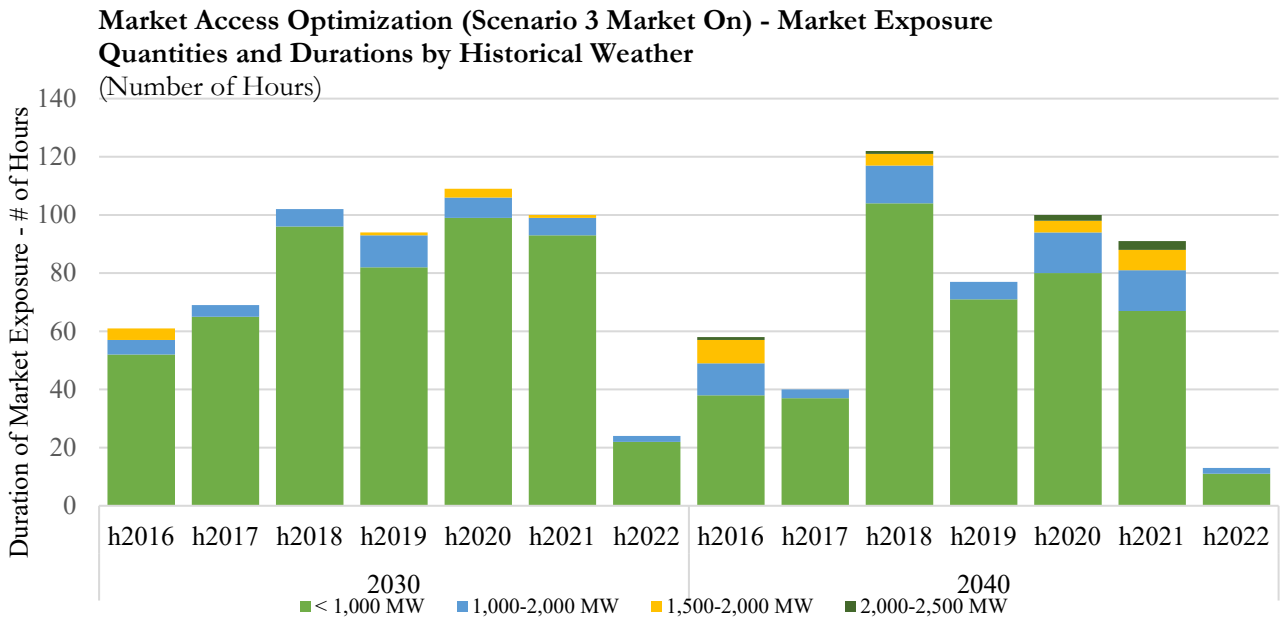


Figure D-5: Market Access Optimization (Scenario 3 optimized with 2,300 MW of hourly market access).



The figures above show the market dependence of each scenario analyzed. The bar for each historic year shows the impact in 2030 in 2040 both in terms of the number of hours of market dependence and the magnitude of those hours. The darkest green

shows hours where over the system must rely on the market for over 2,000 MWs of purchases in order to serve load. Consistent with the results above, the Preferred Plan, Reference Case and Low Load scenarios also result in limited market dependence. In contrast, the Market Optimization analysis shows significant market dependence.

The tests and metrics above focus on limiting market dependence. There are many reasons market exposure can occur, including fluctuations in pricing, weather, load, or generation that last for a few acute hours or for 1–2-day periods. However, in addition to limiting market dependence across all events, different plans can also differ starkly in terms of how they weather a longer period – 4 days – of lower than expected solar and wind generation.

The need for our resources to be able to cover energy needs over an elongated period of time is important because we have seen historical, and projected instances of low renewable output that could create havoc for reliability were there not a sufficient amount of firm capacity to cover energy needs. For instance, recently customers in Oahu were asked to reduce use of electricity to avoid rolling blackouts across Oahu due to a shortage of reserve generation capacity.[5] Two large generating units at Waiau Power Plant went offline, and repairs were not expected to be completed by the end of the day. Heavy cloud cover and rainy conditions reduced the production from solar energy systems and prevented battery energy storage systems from charging to full capacity. As a result, Hawaiian Electric began load shedding in various areas around the island to avoid a more widespread outage or damage to the electric system from an imbalance of demand versus available generation.

Further, the Moon Shoot study[6] by GridLab, emphasized the importance of firm dispatchable generation to support a clean energy policy. The study noted that short storage duration batteries (typically 4 to 10 hours) can provide a significant amount of capacity for reliability, but they cannot be the only capacity resource on the system (unless systems are upsized in terms of solar and wind resources, or capacity expansions are planned through a regional optimization approach). There may be long periods—potentially spanning multiple days—where solar and wind are unavailable, requiring other resources (such as hydrogen capacity) to be available in these times. During this time, even relatively long, 10-hour duration battery storage does not bridge the gap between periods of renewable production and demand.

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[5] https://www.hawaiianelectric.com/update-rolling-oahu-outages-initiated-customers-asked-to-reduce-use-of-electricity.

[6] The Moonshot 100% clean electricity study:
Assessing the tradeoffs among clean portfolios with a PNM case study, Grid Lab
https://gridlab.org/moonshot-study/.

In conclusion, energy adequacy analysis is a critical tool in resource planning. It helps ensure that we have a diverse and resilient energy portfolio capable of meeting demand. This not only ensures the continuous supply of power but also contributes to the broader goals of affordability, carbon reduction and job creation.

IV. THE IMPORTANCE OF FIRM DISPATCHABLE RESOURCES IN OUR PREFERRED PLAN

As we work to decarbonize our system, our models indicate the need for the addition of approximately 3,600 MWs of cumulative firm dispatchable resources between 2027 and 2040 to ensure long-duration, affordable energy when our intermittent renewables are not able to fully meet our customers' needs. Of this modeled need, 2,244 MWs of firm dispatchable resources are needed by 2030. These resources are split between 748 MWs in 2027, 748 MWs in 2028, and 748 MWs in 2030. Approximately 374 MWs of the 2028 need is located on our re-optimized Sherco Generation tie line.

We note that the Commission is considering firm dispatchable resources additions in Docket No. E002/CN-23-212. Additional firm dispatchable resources above 800 MWs have bid into the acquisition proceeding to serve our up to 800 MW need identified in our 2019 Plan. As noted here, firm dispatchable resources provide numerous benefits, including near-instant availability, making them ideal for peak power supply and when intermittent wind and solar generation are not producing energy.

The value of firm dispatchable resources and fuel diversity becomes evident during periods of extreme weather. During the 2019 Plan, it was observed that firm dispatchable resources were crucial during severe cold spells when wind resources underperformed. Even with a hypothetical doubling of wind output, there were periods of low renewable output. Hence, having diverse resources is essential to meet customer needs during such events. A diverse mix of firm dispatchable resources ensures our ability to provide reliable electric service under all conditions. With the increasing frequency of extreme weather events, it is crucial to manage the transformation of our generation portfolio while preserving system reliability and stability. Though our nuclear units remain a major source of reliable, carbon-free generation for our system, our modeling shows a need for additional firm dispatchable generation.

Extreme events can span all or nearly all of MISO's footprint, limiting the ability to rely on the broader MISO system in times of need. To meet the shortfall in the output of variable resources; at such times, we may have to rely on our resource diversity and our dispatchable generation, including units fueled by natural gas and fuel oil. With the increasing frequency of extreme weather events, such as the 2019 polar vortex and

Winter Storm Uri in 2021, it is crucial to manage the transformation of our generation portfolio while preserving system reliability and stability. Any disruption in electric service during similar future events could have serious impacts on our customers, public safety and to overall grid operations.

In sum, from a high-level capacity and reliability standpoint, the importance of firm, dispatchable resources in our energy strategy is undeniable. As we transition towards a more sustainable energy future, these resources provide the reliability and stability necessary to ensure uninterrupted service under all conditions. While advancements in transmission technologies, renewable energy sources, and energy storage resources are promising, they cannot at this time fully replace the need for firm dispatchable resources due to their current technological maturity, regulatory complexities, and the challenges in large-scale deployment. Therefore, a balanced approach that includes a diverse mix of firm, dispatchable resources, is crucial in meeting the growing energy demand while also progressing towards decarbonization.

VI. INERTIAL FLOOR STUDY

In addition to considering the value of various resources from a high-level capacity and reliability view, the Company is assessing the electrical engineering impacts of moving from a system built around large, centrally located baseload units to one based more on remotely located renewable generators. Studies that the Company and others have conducted show that the inertia historically provided by these baseload units is crucial to help the system oscillations dampen out. To help inform decisions for future generation transformation from traditional coal-based generation, the Company's Transmission Planning engineers performed a study to evaluate the NSP system's transient stability response with all of the baseload coal generation in the region offline and replaced by renewable generation (wind and solar) and other thermal generation. Unlike traditional MISO generator replacement studies, this study considers not only what happens to our system as we retire Company-owned coal generation but also potential retirements of neighboring coal generation. At this time, MISO only studies system impacts of unit retirements based on unit-specific requests made by the owners of such units. However, we understand that the vast majority of utilities within MISO are considering similar renewable initiatives to the Company. Therefore, while MISO's studies currently reflect the transmission system as being reliable and stable, they do not provide a forward-looking regional assessment of stability as coal retirements continue.

We include as an attachment to this appendix, our NSP Power System Inertial Floor Study Report, showing how the grid would perform in the absence of traditional baseload generation, mainly coal and nuclear. This Inertial Floor study is run annually to

update the analysis and evaluate the impacts to our system reliability, system stability, angular stability and inertia. This analysis allows us to determine the necessary levels of spinning mass and/or dispatchable generation necessary to keep the system stable and reliable to serve our customers.

Our study shows that inertia is crucial to help the system remain stable, and as we and other owners of baseload generation in the region retire those units, we begin to see regional stability issues. This demonstrates that it will be critical that we acquire resources capable of providing inertia as we retire our coal-fleet.

VI. CONCLUSION

Preparation and planning are key to delivering reliable power to our customers. As a Company, we take this responsibility seriously. Recent events have shown that it is important to plan for how we can provide electricity to our customers under all conditions. In addition to planning to meet our planning obligations without reliance on MISO, we have taken steps to further refine our energy adequacy analysis. We conducted energy adequacy back casting analysis to ensure our system has the reliable energy it needs to serve all customers at every hour of every day. We also examined the inertial floor of our system to assess how the grid would perform in the absence of traditional baseload generation. Our studies go beyond traditional EnCompass modeling to verify the need for firm dispatchable resources and inertia to ensure reliable service for our customers. Our Preferred Plan satisfies these concerns and will provide for the reliability our system needs to adequately ensure continued service to our customers.

NSP Power System
Inertial Floor Study Report

Performed by:
Craig Wrisley

Transmission Planning
July 21, 2023

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Certification

I hereby certify that this report was prepared
by me or under my direct supervision and that
I am a duly Licensed Professional Engineer under the
Laws of the state of Minnesota

Craig Wrisley
7/17/2023
License# 54948

Executive Summary

This analysis was performed to determine how the grid would perform in the absence of traditional baseload generation, mainly coal and nuclear. Baseload generators are units online or operating most hours of the year. To help inform decisions for future generation transformation from traditional coal based, Transmission Planning engineers performed a study to evaluate the NSP system transient stability response with all of the baseload coal generation offline. Renewable generation (wind and solar) and natural gas Combined Cycles (CC) and Combustion Turbines (CT) generation are used to replace the baseload generation that has been turned offline. This study is a stability only look – system transfer capability and resource capacity analyses are out of the work scope of this study. However, all the problems shown in the power flow models are documented.

This study examines grid performance in the absence of traditional baseload generation. The following Table 1 shows theses baseload generators and the amount of power that needs to be replaced by another type of generation.

Table 1

Baseload Generator	2027 SHAW	2027SUM
SherCo #1 (Coal)	730 MW	730 MW
SherCo #2 (Coal)	730 MW	730 MW
SherCo #3 (Coal)	928 MW	928 MW
King (Coal)	197 MW	560 MW

Based on the analysis results performed in this study, there are several potential system issues observed. The observations are listed below:

- Inertia is crucial to help the system oscillations dampen out
- Existing and proposed CCs do help stabilize the power system but are not enough to hold the system stable during all potential future generation retirement or during low renewable power situations when wind and solar are not available (i.e. night time with no wind).

Scenarios Analyzed

Summer Shoulder Average Wind, and Summer Peak scenarios are analyzed in this study. Renewables in the NSP system are modeled at seasonal generation levels; Solar at 50% for Summer Peak, 50% for Summer Shoulder Average Wind, Wind at 14.8% for Summer Peak, 48% for Summer Shoulder Average Wind.. CCs in the study area are turned on to full capacity as required to provide system stability. NERC requires Transmission Planners to evaluate the grid including under prior outage conditions. Key generation outages are assessed in the study:

- Scenario 1: Turn OFF MP Boswell Unit 3 and 4 coal plant
- Scenario 2: Turn OFF GRE Coal Creek Unit 1 and 2 coal plant
- Scenario 3: Turn OFF OTP Bigstone Unit coal plant
- Scenario 4: Turn OFF Nextera Duane Arnold nuclear plant

- Scenario 5: Turn OFF MEC Ottumwa coal plant
- Scenario 6: Turn OFF MEC George Neal Unit 3 and 4 coal plant
- Scenario 7: Turn OFF MEC Council Bluffs Unit 3 and 4 coal plant

NSP load information is shown in following Table 2.

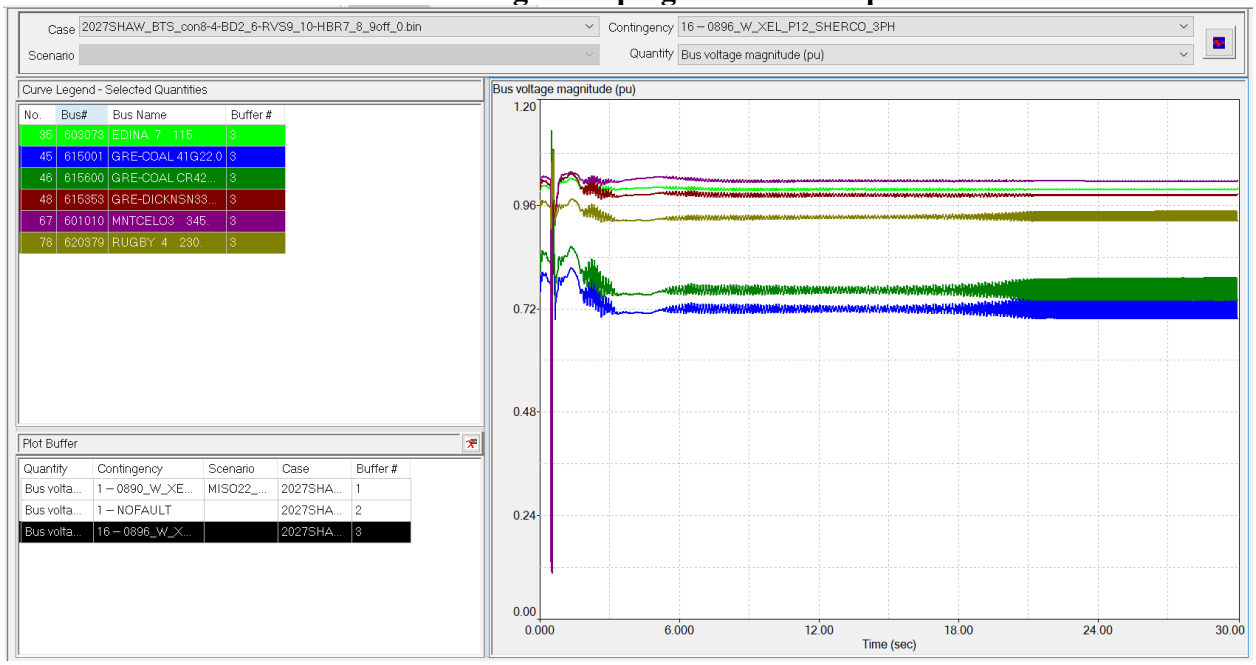
Table 2
NSP Load Level and Thermal Generation

Year	Season	Load Level
2027	Summer Shoulder Average Wind	6517 MW
2027	Summer Peak	9309 MW

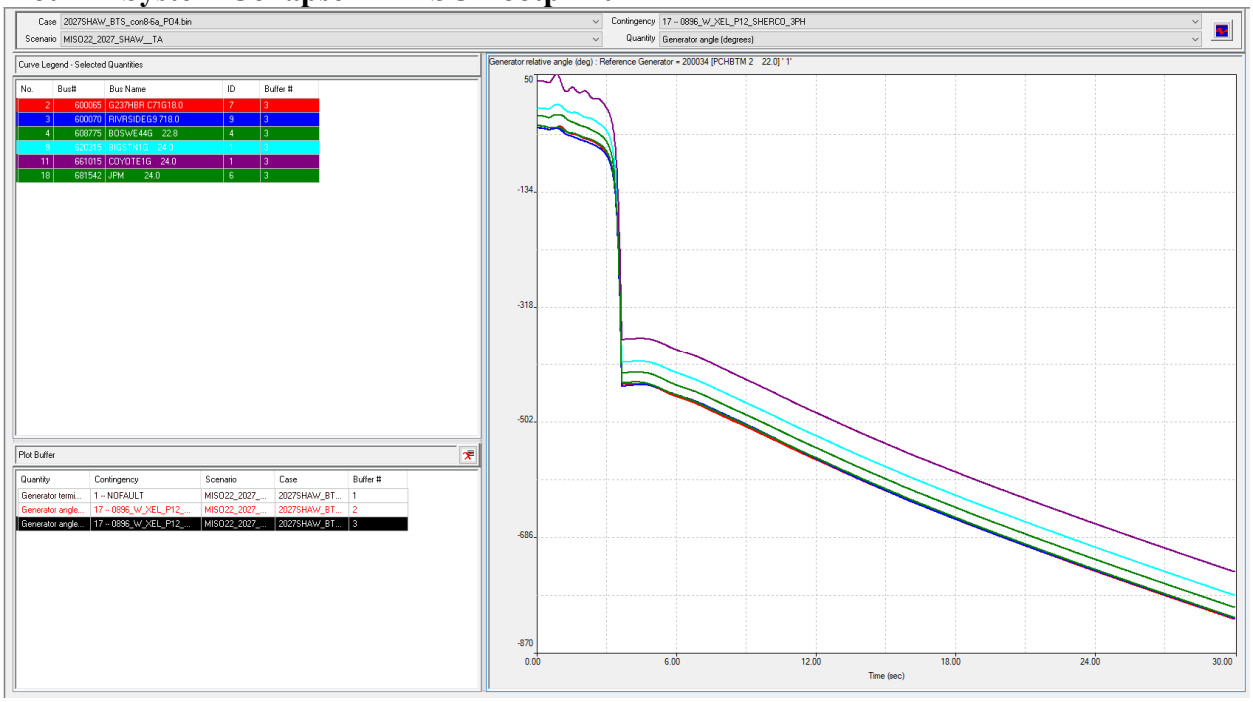
Transient Stability Simulation Results

System voltage damping issues are shown on buses in all disturbances tested with generation below the levels indicated for damping results in the report.

Plot E-1 Voltage Damping in MISO footprint



Plot E-2 System Collapse in MISO Footprint



Introduction

This analysis was performed to determine how the grid would perform in the absence of traditional baseload coal generation. Baseload generators are units online or operating most hours of the year. To help inform decisions for future generation transformation from traditional coal based, Transmission Planning engineers performed a study to evaluate the NSP system transient stability response with all of the baseload coal generation offline. Renewable generation (wind and solar) and natural gas Combined Cycles (CC) and Combustion Turbines (CT) generation are used to replace the baseload generation that has been turned offline. This study is a stability only look – system transfer capability and resource capacity analyses are out of the work scope of this study. However, all the problems shown in the power flow models are documented.

Assumptions

This study is performed utilizing Powertech TSAT version 21.0, and based on the MISO MTEP 2022 dynamics package. MISO MTEP 2022 series, year 2027 models are selected as the starting models; no substantial load growth is assumed in this study. Renewables listed on the MISO Renewable Sitting Location list are selected based on the Tier 1 and Tier 2 order. Only Renewables located in Iowa, South Dakota, North Dakota, Minnesota, and Wisconsin are selected. All generations are modeled as lumped generator, and all wind generators are modeled as type 3 models, and all solar generations are modeled as type 4 models.

Potential Limitations

Software

Powertech TSAT version 21.0 is utilized to perform the study. The existing TSAT software version is designed and manipulated based on today's power system – strong inertial support and high reliability margin– which generates great steady state results and provides very useful information for voltage stability and transient stability studies. However, due to functional limitations and the lack of detailed load and DER modeling information, the existing TSAT program can't predict precisely where the stability issue will start to occur in a high penetration, low inertia system.

Model

The study models originated from the MISO MTEP 2022 package models and are based on 2027 load levels. Existing dynamic load models included in the MTEP package are used in this study, but future, more detailed dynamic load modeling, could significantly change the system stability in a low inertia system. Utility size solar farms are included and modeled, but the smaller distributed solar farms (DER) are not modeled in the study. The DER modeling and coordination can play a very important role in future high penetration and low inertia system.

Unpredictable new technologies (Technology stabilize the system) and/or load (such as system wide loads, new policy making on Electric Vehicles, etc) are not analyzed in this study. However, these factors could change the system condition dramatically. The study is based on all facilities functioning correctly, and all protection schemes correctly coordinated. System coordination will be even more important and challenging in the future, than compared to the current system.

All the wind and solar farms are lumped as a single generator connecting directly to the point of interconnection (POI); detailed connector system is not modeled. The wind and solar farm connector system consumes reactive power which helps to deliver and transform the generated wind power to the rest of the power system; the lumped generator doesn't demonstrate the reactive power consumption in the connector system. Therefore, better reactive capacity is shown in the lump generator modeling.

1 Models and Assumptions

2.1.1 Models Utilized

This study is performed utilizing Powertech TSAT version 21.0 and based on the MISO MTEP 2022 dynamics package. MTEP 2022, year 2027 models are selected as the starting models. No substantial load growth is assumed in this study.

2.1.2 Model Development

MTEP 2022, year 2027 models are selected as the starting models. No substantial load growth is assumed in this study. Renewables listed on the MISO Renewable Sitting Location list are selected based on the Tier 1 and Tier 2 order and IRP filing. All renewables added to the model are listed in Table-3.

Table-3 Renewable Generation Added

Description	Capacity (MW)	Gen Bus # Y5	Area Number	Area Name	Bus Name
Lake Benton I:WT1 143 - Repowered	26.80	600056	600	XEL	BRI311_1W
Lake Benton I:WT1 143 - Repowered	26.80	600076	600	XEL	BRI312_1W
Lake Benton I:WT1 143 - Repowered	26.80	600079	600	XEL	BRI312_2W
Lake Benton I:WT1 143 - Repowered	26.80	600080	600	XEL	WPP93-MN
Lake Benton II:EXIS - Repowered	14.79	600081	600	XEL	BRI321_1W
Lake Benton II:EXIS - Repowered	14.79	600082	600	XEL	BRI321_2W
Lake Benton II:EXIS - Repowered	14.79	600083	600	XEL	BRI321_3W
Lake Benton II:EXIS - Repowered	14.79	600084	600	XEL	BRI321_4W
Lake Benton II:EXIS - Repowered	14.79	600085	600	XEL	BRI321_5W
Lake Benton II:EXIS - Repowered	14.79	600086	600	XEL	BRI322_1W
Lake Benton II:EXIS - Repowered	14.79	600087	600	XEL	G443 BRI323W
Lakota Ridge:NMO1 - Repowered	11.20	600088	600	XEL	BRI323_3W
Shaokatan Hills:6150 - Repowered	11.80	600090	600	XEL	G397 THLEN W
Blazing Star 2	200.00	600179	600	XEL	J587_GEN1
Nobles Wind 2	250.00	600185	608	MP	J512_GENBUS
RRF MISO PV: Minnesota - 9	60.00	601002	600	XEL	ADAMS 3
RRF MISO Wind: Minnesota - 5	96.08	601002	600	XEL	ADAMS 3
RRF MISO PV: Minnesota - 15	60.00	601010	600	XEL	MNTCELO3
RRF MISO PV: Minnesota - 1	60.00	601051	600	XEL	HMPT CNR3
RRF MISO HYB(HB): Minnesota - 1	190.85	601074	600	XEL	CRANDAL 3
RRF MISO PV: Minnesota - 10	60.00	601074	600	XEL	CRANDAL 3
RRF MISO PV: Minnesota - 16	23.42	601077	600	XEL	HAWKSNEST 3
RRF MISO Wind: Minnesota - 2	28.00	602003	600	XEL	BLUEETA5
RRF MISO PV: Wisconsin - 14	11.00	602033	600	XEL	HYDROLN5
J569	100.00	602039	600	XEL	ROCK CO5

Description	Capacity (MW)	Gen Bus # Y5	Area Number	Area Name	Bus Name
RRF MISO PV: South Dakota - 1	41.22	603009	600	XEL	GRANT 7
RRF MISO PV: Minnesota - 6	60.00	603010	600	XEL	LKYNKTN7
RRF MISO PV: Minnesota - 8	54.00	603134	600	XEL	BUFFRID7
Badger Hollow Solar 1	200.00	603172	600	XEL	WYOMING7
Badger Hollow Solar 2	100.00	603172	600	XEL	WYOMING7
RRF MISO PV: Minnesota - 7	60.00	603180	600	XEL	CHANRMB7
RRF MISO PV: Wisconsin - 8	26.00	603202	600	XEL	THREE LAKES7
RRF MISO Wind: North Dakota - 5	12.00	608602	608	MP	SQBEAST4
RRF MISO PV: Minnesota - 2	58.00	613060	600	XEL	BYRON 3
RRF MISO Wind: Iowa - 5	65.00	613330	627	ALTW	RICE 5
RRF MISO PV: Minnesota - 13	22.00	615566	608	MP	GRE-WINGRIV4
RRF MISO Wind: Minnesota - 4	120.00	615648	600	XEL	GRE-CDRMTL23
RRF MISO Wind: North Dakota - 2	120.00	615901	615	GRE	GRE-STANTON4
RRF MISO Wind: North Dakota - 8	29.09	615907	615	GRE	GRE-RMSYCB14
RRF MISO Wind: North Dakota - 4	39.00	615908	615	GRE	GRE-RMSYCB24
RRF MISO PV: Minnesota - 12	20.00	618905	600	XEL	GRE-ELLSBOR7
RRF MISO PV: Minnesota - 4	13.00	619407	600	XEL	GRE-FSCHRHL7
RRF MISO PV: North Dakota - 2	18.00	620204	620	OTP	PELICN N T7
RRF MISO PV: North Dakota - 1	11.00	620259	620	OTP	ALICE 7
RRF MISO Wind: North Dakota - 6	11.00	620259	620	OTP	ALICE 7
RRF MISO PV: North Dakota - 3	78.24	620290	620	OTP	HARVEY 4
RRF MISO PV: North Dakota - 4	48.80	620290	620	OTP	HARVEY 4
RRF MISO Wind: North Dakota - 7	52.00	620290	620	OTP	HARVEY 4
J437	150.00	620322	620	OTP	BSSOUTH4
RRF MISO Wind: South Dakota - 1	61.00	620325	620	OTP	BROWNSV4
Flying Cow Wind	150.00	620417	620	OTP	BSSOUTH3
Deuel Harvest Wind	310.00	620417	620	OTP	BSSOUTH3
Dakota Range III Wind	151.80	621003	620	OTP	J488 G
Codington County Wind	300.00	621102	620	OTP	J436 DK RNG1
RRF MISO Wind: Minnesota - 1	16.00	658114	620	OTP	APPLETN7
RRF MISO Wind: North Dakota - 3	14.00	661030	661	MDU	STEIN 7
RRF MISO Wind: South Dakota - 2	49.46	661038	652	WAPA	GLENHAM4
Merricourt Wind	150.00	661093	661	MDU	MERRCRT4
RRF MISO Wind: North Dakota - 1	40.00	661094	661	MDU	WISHEK 4
J718	49.98	680413	680	DPC	CHERRY_8
RRF MISO PV: Wisconsin - 12	43.00	681534	680	DPC	APL RVR5
GRE Ramsey	503.00	615335	615	GRE	GRE-RAMSEY
Minnesota Energy Connection	2200	601011	600	XEL	SHERCO 3

Description	Capacity (MW)	Gen Bus # Y5	Area Number	Area Name	Bus Name
King Transmission Connection	560	601014	600	XEL	AS KING3

Summer Shoulder Average Wind, and Summer Peak scenarios are analyzed in this study. Renewables in the NSP system are modeled at seasonal generational levels in both models; Solar at 50% for Summer Peak, 31% for Summer Shoulder Average Wind, Wind at 14.9% for Summer Peak, 50% for Summer Shoulder Average Wind. For No renewable cases, Wind and Solar were reduced to 0MW and 70% MVAR availability to simulate the Wind Free and Q at night functionality of the new inverter types. CCs in the study area are turned on to full capacity as needed to provide stability in each scenario. NSP load information is shown in Table-4.

Table-4 NSP Load Level and Thermal Generation Level

Year	Season	Load Level
2027	Summer Shoulder Average Wind	6517 MW
2027	Summer Peak	9309 MW

Baseload generators turned off are listed in Table-5.

Table-5 Baseload Generation Turned off

Bus Name	Bus Number	2027 SHAW	2027SUM
600000	SHERC31G 24.000	730 MW	730 MW
600001	SHERC32G 24.000	730 MW	730 MW
600002	SHERC33G 26.000	928 MW	925 MW
600006	KING 31G 20.000	552 MW	552 MW

CC generations turned on are listed in Table-6.

Table-6 Shoulder Average Wind Combined Cycle and Combustion Turbine Generation Turned on

Gen PSSE Bus	Gen Name	Pmax	SHAW Base	SHAW Prior Outage	SHAW Synch Cond Prior Outage	SHAW No Renewable	SHAW No Renewable Prior Outage
600993	Lyon Co CT	**800**					
600022	Blue Lake 1	**39**					
600023	Blue Lake 2	**39**					
600024	Blue Lake 3	**36**					
600025	Blue Lake 4	**39**					
600043	Blue Lake 7	**151**				**X**	**X**
600044	Blue Lake 8	**151**				**X**	**X**
600995	Inverhills CT2	**200**					
600996	Inverhills CT1	**225**					**X**
600012	Black Dog 2	**115**				**X**	**X**
600164	Black Dog 6	**214**				**X**	**X**
600065	Highbridge 7	**162**		**X**		**X**	**X**
600066	Highbridge 8	**162**				**X**	**X**
600067	Highbridge 9	**226**				**X**	**X**
600007	Riverside 7	**160**		**X**		**X**	**X**
600070	Riverside 9	**158**				**X**	**X**
600071	Riverside 10	**158**				**X**	**X**
600046	MEC ST	**330**				**X**	**X**
600047	MEC CT1	**188.5**				**X**	**X**
600172	MEC CT2	**186**				**X**	**X**

Table-6 Summer Combined Cycle and Combustion Turbine Generation Turned on

Gen PSSE Bus	Gen Name	Pmax	SUM Base	SUM Prior Outage	SUM Synch Cond Prior Outage	SUM No Renewable	SUM No Renewable Prior Outage
600993	Lyon Co CT	800		X	X	X	X
600022	Blue Lake 1	39		X	X	X	X
600023	Blue Lake 2	39		X	X	X	X
600024	Blue Lake 3	36		X	X	X	X
600025	Blue Lake 4	39		X	X	X	X
600043	Blue Lake 7	151	X	X	X	X	X
600044	Blue Lake 8	151	X	X	X	X	X
600995	Inverhills CT2	200					
600996	Inverhills CT1	225		X	X	X	X
600012	Black Dog 2	115	X	X	X	X	X
600164	Black Dog 6	214	X	X	X	X	X
600065	Highbridge 7	162	X	X	X	X	X
600066	Highbridge 8	162	X	X	X	X	X
600067	Highbridge 9	226	X	X	X	X	X
600007	Riverside 7	160	X	X	X	X	X
600070	Riverside 9	158	X	X	X	X	X
600071	Riverside 10	158	X	X	X	X	X
600046	MEC ST	330	X	X	X	X	X
600047	MEC CT1	188.5	X	X	X	X	X
600172	MEC CT2	186	X	X	X	X	X

2.1.3 Modeling Assumption

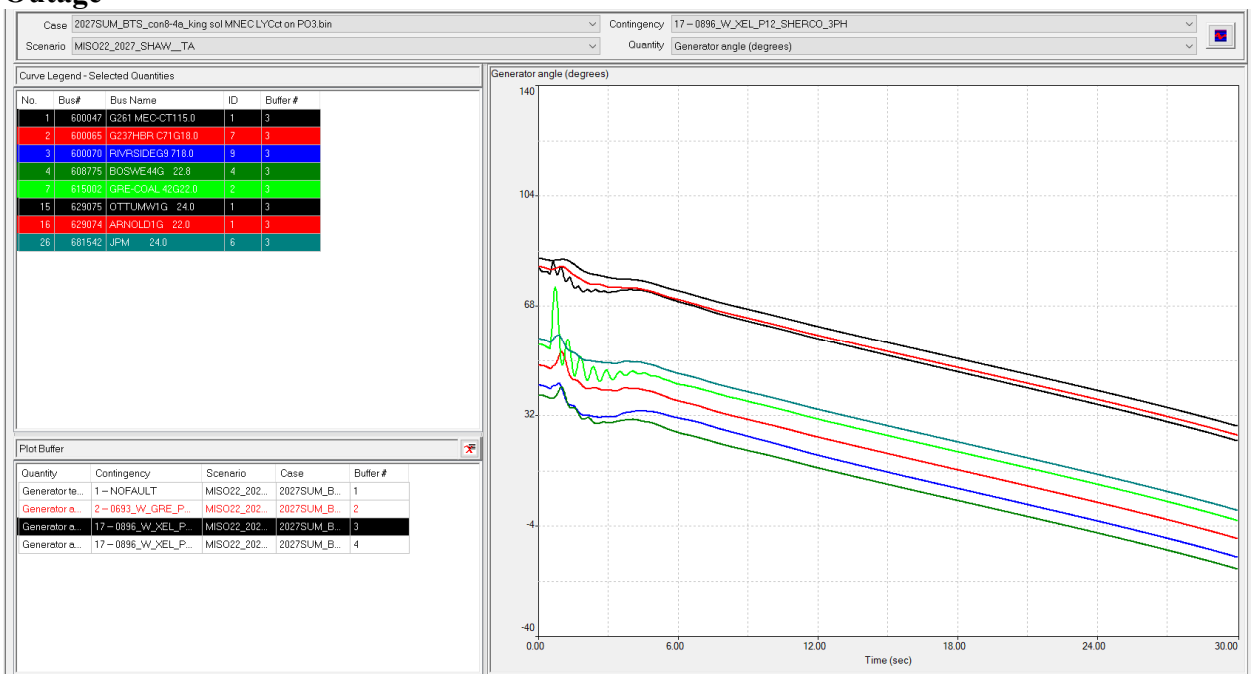
Only Renewables located in Iowa, South Dakota, North Dakota, Minnesota, and Wisconsin are selected. All wind generations are model as type 3 models, and all solar generations are modeled as type 4 models. Solar at 50% for Summer Peak, 31% for Summer Shoulder Average Wind, Wind at 14.9% for Summer Peak, 50% for Summer Shoulder Average Wind. For No renewable cases, Wind and Solar were reduced to 0MW and 70% MVAR availability to simulate the Wind Free and Q at night functionality of the new inverter types.

2.1.4 Issues Shown in Power Flow Models

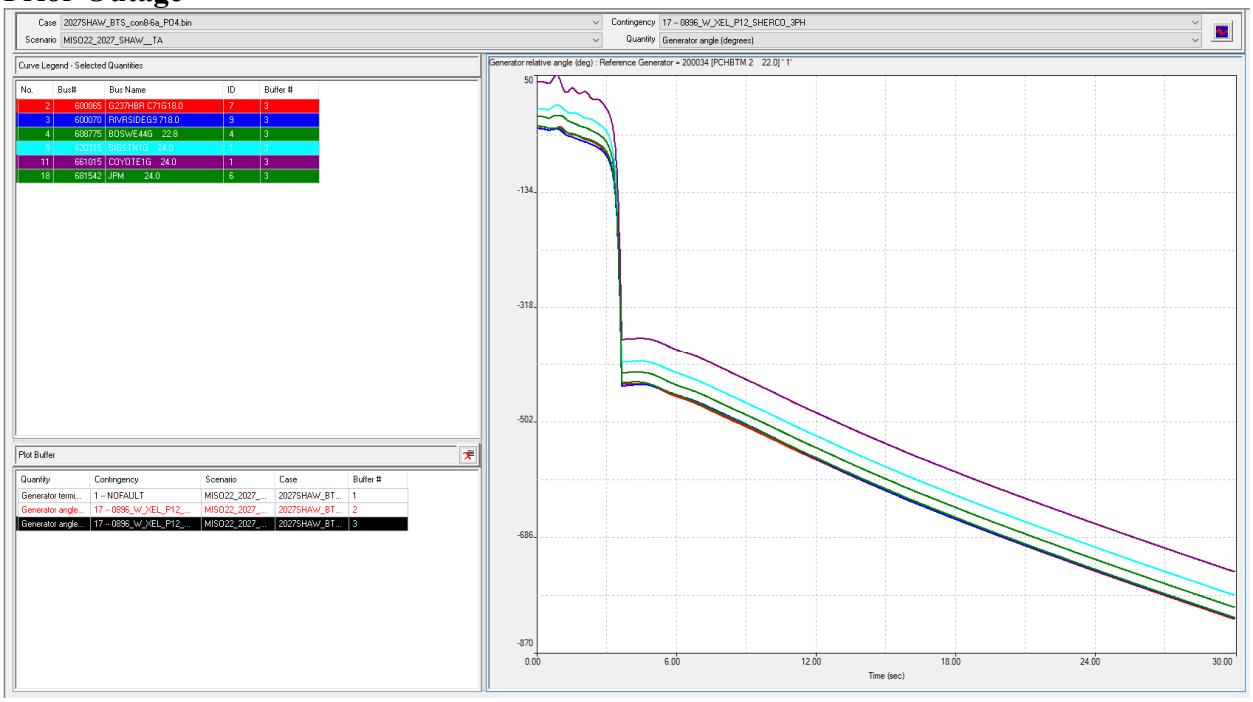
Potential generation stability issues were identified in SHAW, no renewable prior outage cases and SUM prior outage and no renewable cases. The instability is indicated by the generator rotor

angles exceeding 300 degrees, which is indication of angular separation from the grid, which would lead to generator tripping and likely islanding of the system where small pockets of the system are isolated by protection tripping. The SUM prior outage cases did not exceed 300 degrees in the 30 second analysis duration, but did showed degrading angle and no indication of recovery. Plots E3 and E4 show examples of the generator angle instability.

Plot E-3 Generator Angular Instability Summer with Synchronous Condenser Prior Outage



Plot E-4 Generator Angular Instability Shoulder Average Wind No Renewable Prior Outage



2.1.5 Prior Outages

Three prior outages are selected to test more stressed system conditions. The selected prior outages are tested for each season, and listed below:

- Scenario 1: Turn OFF MP Boswell Unit 3 and 4 coal plant
- Scenario 2: Turn OFF GRE Coal Creek Unit 1 and 2 coal plant
- Scenario 3: Turn OFF OTP Bigstone Unit coal plant (Summer Only, Unit Off in Shoulder Base Case)
- Scenario 4: Turn OFF Nextera Duane Arnold nuclear plant
- Scenario 5: Turn OFF MEC Ottumwa coal plant
- Scenario 6: Turn OFF MEC George Neal Unit 3 and 4 coal plant
- Scenario 7: Turn OFF MEC Council Bluffs Unit 3 and 4 coal plant

2 Stability Analysis

MISO MTEP 2022 Transient Dynamic package is used to conduct the transient stability analysis. Three phase faults with normal clearance time and single line to ground faults with a stuck breaker are tested for major 345 kV substations, transmission lines in Twin Cities and neighboring areas. Selected 345 kV bus voltages and transmission line power flow in Twin Cities and neighboring areas are monitored and plotted. The disturbances studied are listed in Table-7:

Table-7 Disturbances Simulated in the Study

YELLOW HIGHLIGHT DENOTES PROTECTED CEII DATA

Name	Description

Name	Description

3 Analysis Results

Stability simulation results are summarized in Table-8: **YELLOW HIGHLIGHT DENOTES PROTECTED CEII DATA**

Table-8 Stability Analysis Summary

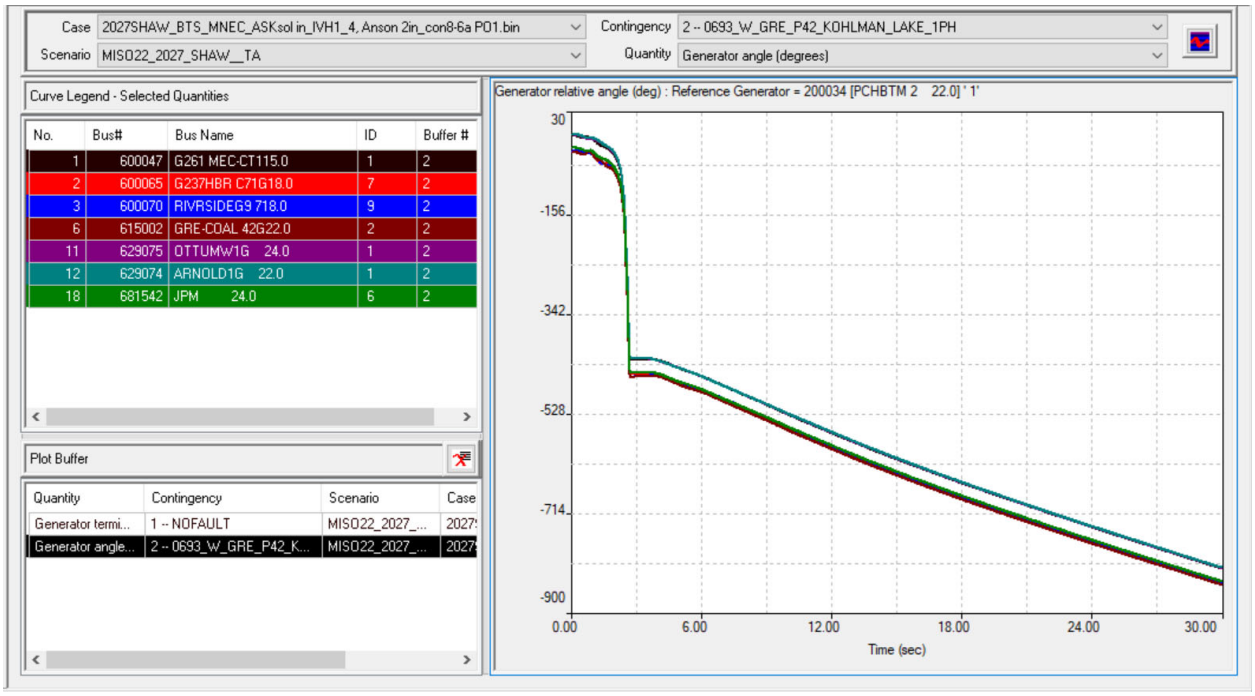
Contingency	Description	2027 SHAW Base	2027 SHAW Prior Outage	2027 SHAW Synch Cond Prior Outage	2027 SHAW synch cond No Renewable	2027 SHAW synch cond No Renewable Prior Outage	2027 SUM Base	2027 SUM Prior Outage	2027 SUM Synch Cond Prior Outage	2027 SUM synch cond No Renewable	2027 SUM synch cond No Renewable Prior Outage
0693_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0857_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0860_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0865_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0866_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0867_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0868_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0879_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0890_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0891_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0892_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0893_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0896_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0898_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0920_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0922_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0927_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse

Contingency	Description	2027 SHAW Base	2027 SHAW Prior Outage	2027 SHAW Synch Cond Prior Outage	2027 SHAW synch cond No Renewable	2027 SHAW synch cond No Renewable Prior Outage	2027 SUM Base	2027 SUM Prior Outage	2027 SUM Synch Cond Prior Outage	2027 SUM synch cond No Renewable	2027 SUM synch cond No Renewable Prior Outage
0935_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0936_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0941_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0942_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0943_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0944_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
0945_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
2199_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
2217_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
2218_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
2219_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
2229_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
2238_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
2242_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
2257_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse
2277_redacted		Damping	Damping	Damping	Damping	Collapse	Damping	Collapse	Collapse	Collapse	Collapse

5 Analysis Results Discussion

2027 Shoulder Average Wind Case:

System generator angular stability issues are shown in the no renewable scenario on generators in the study area in all disturbances tested.



Summer Peak Case:

System generator angular stability issues are shown in the prior outage and no renewable scenario on generators in the study area in all disturbances tested.

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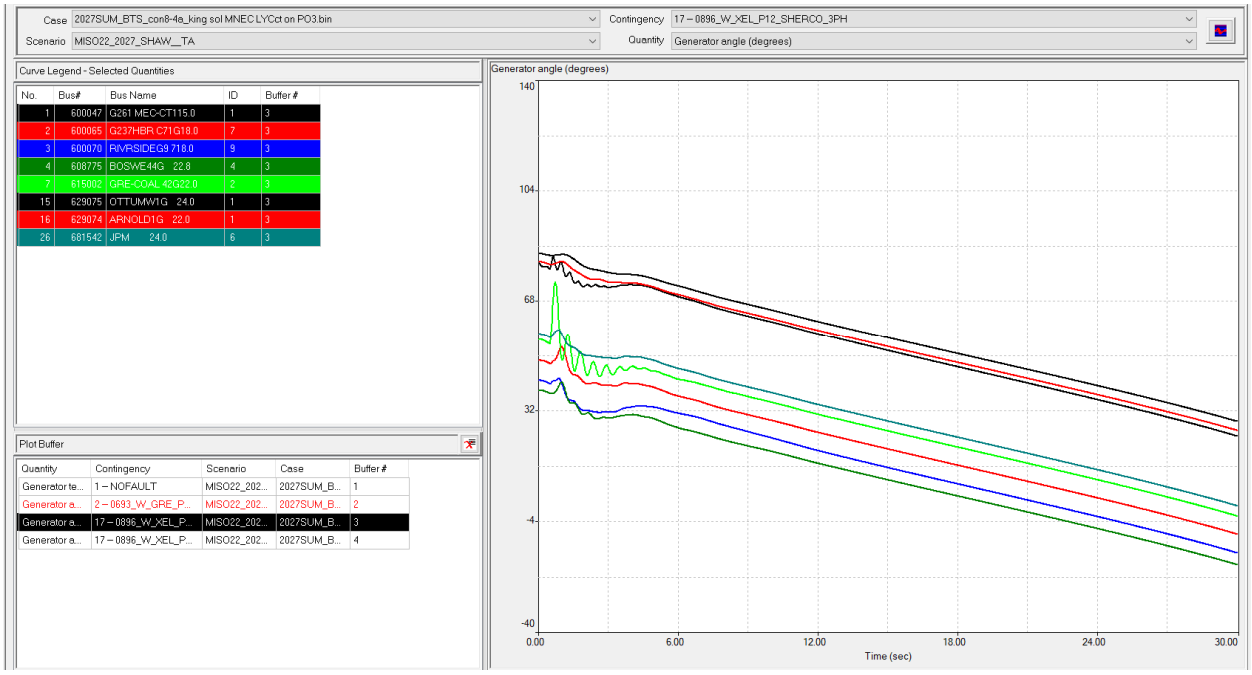


6 Observation

Based on the analysis results performed in this study, there are several potential system issues that have been observed. These observations are listed below:

- Inertia is crucial to help the system oscillations dampen out, but does not help angular stability.
    - Inertia can be provided by synchronous machines.
    - Angular stability can only be solved by using real power on the other side of the power transfer to reduce the angle.

Existing and proposed CCs do help stabilize the power system but are not enough to hold the system stable during all potential future generation retirement or during low renewable power situations.

APPENDIX E – LOAD AND DISTRIBUTED ENERGY RESOURCE FORECASTING

I. SUMMARY LOAD FORECAST DESCRIPTION

This appendix discusses the methodology we used in conjunction with this resource plan to forecast customer need, including the requirements specified in Minn. R. 7610.0320. This appendix documents our load and energy demand forecasting process. In addition, we have taken additional steps in this resource plan to model energy efficiency (EE) as a supply-side resource. Where relevant, we include explanations of these steps to provide transparency and explain how this base forecast correlates to the load and energy demand forecasting discussed in Chapter 3: Minimum System Needs, and Appendix F: EnCompass Modeling Assumptions and Inputs.

The Company relies on econometric models and other statistical techniques to develop the sales forecast. The econometric models relate our historical electric sales to demographic, economic, and weather variables. We develop our sales forecasts for each major customer class in each state of our service area. The individual class forecasts for each state are summed to derive a total system sales forecast.

We convert the sales forecast into energy requirements at the generator level by adding energy losses. The forecasted losses are based on forecasted loss factors, which are developed by modeling actual historical losses. We develop a preliminary peak demand forecast using a regression model that relates historical monthly base peak demand to energy requirements and weather, and then develop a final peak forecast by adjusting for electric vehicles, changes in large customer loads, and beneficial electrification. We provide a detailed discussion of the forecast methodology later in this appendix.

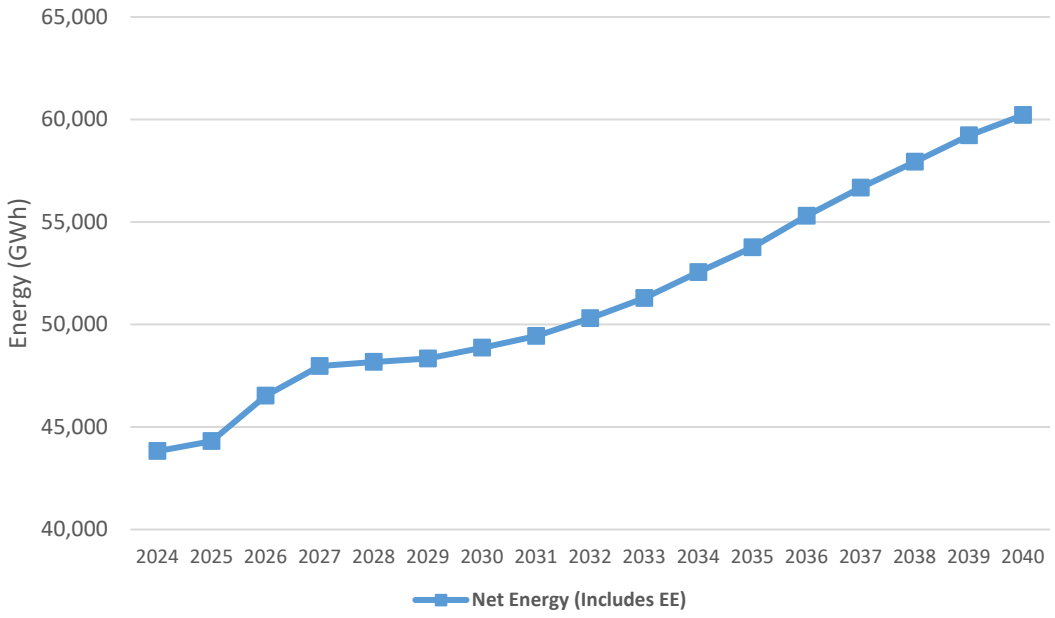
The forecasts themselves are based on projections of economic activity for our various service areas provided by IHS Global Insight, Inc. (Global Insight). Global Insight expects continued growth in key economic indicators. For example, for the Minneapolis-St. Paul metropolitan area, households are expected to increase at an average annual rate of 0.8 percent during the 2024-2040 planning period. Real per-capita personal income is expected to increase 1.9 percent per year on average, and employment is expected to gain an average of 0.4 percent per year. Minnesota real gross state product is expected to increase at an average annual rate of 1.8 percent.

A. Energy Forecast

1. Base Forecast

The base energy forecast increases at an average annual growth rate of 2 percent over the 2024 – 2040 planning period, net of modeled energy savings, forecasted distributed solar, and electric vehicle charging projections. Electric energy requirements[1] are expected to increase at an annual average of 1,025 gigawatt-hours (GWh), starting with 43,823 GWh in 2024 to 60,215GWh in 2040. See Figure E-1 below.

Figure E-1: NSP System Total Median Net Energy (GWh)
(Includes Adjustment for EE)



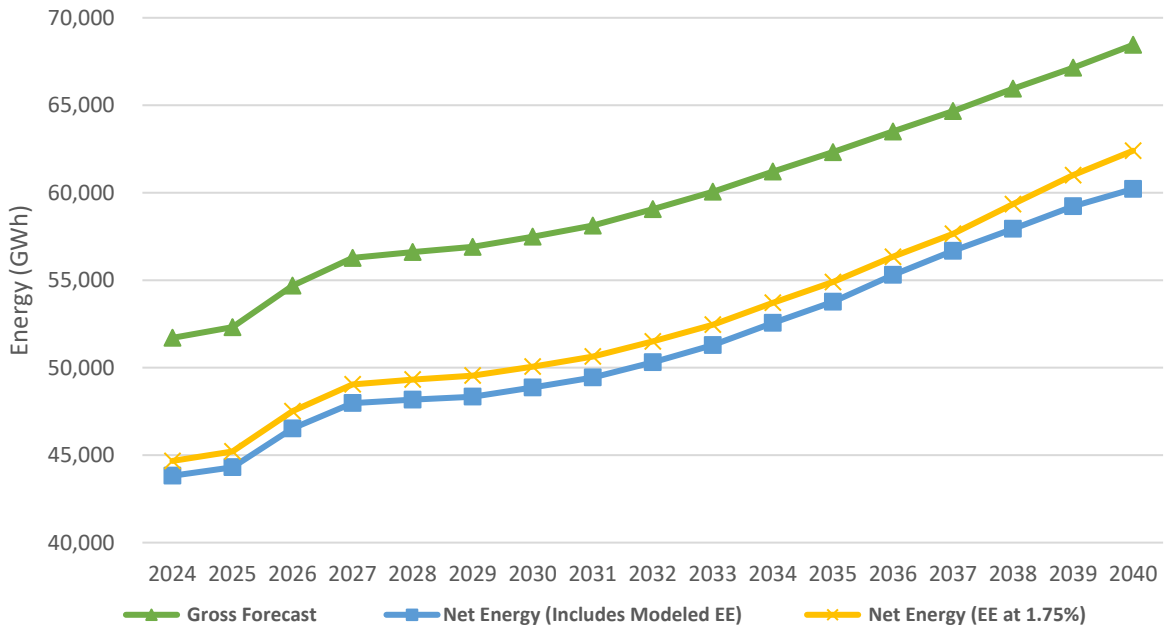
The projected 2 percent average annual growth in electric energy requirements is stronger than the actual growth seen over the past few years due, primarily, to large new data center loads and acceleration in the adoption of Electric Vehicles. After adjusting for unusual weather, electric energy requirements increased at an average annual rate of 0.2 percent from 2019 to 2022.[2]

[1] Gross of rooftop solar generation. Solar generation was modeled as a resource instead of netting against energy requirements.
[2] This data comes from the Company's EFF database, which is our system of record for sales and customer accounts.

2. Modifications for Use in EnCompass

To be consistent with the modeling approach for EE in the last IRP, we continue to model energy efficiency as a supply-side resource. This required that we adjust the base energy forecast (discussed in Part 1 above) to remove the embedded EE adjustment that projects the effects of energy savings to the end of the Planning Period. This resulted in an NSP System Gross Energy Requirements forecast. In a separate process, we formulated annual EE savings amounts into "Bundles" that we made available in the EnCompass model along with other supply-side resources. These adjustments are shown in Figure E-2 below.

Figure E-2: Gross Energy Requirements Forecast Compared to Net Energy Requirements Forecast



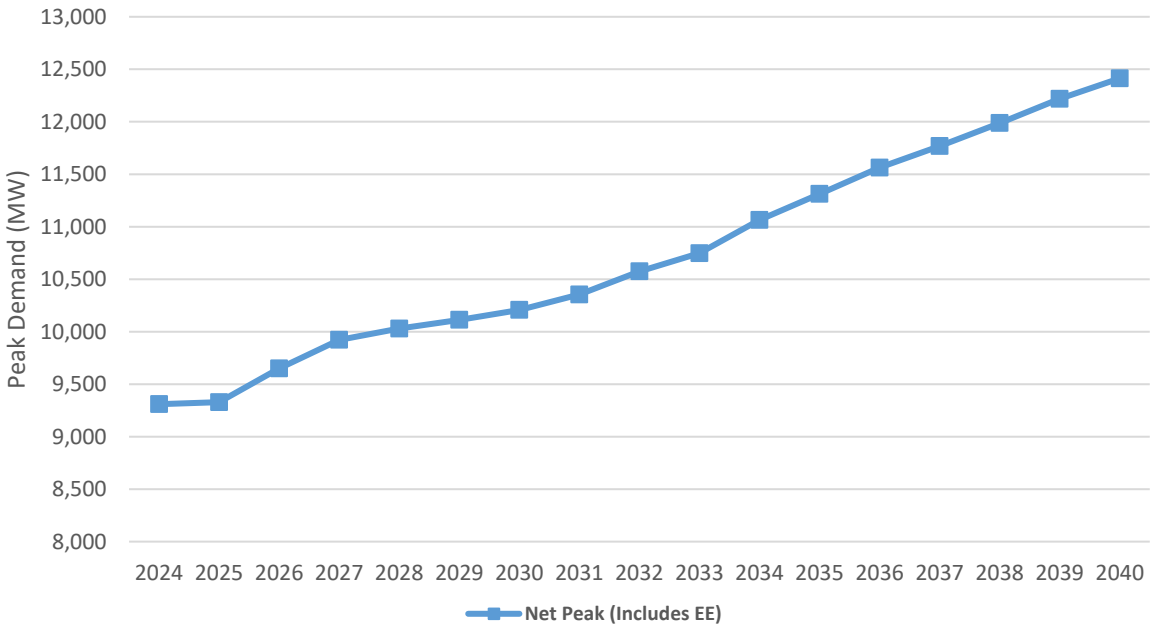
We discuss the EE Bundle modeling further later in this appendix, as well as in Appendix F: EnCompass Modeling Assumptions and Inputs, and Appendix H: Resource Options. Appendix J: Distributed Energy Resources contains detail on how the EE bundles were developed.

B. System Peak Demand Forecast

1. Base Forecast Methodology

During the 2024 – 2040 planning period, the base case peak forecast increases at an average annual growth rate of 1.8 percent. As demonstrated in Figure E-3 below, annual summer peak demand increases at an average of 194 MW each year, starting with 9,309 MW in 2024 to 12,414 MW in 2040.

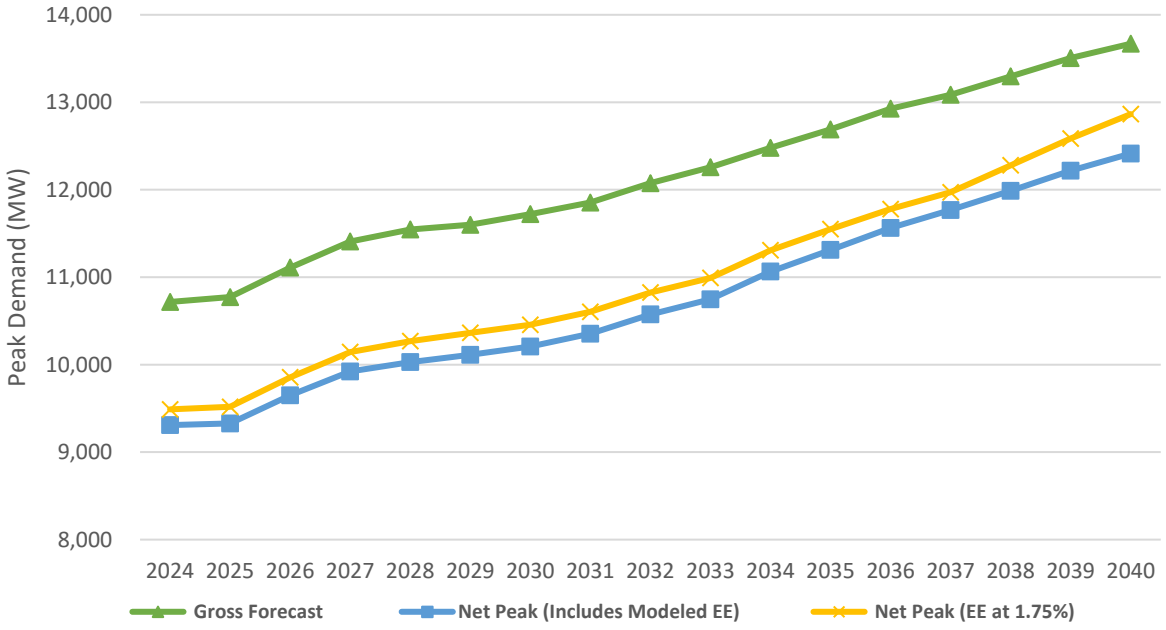
Figure E-3: NSP System Median Base Summer Peak Demand (MW) (Includes modeled EE Adjustment)



2. Modifications for Use in EnCompass

For modeling peak summer demand levels in EnCompass, we took the same approach as noted in reference to the energy forecasts. Again here, for EnCompass modeling purposes, we start with the base forecast and remove EE adjustments to reflect gross load. This process enables us to model the system considering EE as a supply-side resource.

Figure E-4: Gross Peak Demand Forecast Compared to Net Peak Demand Forecast



The remainder of this appendix discusses the energy and peak load forecasting methodologies, assumptions, analytics, adjustments, etc. to derive the System Energy Forecast presented in Part A.1 and Figure E-1 and the System Base Peak Demand Forecast presented in Part B.1 and Figure E-3.

C. Forecast Methodology

Xcel Energy serves customers in five jurisdictions in the upper Midwest: Minnesota, North Dakota, South Dakota, Wisconsin, and Michigan. We develop a forecast for each major customer class and jurisdiction using a variety of statistical techniques.

We first develop our system sales forecasts by using a set of econometric models at the jurisdictional level for the Residential, Small Commercial and Industrial sectors for all jurisdictions, Large Commercial and Industrial sector for all NSPM jurisdictions, and the Minnesota Public Street and Highway Lighting and Public Authority sectors. These models relate our historical electric sales to demographic, economic and weather variables as detailed in the prior section of this document.

For the remaining, more static customer classes – Large Commercial and Industrial (NSPW), Public Street and Highway Lighting, Public Authority, and Interdepartmental – in all states but Minnesota we use trend analysis or a simple historical average. We compile our system sales by summing the individual forecasts for each sector in each jurisdiction.

Since some energy is lost, mostly in the form of heat created in transmission and distribution conductors, we use loss factors to convert the sales forecasts into energy production requirements at the generator. The forecasted loss factors are developed by modeling actual historical loss factors and estimating losses for the first forecast year (2023). These factors are held constant over the forecast period.

We updated our peak forecast methodology to better account for the potential peak shifting due to future adoption of Distributed Solar Generation (DG Solar), managed and unmanaged Electric Vehicle (EV) charging, and Beneficial Electrification (BE). These technologies will, on net, shift load from typical summer peak hours (afternoon/early evening) into late evening or, in the case of managed EV's, early morning. The prior monthly peak modeling approach could not account for time shifting; therefore, the static assumption would be that NSP will continue to peak at the same time as the historical series being modeled.

The current "8760" peak modeling approach uses Metrix LT to scale unique hourly profiles for each hour in the year. Specifically, we perform modeling for Base energy,[3] EV, BE, DG Solar,[4] Large CI Data Centers, and Energy Efficiency using monthly energy assumptions for each specific component and on a state-by-state basis. The Base energy curve is also scaled to include a Base monthly peak demand outlook[5] that assumes no new technologies and no change in customer behavior from the present. All component curves are then aggregated, and the maximum hourly load by month is calculated. The resulting peaks largely align with the Company's old monthly modeling process for the first few years of the forecast timeframe. However, adoption of rooftop solar generation eventually pushes summer peaks later into the evening, and increased EV penetration with charge management programs moves peaks to 1:00 a.m. by the early 2040s.

[3] Base energy is an outlook for NSP consumption that assumes no change in customer behavior i.e. if consumer behavior remains unchanged from the present, and includes no forecast adjustments for EV, BE, DG Solar, new Large CI Data Centers, and Energy Efficiency.
[4] DG Solar does not include CSGs or solar that satisfies the 3 percent DSES legislation.
[5] Produced using a monthly regression model of NSP peak demand.

Once the NSP System peak demand forecast is complete,[6] a model is developed that relates the NSP System's non-MISO coincident peak (NCP) to the NSP System demand coincident with the Midcontinent Independent System Operator (MISO) system peak demand. In other words, the model was developed to calculate NSP's coincident peak (CP). The resulting relationship between the two series is referred to as the Coincidence Factor (CF), and is used to convert the NCP[7] to the CP forecasts used in Encompass modeling for this Resource Plan.

D. Forecast Adjustments

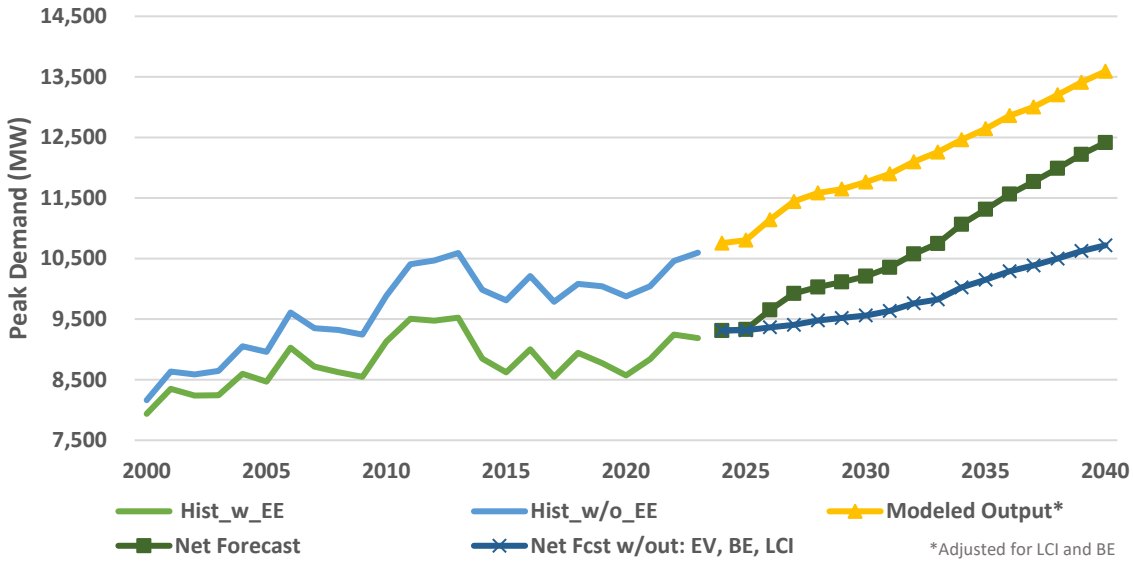
The demand and energy forecasts are developed using a number of assumptions described in this appendix, including Energy Efficiency (EE). NSP's methodology is unchanged from the 2019 and 2015 resource plans, and the process follows three distinct steps:

- Collect and calculate historical and current effects of EE on observed sales.
- Project the forecast using observed data with the impact of EE removed (i.e., increase historical sales to show hypothetical case without EE).
- Adjust the forecast to show the impact of all planned EE in future years and from continuing energy savings resulting from historical measures.

These EE adjustments are based on the Company's current Energy Conservation and Optimization (ECO) Triennial Plan goals, which were set using the savings level approved in the resource planning process. The Commission approved an average annual energy savings level of 780 GWh for all planning years in our 2019 Resource Plan.[8] Our most recent ECO Triennial filing[9] follows the approved level, and these EE impacts are shown below in Figure E-5.

[6] The Coincident Factor calculations were conducted using NSP's old monthly-frequency modeling process, and not the new 8760 process. This was partly due to timing of 8760 process development and partly because the Company could not determine a viable methodology for translating the 8760 process to a MISO CP forecast result.
[7] Produced by the 8760 modeling process.
[8] Docket No. E002/RP-19-368.
[9] Docket No. G002/CIP-23-92.

Figure E-5: Illustration of EE Adjustment – NSP System Demand (MW)



In response to the amendments to the Solar Energy Standard (SES) by the Minnesota Legislature in 2023,[10] an increased emphasis has been placed on distributed solar generation. We developed a forecast of the expected impact on demand and energy based on new programs designed to meet goals established for the SES. We adjusted the Minnesota class-level sales forecasts and the system peak demand forecast to account for the impacts of customer-sited behind-the-meter solar installations on the NSP System. We discuss the distributed solar forecast methodology below.

After determining the base forecast, we developed net forecasts that include all adjustments, including future EE, distributed solar generation, electric vehicle charging, and the effects of our EE programs over time.

E. Additional Forecast Adjustments

We made additional adjustments to the energy and demand forecasts to account for expected changes in specific large customers' electricity usage. These additional adjustments include:

[10] Sec. 16. Minnesota statutes 2022, section 216b.1691. Subd. 2h. Chapter 60 - mn laws (https://www.revisor.mn.gov/laws/2023/0/Session+Law/Chapter/60/).

- Customers adding self-generation combined heat and power capabilities, which reduce energy consumption and peak demand. This adjustment only applies to the Large CI class.
- Increases (or reductions) in usage due to customers moving into and out of our service territory, or planned expansions or reductions of load by existing customers. This adjustment also only applies to the Large CI class, and
- Increasing use of plug-in electric vehicle charging, which we discuss in Section VI.C. below.
- Increasing levels of Beneficial Electrification.
- Increasing adoption of rooftop solar.

F. Forecast Variability

As with any forecast, our projections of energy requirements and peak demand depend on other forecasts of key variables. Changes in these variables will affect our forecasts. For instance, if the number of households in our service territory is lower than Global Insight has predicted, electric consumption in the residential sector will be lower. The peak demand for electric power each year is very sensitive to weather conditions and can vary considerably as the result of abnormal weather conditions.

Other forecast uncertainties include potential increases in loads due to new customers and potential losses in loads due to changes in customers' operations. For example, the potential exists for large increases in Data Center loads early in the planning period. However, these loads may fail to materialize as assumed, and NSP may be responsible for serving a different amount of load than forecasted in the Base Case.

Given the uncertainty in any long-term forecast, primarily around the potential for data center loads and their timing, accelerated EV and DG adoption, etc., NSP developed High and Low load sensitivities that adjusted the base outlook using discrete adjustments for these forecast components. This discrete adjustment approach replaces the prior uncertainty modeling method involving Monte Carlo simulations, as a Monte Carlo approach would fail to account for the sizeable increases in load due to data center load or EV adoption. The resulting High and Low load sensitivities are shown below in Figure E-6.

Figure E-6: NSP System Total Net Energy (MWh)
(Includes EE adjustment)

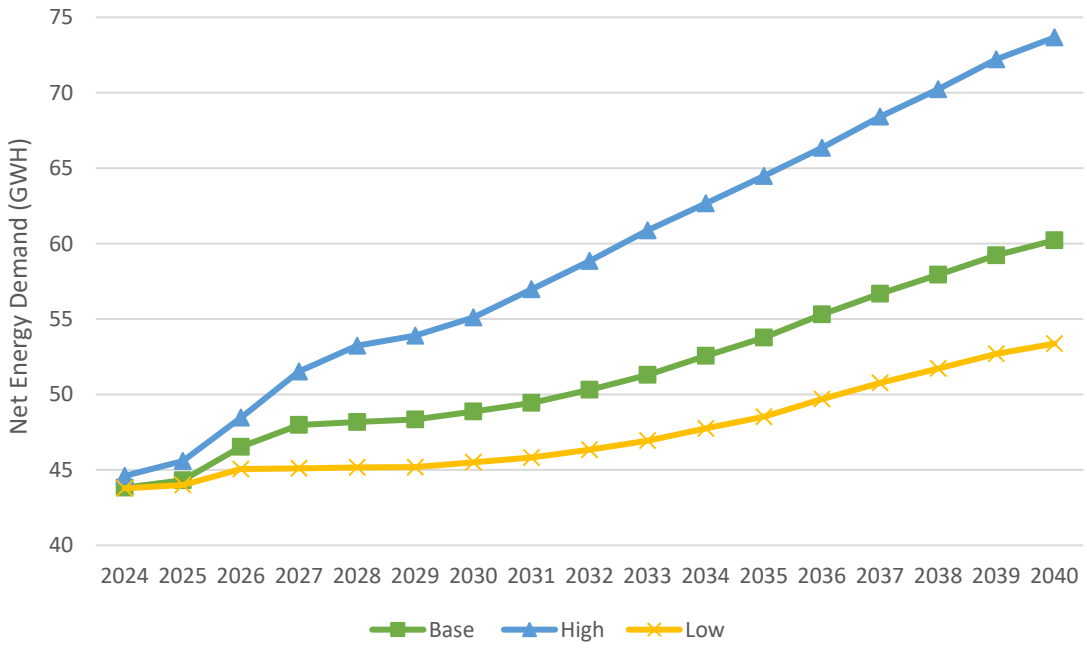
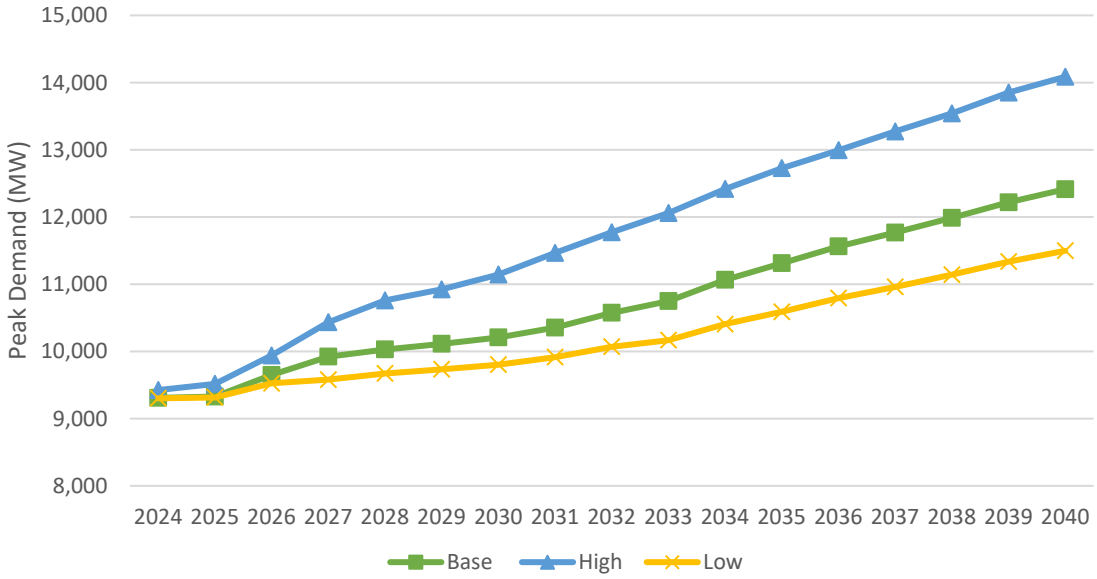


Figure E-7 below shows the high and low sensitivities for base peak demand.[11]

Figure E-7: NSP System Total Base Summer Peak Demand (MW)
(Includes EE Adjustment)



Tables E-1 and E-2 below provide the data underlying Figures E-6 and E-7 respectively.

Table E-1: Annual Net Energy (MWh)
(Including EE Adjustment)

Year	Base	High	Low
2024	43,823	44,602	43,777
2025	44,308	45,588	43,996
2026	46,524	48,460	45,051
2027	47,973	51,524	45,097
2028	48,170	53,232	45,163
2029	48,339	53,898	45,180
2030	48,866	55,102	45,503
2031	49,436	56,970	45,813
2032	50,305	58,844	46,337
2033	51,291	60,876	46,933
2034	52,555	62,663	47,747

Year	Base	High	Low
2035	53,763	64,476	48,517
2036	55,302	66,353	49,694
2037	56,674	68,416	50,764
2038	57,934	70,234	51,718
2039	59,222	72,216	52,695
2040	60,215	73,662	53,370
Average Annual Growth	2.0%	3.2%	1.2%

Table E-2: Annual Base Summer Peak Demand (MW)
(Includes EE Adjustment)

Year	Base	High	Low
2024	9,309	9,425	9,303
2025	9,328	9,517	9,315
2026	9,650	9,940	9,526
2027	9,922	10,434	9,581
2028	10,029	10,759	9,672
2029	10,112	10,923	9,734
2030	10,207	11,144	9,803
2031	10,354	11,466	9,915
2032	10,574	11,773	10,070
2033	10,748	12,058	10,168
2034	11,065	12,417	10,406
2035	11,312	12,726	10,590
2036	11,563	12,994	10,794
2037	11,768	13,273	10,959
2038	11,987	13,542	11,142
2039	12,218	13,851	11,337
2040	12,414	14,087	11,498
Average Annual Growth	1.8%	2.5%	1.3%

G. Forecast Vintage Comparison

As described above, projections of energy and demand are fundamental to identifying the need for resources to meet expected customer needs. Thus, these forecasts are an important component in determining the size, type, and timing of new generation resources. As a result, ensuring robust forecasts with fully analyzed assumptions and variables is key to supporting a Resource Plan or resource acquisition.

Per the Commission's Order in the IDP,[12] Xcel Energy made efforts to maintain consistency of DER assumptions between our IDP and IRP by utilizing the same forecast vintages when possible. However, the IDP and IRP processes are fundamentally different, serve disparate functions, and are developed on different time horizons with differing planning cycle durations and cadences. This makes it difficult, if not impossible, to generate forecasts in them that will align perfectly. The IRP is a well-established, long-term resource planning process that indicates size, type, and timing of resource needs over a 15-year time horizon. In comparison, the nascent IDP shows a five-year budget of discrete projects and investments. The five-year budget used for the IDP is built every year on the forecast from the previous fall – for example, the 2023 IDP budget was based on forecast data from Fall 2022. This is significantly different in the IRP, where the modeling happens only three to six months in advance of the filing date every four years, meaning that the most recent and relevant forecast vintages are used.

Despite these differences, we made efforts when developing this IRP to set the forecasts for DER consistently between our IDP and IRP to align with the Commission's IRP Order. [13] Because of the modeling timeline for the IRP, finalization of the IRP models was not complete at the time of IDP submission on November 1, 2023. However, we were able to use some forecasts or updated versions of forecasts developed for the IDP in our IRP process.

Table E-3 below identifies the forecast vintages that were used for the various IDP and IRP forecasts that we provided in Appendix A1: System Planning of our November 1, 2023 IDP.

[12] July 26, 2022, Order, Docket No. 21-694, Ordering Paragraph 4.
[13] The Commission's latest IDP Order includes a parallel Order Point; *see* July 26, 2022 Order in Docket No. E002/M-21-694, at Order Point 4.

Table E-3: Forecast Vintage Comparison

Forecast	Vintage Reflected in Corporate-Level DER Scenario Modeling	Vintage Used in LoadSEER DER Scenario Modeling	Vintage Used in IRP Energy Forecast
Distributed Solar PV	June 2023	June 2023	June 2023
Community Solar Gardens	August 2023	August 2023[14]	August 2023
Distributed Energy Storage	September 2023	2021 IDP	Do not model in IRP
Energy Efficiency	September 2023	Embedded In 2022 Energy Sales & Demand Forecast	September 2023
Demand Response	2022	Embedded In 2022 Energy Sales & Demand Forecast	September 2023
Electric Vehicles	July 2023	2022	July 2023

We assume Distributed Energy storage will cause minimal overall increases in energy consumption since there are only small losses associated with consumer-level storage, which is why it was not modeled for this IRP. Energy storage will likely have a notable impact on peak demand in the distant future once adoption is widespread and a Time of Use (TOU) rate encourages customers to consume from the grid only at specific times. We expect to enhance our forecast with assumptions for consumer-level energy storage in the future, but we do not currently make assumptions for TOU adoption or its estimated impacts on customer usage.

The review process for a Resource Plan or a resource acquisition typically takes a significant amount of time and effort to complete. During this time, forecasts can change as economic conditions, business operations, and technology changes occur. The graphs below compare the peak demand and energy of the Company's current forecast with the forecasts filed in the 2019 Resource Plan.

Figures E-8 and E-9 below indicate that the Fall 2023 energy and load forecasts are higher than the Fall 2018 forecast used in our 2019 Resource Plan due, primarily, to the current Resource Plan's assumptions for large new data center loads and a more reasonable forecast for adoption of Electric Vehicles.

[14] This sensitivity includes a forecast for solar that will meet Distributed Solar Energy Standard (DSES), Minn. Stat. § 216B.1691, subd. 2h, as added by 2023 Session Laws Chapter 60, Article 12, Section 16, and is discussed in section II.C.7.

Figure E-8: Net Energy Requirements (MWh) – Comparison of Current and Previous Base Case Energy Forecasts

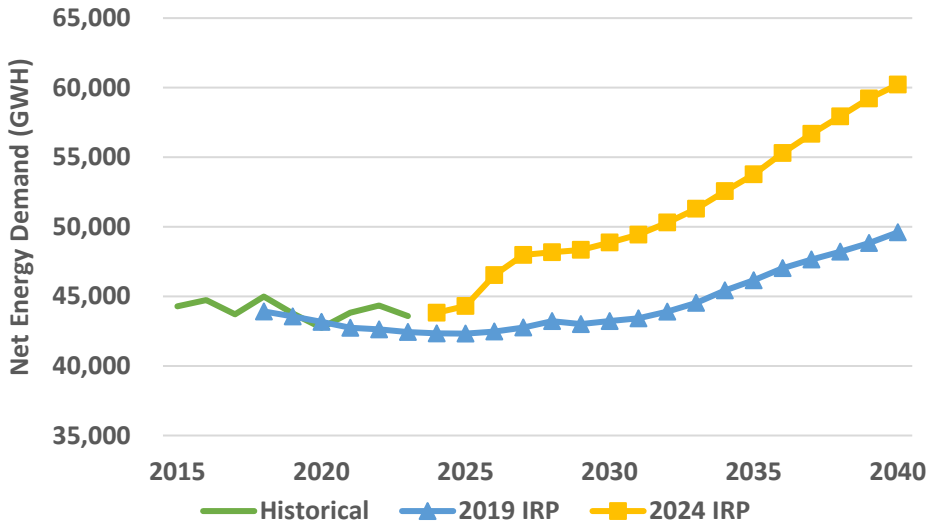
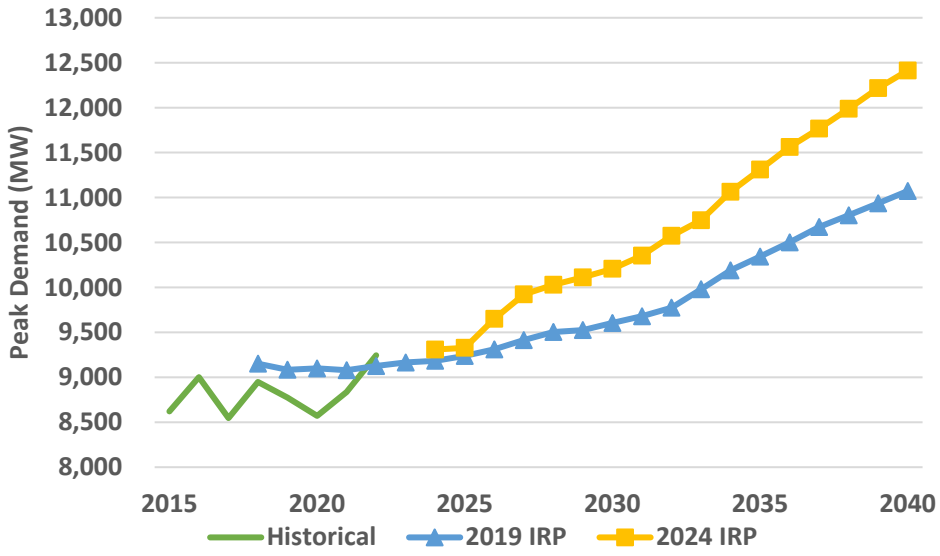


Figure E-9: Peak Demand (MW) – Comparison of Current and Previous Demand Base Case Forecasts



The 2019 Resource Plan assumed EV growth effectively stopped in 2024 at just 235,000 MWh in EV requirements per year; a level we are likely to surpass in the next year or two. EV assumptions in this Resource Plan are detailed in Section VI.C. of this appendix.

Further, projected economic growth is notably higher than forecast in the 2019 Resource Plan. For example, employment in the Minneapolis-St. Paul metropolitan area is expected to gain an average of 0.4 percent per year from 2024-2040, whereas the 2019 Resource Plan's employment outlook only grew at 0.2 percent.[15]

II. OVERALL LOAD FORECAST METHODOLOGICAL FRAMEWORK

Xcel Energy prepares its forecast by major customer class and jurisdiction, using a variety of statistical and econometric techniques. The NSP System serves five jurisdictions. Minnesota, North Dakota, and South Dakota are served by Northern States Power Company (NSPM). Wisconsin and Michigan are served by Northern States Power Company, a Wisconsin corporation (NSPW). The NSPM and NSPW Systems operate as an integrated system. The forecast is referred to as the 2023v2.0 Forecast (completed in July 2023).

A. Specific Analytical Techniques

1. Econometric Analysis. Xcel Energy used econometric analysis to develop jurisdictional MWh sales forecasts at the customer meter for the following sectors (exceptions to this are noted in bullet 2):

   a. Residential without Space Heating;
   b. Residential with Space Heating;
   c. Small Commercial and Industrial;
   d. Large Commercial and Industrial (NSPM only);
   e. Public Street and Highway Lighting (Minnesota only);
   f. Sales to Public Authorities (Minnesota only).

   Xcel Energy also used econometric analysis and the 8760 process to develop the total system MW peak demand forecast.

2. Trend analysis or simple historical averages were used for all other sectors, which includes Large Commercial and Industrial (in NSPW jurisdictions),

[15] IHS Global Insight, July 2018 vintage, 2020-2034 planning period.

Public Street and Highway Lighting, Other Sales to Public Authorities for all jurisdictions except Minnesota, and Interdepartmental sales for all jurisdictions.

3. Loss Factor Methodology. Loss factors by jurisdiction were used to convert the sales forecasts into system energy requirements (at the generator).
4. Judgment. Judgment is inherent to the development of any forecast. Whenever possible, Xcel Energy used quantitative models to structure its judgment in the forecasting process.

The sales forecasts are estimates of MWh levels measured at the customer meter. They do not include line or other losses. The various jurisdictional class forecasts were summed to yield the total system sales forecast. Native energy requirements are measured at the generator and include line and other losses. Xcel Energy created the native energy requirements based on the sales forecasts. A system loss factor for each jurisdiction, developed based on modeled historical losses, is applied to the sales forecast to calculate total losses. The sum of the MWh sales and the MWh losses equals the native energy requirements. The native energy requirements, along with peak producing weather and binary variables, then were used as independent variables within an econometric model to forecast MW peak demand for the Xcel Energy North System.

B. Models Used

1. ***Residential Econometric Models.*** Sales to Residential customers represent 31.5 percent of NSP System electric sales in 2022. Residential sales are divided into two sub-classes for each NSPM jurisdiction: space heating and without space heating. NSPW jurisdictions only have a total Residential customer class. Regression models using historical data are developed for each Residential sector. A variety of independent variables were used in the models, including:

    - Real Personal Income or Real Personal Income per Capita for the respective jurisdiction;
    - Average price (reported revenues/reported sales) for the respective jurisdiction;
    - Gross Metro Product for the respective jurisdiction;
    - Total population for the respective jurisdiction;

- Average price of West Texas Intermediate crude oil;
- Actual heating (HDD) and temperature humidity index (THI) degree days;
- Number of customers;
- Number of monthly billing days;
- Month specific binary variables;
- Other binary and or trend variables.

2. *Small Commercial and Industrial Econometric Models.* The small commercial and industrial sector represents 42.75 percent of NSP System electric sales in 2022. The models are econometric regressions using historical data. The models include a combination of variables, including the following:

   - Number of small commercial and industrial customers;
   - Gross State/Metro Product for respective jurisdiction;
   - Employment for respective jurisdiction;
   - Actual heating (HDD) and temperature humidity index (THI) degree days;
   - Number of monthly billing days;
   - Month specific binary variables;
   - Other binary and or trend variables.

3. *Large Commercial and Industrial Econometric Model (NSPM).* Sales to the large commercial and industrial sector represent 25.2 percent of NSP System electric sales in 2022. The regression models used for NSPM jurisdiction LCI forecasts use historical data and the following explanatory variables:
   - Industrial Manufacturing Employment;
   - Number of monthly billing days;
   - Month specific binary variables;
   - Other binary variables.

4. *Others.* Sales to the "Others" sector represent 0.6 percent of NSP System electric sales in 2022. This sector includes Public Street and Highway Lighting (PSHL), Sales to Public Authorities (OSPA) and Interdepartmental (IDS) sales. Regression models are used to estimate sales for the PSHL and

OSPA classes (Minnesota only), using historical data and a combination of variables, including the following:

a. Population for the respective jurisdiction;
b. Gross Metro Product for the respective jurisdiction;
c. Number of monthly billing days;
d. Month specific binary variables;
e. Other binary and or trend variables.

5. ***Municipals.*** As of 2014 there are no longer any municipal customers for whom NSP or NSPW provides firm service.
6. ***Peak Demand. The peak demand forecast i***s the result of an updated, granular process referred to as the "8760" peak forecasting process. Section D "Forecast Methodology" summarizes this process.

C. Key Demand and Energy Forecast Variables

Below we discuss some of the key variables that are included in the 2024 Resource Plan forecasts.

1. Demographics

Demographic projections are essential to the development of the long-range forecasts. The consumption of electricity is closely correlated with demographic statistics. The number of residential customers, weather data, and economic indicators are key variables in the residential energy sales forecast. Over 99 percent of the variability in historical electric residential customer counts in our service territory can be explained through an econometric model that contains either population or households as key drivers. The forecasts for population and households are provided by Global Insight. We forecast an average annual growth rate for total residential customers on our system of 0.7 percent, with the addition of 12,153 residential customers on average per year from 2024 through 2040.

2. Economic Indicators

Xcel Energy uses estimates of key economic indicators to develop electric sales forecasts. These variables include gross state product, employment, and real personal income. The variables used are specific to the jurisdiction and are statistically significant in the sales models for the residential and commercial and industrial

customer classes. Growth in electric energy consumption in the residential and commercial and industrial sectors closely follows trends in economic activity. Global Insight provided the economic forecasts used in our regression models.

For the planning period, the economy is expected to continue to grow, resulting in growth in electric energy consumption.

3. Weather

The peak demand for electric power is heavily influenced by hot and humid weather. As the temperature and humidity rise, the demand for cooling rises steeply. Our approach to forecasting peak demand includes using a weather variable that consists of the mean of an index of heat and humidity referred to as the temperature humidity index (THI). Simply stated, the THI is an accurate measure of how hot it really feels when the effects of humidity are added to the high temperature.

We have tracked the THI at the time of the system peak demand over the past 20 years. Because of the 20 years of smoothing, the weather variable does not drastically affect our median forecasts; however, it becomes a key factor in assessing the potential peak demand if and when hot and humid weather extremes are encountered. Since Xcel Energy must have adequate generating resources available during hotter than normal circumstances, planning for the extreme is important.

III. FORECAST ADJUSTMENTS

The outputs of raw econometric modeling are adjusted to account for either: 1) components that cannot be modeled correctly using regression, such as the addition of a new customer in the forecast timeframe, or 2) components that are necessary because of our regression modeling process, such as "adding back" the effects of energy efficiency.

A. Energy Efficiency Programs

The sales outlooks for residential and commercial/industrial classes are initially modeled based on a history that excludes the effects of Energy Efficiency (EE), and the resulting forecasts also exclude the effects of EE. This approach is necessary to properly account for EE in the forecast timeframe as the gross outlook (the outlook excluding EE) can then be adjusted per any assumption of future EE.

The first step in this process involves collecting EE data for the historical period being modeled. In the Fall 2023 models, NSP collected monthly energy savings for any measure impacting customer usage for the time-period from 2008 to 2023. Since EE measures have a "life of measure" that is typically longer than just one year, EE data for several years prior to the Fall 2023 estimation timeframe (2008-2023) was collected.

A hypothetical "gross of EE impacts"[16] sales data set is created by subtracting historical EE impacts from historical sales. That "gross of EE impacts" series is then modeled and forecast using regression analysis. The resulting sales series is presumed to also be "gross of EE impacts," and must be adjusted per any future impacts of EE. Future EE impacts resulting from past measures are netted from the energy outlook, whereas EE resulting from future measures is modeled as a resource in Encompass.

B. Behind-the-Meter Distributed Solar Generation

In response to changes to the SES by the Minnesota Legislature, as discussed above, an increased emphasis has been placed on distributed solar generation. A forecast of the expected impact on demand and energy has been developed based on new programs designed to meet goals established for the SES. The process of incorporating behind-the-meter distributed solar generation into the forecast process is similar to how EE program savings are incorporated in the sales and peak demand forecasts. Historical behind-the-meter distributed solar generation is added-back to the historical sales and peak demand modeling data to create a "gross of historical distributed solar" sales series, which is then modeled. The resulting forecast output is presumed to be gross of distributed solar and must be reduced for the future impacts of behind-the-meter installations on the class level sales in Minnesota and South Dakota and the NSP System peak demand.

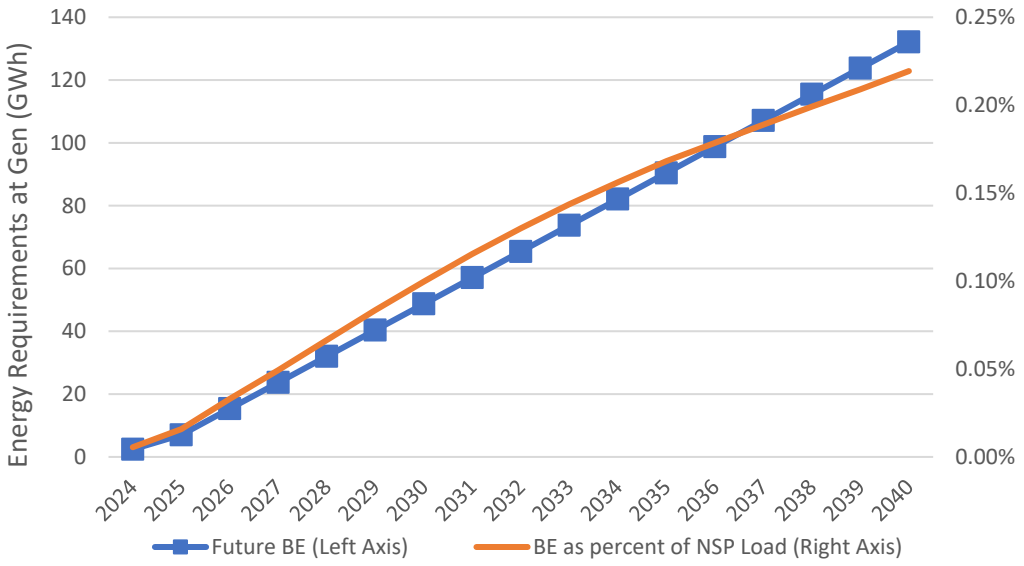
C. Beneficial Electrification

We made assumptions for Beneficial Electrification (BE) of space and water heating based on achievement of the annual goals filed in the Xcel Energy 2024-2026 Energy Conservation and Optimization Triennial Plan (Docket No. G, E002/CIP-23-92) for 2024-2026, and assumed achievement of the 2026 goal for all subsequent years. The goal assumptions included in this Plan are modest as the electrification technologies

[16] Would not include any naturally occurring/customer driven EE. The adjusted series only accounts for Company EE resulting from Conservation Improvement Programs (CIP).

and programs are just being introduced to the market and have significant barriers to adoption the next few years. This is the first time NSP has included BE assumptions in our electricity sales forecast,[17] and the Company will likely continue to keep its assumptions modest until observed trends or policy suggest higher levels of BE. The chart below shows the Company's assumption for BE in both GWh requirements and as a percent of overall NSP load.

Figure E-10 Base Case Beneficial Electrification Assumption



D. Large C&I Adjustments

Adjustments have been made to the forecast to account for planned changes in production levels for several large customers in Minnesota and Wisconsin. The most significant Large C&I adjustments concern the anticipated and expected addition of several large data centers in Minnesota. The assumptions for LCI adjustments under the Base, High, and Low sensitivities are discussed in section VI.F. of this Appendix.

[17] Displacement of natural gas consumption by this electrification was also reflected in NSP's forecast of gas sales forecast.

IV. METHODOLOGY

The strength of the process Xcel Energy used for this forecast is the richness of the information obtained during the analysis. Xcel Energy's econometric forecasting models are based on sound economic and statistical theory. Historical modeling and forecast drivers are based on economic and demographic variables that are easily measured and analyzed. The use of models by class and jurisdiction gives greater insight into how the NSP System is growing, thereby providing better information for decisions to be made in the areas of generation, transmission, marketing, conservation, and load management.

With respect to accuracy, forecasts of this duration are inherently uncertain. Planners and decision makers must be keenly aware of the inherent risk that accompanies long-term forecasts. They must also develop plans that are robust over a wide range of future outcomes, which is why we developed high and low load sensitivities.

V. DATA SOURCES

MWh sales and MW peak demand. Xcel Energy uses internal and external data to create its MWh sales and MW peak demand forecast.

Historical MWh sales and MW peak demand. Historical MWh sales are taken from Xcel Energy's internal company records, fed by its billing system. Historical coincident net peak demand data is obtained through company records. The load management estimate is added to the net peak demand to derive the base peak demand.

Weather data. Weather data (dry bulb temperature and dew points) were collected from www.weatherunderground.com and the National Oceanic and Atmospheric Administration for the Minneapolis/St. Paul, Fargo, Sioux Falls, and Eau Claire areas. The heating degree-days and THI degree-days are calculated internally based on this weather data.

Economic and demographic data. Economic and demographic data is obtained from the Bureau of Labor Statistics, U.S. Department of Commerce, and the Bureau of Economic Analysis. Typically, they are accessed from IHS Global Insight, Inc. data banks, and reflect the most recent values of those series at the time of modeling.

A. Input Data Adjustments and Assumptions

Weather Adjustments. Xcel Energy adjusts the monthly weather data to reflect billing schedules. Therefore, the monthly weather data corresponds proportionately with the billing month schedule.

Economic Adjustments. All economic series are deflated to 2012 constant dollars.

B. Assumptions and Special Information

The data used in Xcel Energy's forecasting process has already been discussed in a general way. Descriptions and citations of sources for the data sets have been mentioned within this documentation under different sections.

Xcel Energy believes that its process is a reasonable and workable one to use as a guide for its future energy and load requirements. The underlying assumptions used to prepare Xcel Energy's median forecast are as follows:

- *Demographic Assumption.* Population or household projections are essential in the development of the long-range forecast. The forecasts of customers are derived from population and household projections provided by IHS Global Insight, Inc., and reviewed by Xcel Energy staff. Xcel Energy customer growth mirrors demographic growth over the forecast period.

- *Weather Assumption.* Xcel Energy assumes "normal" weather in the forecast horizon. Normal weather is defined as the average weather pattern over the 20-year period from 2003-2022. The variability of weather is an important source of uncertainty. Xcel Energy's energy and peak demand forecasts are based on the assumption that the normal weather conditions will prevail in the forecast horizon. Weather-related demand uncertainties are not treated explicitly in this forecast.

- *Loss Factor Assumptions.* The loss factors are important to convert the sales forecast to energy requirements. Xcel Energy uses modeled historical losses for each jurisdiction for the first forecast calendar year, and assumes it will not change in the future.

C. MISO Coincident Peak Demand Forecast

The MISO coincident peak (CP) forecast is an estimate of NSP load at the time of MISO peak. The process involves scaling our overall NSP system peak, i.e. our non-coincident peak (NCP), by a coincidence factor (CF). The coincident factor is calculated using the methodology described below.

Historical monthly MISO-coincident peaks are queried using the historical peak date/times provided by MISO.[18] Peak-day weather conditions are also queried using these date/times. MISO coincident peaks and corresponding CF for the Planning Year 2024-2025 (PY 24-25) are modeled as a function of historical NSP NCP, weather, and monthly binaries. The peak-day weather forecast assumption is a simple monthly historical average of 2009-2023 CP weather data.

The resulting CF for the Planning Year 2024-2025 (PY 24-25) are averaged with last year's CF's (PY 23-24) to produce the seasonal peak coincident factors used in this Resource Plan. These factors are shown in Table E-4 below.

Table E-4: Coincident Factor Assumptions

	Summer	Fall	Winter	Spring
Average Coincident Factor (PY23-24 & PY24-25)	92.24%	92.67%	97.09%	95.61%

D. Forecast Coordination

Xcel Energy reports its energy and peak demand forecasts to MISO, who then combines the forecasts of all its member utilities. Xcel Energy also reports its forecast to the Public Service Commission of Wisconsin as part of its Strategic Energy Assessment (SEA) process. In this process, the Wisconsin portion of the total Xcel Energy system load is combined with other Wisconsin electric utilities to form a statewide Wisconsin forecast.

VI. SENSITIVITY ASSUMPTIONS

The Company's Fall 2023 load forecast is used as the base assumption in this Resource Plan. The forecast assumes adoption of electric vehicle (EV), new Large C&I customer additions, Beneficial Electrification (BE), and demographic/economic growth. Two alternative sensitivities were developed to model the range of potential outcomes for NSP energy requirements and load: the High and Low load sensitivities. The details of each sensitivity, by component assumptions are described in this section. Table E-5 below shows how component assumptions were adjusted from the base case by sensitivity. Base load (i.e. the modeled econometric outputs) were not adjusted in any of the sensitivities; instead, discrete adjustments for each component were developed to clearly define each sensitivity. This approach replaces the previous process involving Monte Carlo simulation.

Table E-5: High and Low Load Sensitivity Assumptions

Component	High Load Case	Low Load Case
Base Load	Base Case	Base Case
Solar	Base Case	High Solar
Demand-Side Management	Base Case	Base Case
Beneficial Electrification	High BE	No BE
Electric Vehicles	Full Achievement	Low Achievement
Large Commercial & Industrial Customers	High LCI	Low LCI

A. Distributed Solar

We offer several programs to customers interested in solar as a renewable energy opportunity, including our Solar*Rewards program and our Community solar program, which provides the opportunity to earn bill credits for Community Solar Gardens (CSGs). In addition, for larger systems, we offer a net-metering option. We have factored all these distributed solar PV options into our various distributed solar forecasts. As we will discuss further below, the rooftop solar forecast is from June 2023 and the CSG forecast is from August 2023.

In determining our Solar*Rewards forecast, we updated our goals to be consistent with legislative outcomes that increased and provided funding for Solar*Rewards incentives for 2023 to 2025. The Solar*Rewards installations for 2023 to 2026 were estimated based on historical trends of funding levels and project conversion rates.

For net metering and CSGs, we assume that customers who participate in solar programs would consider, in most cases, that these programs are substitutes for each other. Therefore, the incremental growth in one category is interchangeable with another category.

We used the average of a Bass Diffusion and an economic model to derive the base forecast of net metered solar. Bass Diffusion models are used to describe various technology adoptions that penetrate an existing market through an "S" shaped diffusion characteristic. Economic models use a simple payback to estimate potential adoption. The Bass Diffusion model is calibrated using state specific, historical solar installed capacity through December 2022. Additionally, we have incorporated into both the Bass diffusion and economic models, a factor for the percentage of customers unable to install solar on their roof, for various reasons (e.g., renters, shaded roof, inability to access the roof, etc.). The main variables impacting adoption in the economic payback model are installation and maintenance cost, hosting capacity, inverter replacement, investment tax credit, utility rates, and capacity factors. Models and estimates are updated as new data becomes available and estimates can vary significantly.

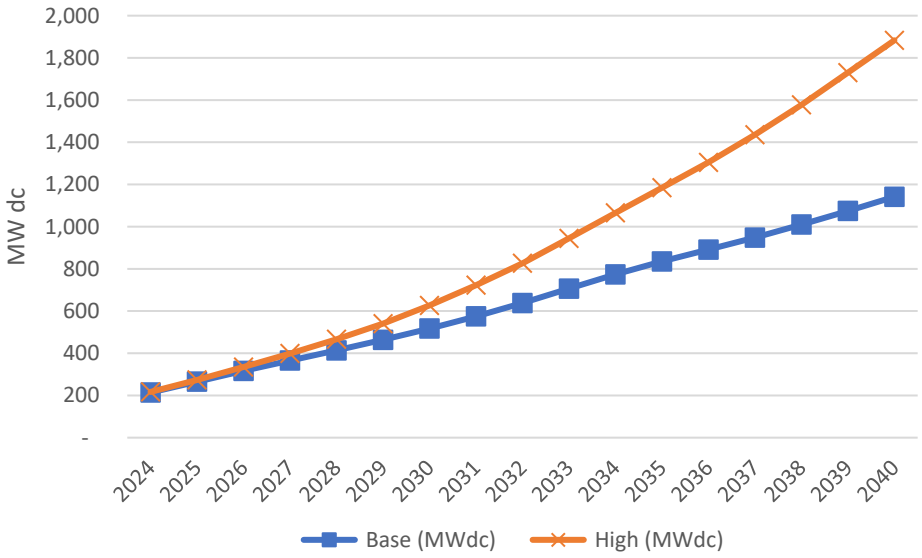
We created the High solar adoption sensitivity using a combination of lower installation cost and higher savings. The High sensitivity assumes the installation costs decrease at a faster rate than the Base outlook. The Bass Diffusion High sensitivity uses higher coefficients compared to the Base case. These coefficients were calibrated using a section of the historical curve that showed higher than average growth.

The Base and high load sensitivities use the base PV adoption scenario, the results of which indicate around 706 MWdc for the total installed rooftop distributed solar by 2033. The low load sensitivity assumes a high PV adoption outlook, the results of which show installed rooftop distributed solar around 944 MWdc by 2033. We provide a tabular and graphical view of the forecast in Table E-6 and Figure E-11.

Table E-6: Distributed Rooftop Solar Scenarios

	Base (MWdc)	High (MWdc)
2024	214	217
2025	265	274
2026	317	335
2027	365	399
2028	413	466
2029	463	540
2030	517	626
2031	575	723
2032	638	827
2033	706	944
2034	774	1,065
2035	835	1,184
2036	891	1,304
2037	948	1,436
2038	1,010	1,577
2039	1,074	1,730
2040	1,142	1,883

Figure E-11: Distributed Rooftop Solar Forecast



B. Distributed Wind

We presently have a small number of distributed wind projects on our system, with a total of 93 projects that comprise 12 MWdc. We believe distributed wind will continue to be a very small proportion of DER on our distribution system, largely due to the rapid development of solar and storage markets – and their relative ease of adoption, compared to wind. Additionally, there is little information available in the industry regarding the adoption of distributed wind. For these reasons, we are not providing a forecast in conjunction with this Resource Plan.

C. Electric Vehicles

With an increase of available models, EV adoption has increased, and there are approximately 38,000 light-duty EVs estimated to be in Xcel Energy's Minnesota service territory as of September 2023. The EV forecasts discussed below were updated in July 2023.

Light Duty Vehicles

We currently estimate light-duty EV adoption for the Base and Low forecast using two modeling techniques: (1) Bass Technology Diffusion, and (2) Economic models.

Our current approach for the Base forecast relies on state and Xcel Energy service area specific data. The Bass Diffusion model is calibrated using state specific historical EV sales. The economic model calculates the total cost of ownership for EV compared to traditional internal combustion engine (ICE) automobiles. An average of both the Bass Diffusion and total cost ownership models are used to estimate EV adoption. Additionally, we have incorporated into both the Bass Diffusion and economic models a factor for the percentage of vehicles in urban and rural areas. Presently, higher adoption is occurring in urban areas with the rural areas anticipated to ramp-up slowly. Our cumulative Base adoption estimate for 2030 is approximately 7.8 percent of all registered cars and light trucks in our Minnesota service territory.

We create the Low economic model sensitivity for Minnesota and the Dakotas using a combination of battery prices and gasoline prices. The Low sensitivity assumes battery prices are 20 percent higher than the Base Case outlook, and gasoline prices lower by one standard deviation. The Low sensitivities for the Bass Diffusion models are created using data from states that reflect low historical adoption rates.

The High sensitivity reflects the Minnesota state goal of EV's accounting for 20 percent of all light-duty vehicles by 2030 and also applies this goal to medium and heavy-duty vehicles as well. This results in 100 percent EV saturation by 2052. This same methodology is then applied to produce the estimates for North Dakota and South Dakota. The High sensitivity outlooks for Wisconsin and Michigan were developed by scaling the Base outlooks using the South Dakota's ratio of High to Base outlook[19].

We note that EV fuel efficiency could be impacted by advances in technology; we currently assume gasoline cars average 25 miles per gallon. Analysis indicates that battery costs are a significant factor for higher EV prices. The main variables impacting adoption are available tax incentives, price differential between EV and ICE vehicles, and gasoline prices. Models and estimates are updated annually with new relevant available data and estimates can vary significantly. Since we are in the early stages of EV adoption, we expect our future estimates will be increasingly robust with additional data available every year.

Our estimates show significant volatility between various sensitivities. The estimates are also sensitive to several externalities like policy changes (e.g., incentive changes, cybersecurity requirements, carbon requirements); technology changes (e.g., improvements in existing battery technologies and new disruptive battery or electric motor management technologies, autonomous vehicles, alternate technologies like fuel cell vehicles); geopolitical factors – such as trade and tariff issues; availability of raw materials such as lithium, cobalt, and nickel; and infrastructure availability.

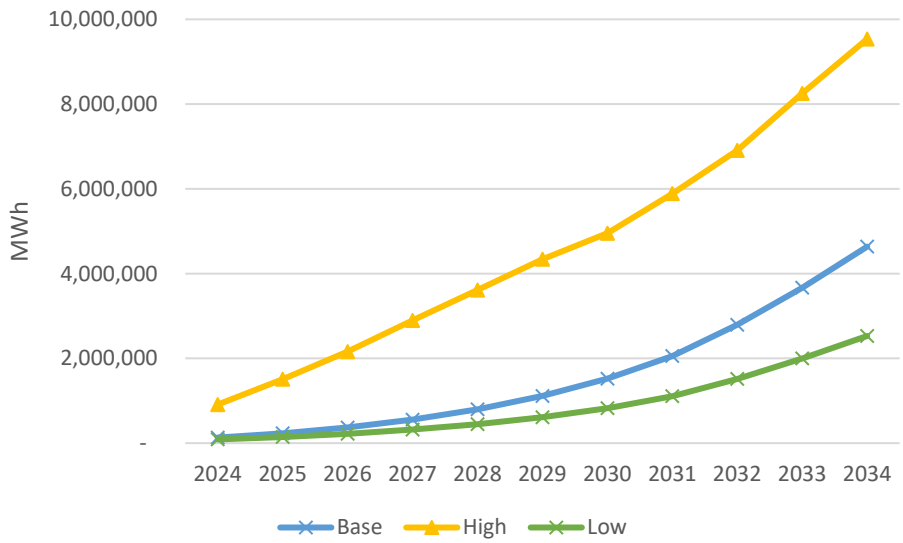
Additionally, many of the inputs change frequently and could produce significant swings in the model outputs.

Medium and Heavy-Duty Vehicles

We utilize estimates from a third-party consultant for medium and heavy-duty electric vehicle Base Case adoption in Xcel Energy's service territory.

[19] The same method was used to develop Wisconsin and Michigan's low sensitivity outlooks.

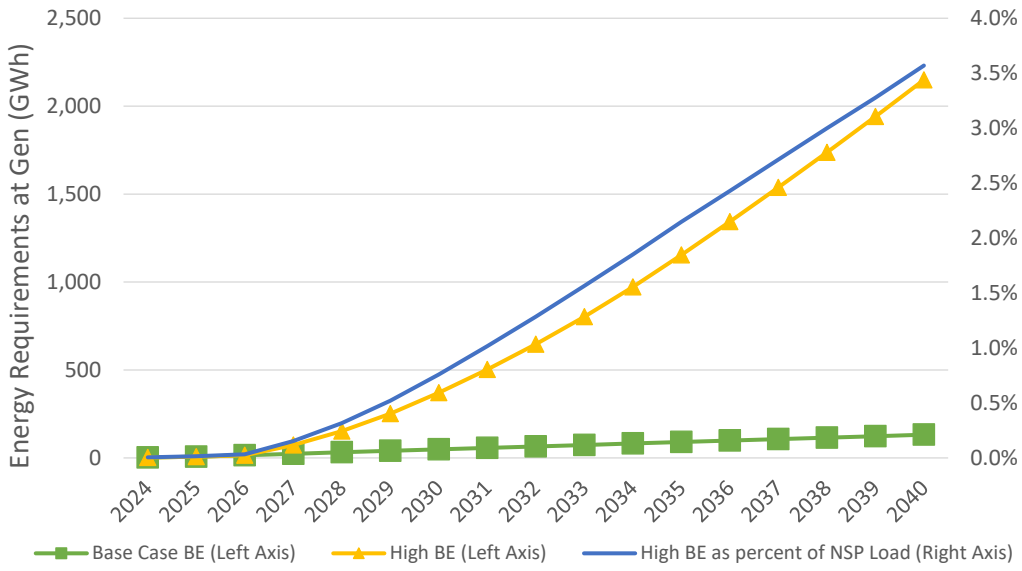
Figure E-12: NSP System Base, High, and Low EV Sensitivities



D. Beneficial Electrification

Assumptions for Beneficial Electrification (BE) were adjusted in both the High and Low sensitivities. The Low sensitivity simply assumed no added load from beneficial electrification, and the High sensitivity assumed substantial growth in BE over the Base Case assumptions. Under the High load sensitivity, new load from BE would comprise about 3.5 percent of total energy requirements.

Figure E-13: NSP System Base and High Beneficial Electrification Forecasts



E. LCI Assumptions

The NSP Base, High, and Low outlooks include some load for several prospective new large data center customers in the Minnesota jurisdiction, and the volume of load included in each sensitivity for these customers is dependent on the likelihood of each load tranche.

Under the Base sensitivity, we assume **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]** of new load from data centers in the 2025-2026 timeframe. A location in **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]** is especially promising location, and we expect that any of the above-mentioned companies would take advantage of the opportunity to locate there, but at this time it is unclear which project is most likely. We also assumed several smaller additions or expansions by new or existing customers that would add load in the 2023-2024 timeframe, but these are more than offset by expected new on-site generation by existing customers; the combined impact of non-data center load adjustments in the Base forecast is -4 MW.

Under the High sensitivity, we assume data centers add **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]** due to expansions in the

2030-2033 timeframe. These expansions are added to the Base case assumptions bringing the total new data center load to **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]** under the High sensitivity. This sensitivity also includes a **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]** expansion by **[PROTECTED DATA BEGINS PROTECTED DATA ENDS].** However, this assumed expansion is not expected until **[PROTECTED DATA BEGINS PROTECTED DATA ENDS].**

Under the Low sensitivity, we assume **[PROTECTED DATA BEGINS PROTECTED DATA ENDS]** of new data center load growth**.** The timing of these load additions is the same as in the Base case (2025-2026), but the magnitude is more conservative.

APPENDIX F – ENCOMPASS MODELING ASSUMPTIONS AND INPUTS

A. Discount Rate and Capital Structure

The discount rate used for levelized cost calculations and determining the present value of modeled costs is 6.39 percent. The rates shown below were calculated by taking a weighted average of the most recent electric retail rate case in each NSP jurisdiction.

Discount Rate and Capital Structure				
	Capital Structure	Allowed Return	Before Tax Electric WACC	After Tax Electric WACC
Long-Term Debt	46.83%	4.34%	2.03%	1.47%
Common Equity	52.48%	9.35%	4.91%	4.91%
Short-Term Debt	0.68%	3.18%	0.02%	0.02%
Total			**6.96%**	**6.39%**

B. Inflation Rate

The inflation rate is applied to existing resources, generic resources, and other costs associated with general inflationary trends in the modeling. For long term capacity expansion planning purposes, we used the two percent long-term inflation rate inflation target established by the Federal Reserve.

C. Reserve Margin

The modeled Planning Reserve Margin is based on the MISO Planning Year 2024-2025 assumptions, adjusted for the average coincidence factors in MISO Planning Year 2024-2025 and Planning Year 2023-2024.

Table F-1: Seasonal Planning Reserve Margin

	Summer	Fall	Winter	Spring
MISO Planning Reserve Margin (PRM) PY24/25	9.00%	14.20%	27.40%	26.70%
Average Coincidence Factor	92.24%	92.67%	97.09%	95.61%

The higher Planning Reserve Margin or MISO Reliability Based Demand

Curve[1](RBDC) Opt-Out sensitivity represents the additional capacity necessary to opt out of the RBDC and assumes the effective reserve margin as shown in Table F-2.

Table F-2: Reliability-Based Demand Curve Sensitivity

	Summer	Fall	Winter	Spring
Reliability-Based Demand Curve Opt Out[2]	3.1%	3.4%	2.7%	1.7%

D. Greenhouse Gas Costs

The December 19, 2023 Commission Order in Docket Nos. E999/CI-07-1199, E999/DI-22-236, E-999/CI-14-643 Addressing Environmental and Regulatory Costs (Environmental and Regulatory Costs Order)[3] at Order Point 2 requires utilities to continue to analyze potential resources under a range of assumptions about environmental values and future regulatory costs, including five modeling scenarios as outlined in *In the Matter of Establishing an Estimate of the Costs of Future Carbon Dioxide Regulation on Electricity Generation Under Minnesota Statutes § 216H.06,* Docket No. E-999/CI-07-1199, Order Establishing 2020 and 2021 Estimate of Future Carbon Dioxide Regulation Costs (September 30, 2020), Ordering Paragraph 2, as modified.

Per the Environmental and Regulatory Costs Order, for purposes of measuring environmental and socioeconomic costs under Minn. Stat. § 216B.2422, Subd. 3, the PVSC Base Case Greenhouse Gas (GHG) values, inclusive of carbon dioxide, methane and nitrous oxide, are based on the United States Environmental Protection Agency's (EPA) September 2022 *External Review Draft of Report on the Social Cost of Greenhouse Gases*[4] (EPA SC-GHG), mid EPA SC-GHG values, with the high and low EPA SC-GHG values as sensitivities. The EPA SC-GHG costs are applied post processing and do not impact dispatch order. All prices are converted from metric ton to short ton and to nominal dollars using two percent escalation factor.

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[1] The RBDC proposal, currently under consideration by FERC, is a proposed design for MISO's Planning Resource Auction that aims to reflect the reliability value of capacity and produce more efficient and stable capacity prices. Pending FERC approval, the RBDC reform is expected to be implemented in PY 2025-2026.
[2] Reliability Requirement Representations in the Planning Resource Auction: Consideration of a Reliability-Based Demand Curve (August 22, 2023). Available at: https://cdn.misoenergy.org/20230822-23%20RASC%20Item%2006a%20Reliability%20Based%20Demand%20Curves%20Presentation%20(RASC-2019-8)629946.pdf
[3] Order in Docket Nos. E-999CI-07-1199, E-999/DI-22-236, E-999/CI-14-463. December 19, 2023.
[4] We understand the EPA finalized the draft SC-GHG values in November 2023.

Starting in 2028, the PVSC Base Case values also include the Regulatory Cost of Carbon (RCC), relying on the "mid" end of the range of regulated costs.[5,6] Although the cost range was amended in 2023, when the Commission modified the range to between $5 and $75, these values will still begin being applied in 2028, and still under the range of assumptions about environmental values and future regulatory costs (including the five modeling scenarios) outlined in the September 30, 2020 Order.[7] The low end and high end of the range are modeled in separate sensitivities. The regulatory costs are applied to all carbon emitting units as well as market energy purchases, hence affect dispatch order.

The following additional sensitivities have also been modeled: high RCC with high draft EPA SC-GHG, low RCC with low draft EPA SC-GHG costs, zero RCC with low, mid and high draft EPA SC-GHG. We have adjusted the EPA SC-GHG values for modeling purposes by subtracting the regulatory cost of carbon from the EPA SC-GHG value beginning in 2028 to avoid double counting of GHG costs. All prices escalate at general two percent inflation.

The values modeled in the PVSC Base Case and alternative scenarios are identified below in Table F-3 and F-4.

[5] Order Establishing 2018 and 2019 Estimate of Future Carbon Dioxide Regulation Costs in Dockets No. E999/CI-07-1199 and E-999/DI-17-53. June 11, 2018.
[6] Order in Docket Nos. E-999CI-07-1199, E-999/DI-22-236, E-999/CI-14-463. December 19, 2023.
[7] In the Matter of Establishing an Estimate of the Costs of Future Carbon Dioxide Regulation on Electricity Generation Under Minnesota Statutes § 216H.06, Docket No. E-999/CI-07-1199. Order Establishing 2020 and 2021 Estimate of Future Carbon Dioxide Regulation Costs. September 30, 2020.

Table F-3: CO2 Regulatory Costs

CO2 Regulatory Costs ($nominal per short ton)			
Year	Low Regulatory Cost	Mid Regulatory Cost	High Regulatory Cost
2024	$0.00	$0.00	$0.00
2025	$0.00	$0.00	$0.00
2026	$0.00	$0.00	$0.00
2027	$0.00	$0.00	$0.00
2028	$5.00	$40.00	$75.00
2029	$5.00	$40.00	$75.00
2030	$5.00	$40.00	$75.00
2031	$5.00	$40.00	$75.00
2032	$5.00	$40.00	$75.00
2033	$5.00	$40.00	$75.00
2034	$5.00	$40.00	$75.00
2035	$5.00	$40.00	$75.00
2036	$5.00	$40.00	$75.00
2037	$5.00	$40.00	$75.00
2038	$5.00	$40.00	$75.00
2039	$5.00	$40.00	$75.00
2040	$5.00	$40.00	$75.00
2041	$5.00	$40.00	$75.00
2042	$5.00	$40.00	$75.00
2043	$5.00	$40.00	$75.00
2044	$5.00	$40.00	$75.00
2045	$5.00	$40.00	$75.00
2046	$5.00	$40.00	$75.00
2047	$5.00	$40.00	$75.00
2048	$5.00	$40.00	$75.00
2049	$5.00	$40.00	$75.00
2050	$5.00	$40.00	$75.00
2051	$5.00	$40.00	$75.00
2052	$5.00	$40.00	$75.00
2053	$5.00	$40.00	$75.00
2054	$5.00	$40.00	$75.00
2055	$5.00	$40.00	$75.00

Table F-4: EPA GHG Social Costs

	CO2 ($nominal per short ton)			CH4 ($nominal per short ton)			N2O ($nominal per short ton)		
Year	Low EPA Social Cost	Mid EPA Social Cost	High EPA Social Cost	Low EPA Social Cost	Mid EPA Social Cost	High EPA Social Cost	Low EPA Social Cost	Mid EPA Social Cost	High EPA Social Cost
2024	$126	$204	$350	$1,497	$1,915	$2,602	$38,320	$57,976	$91,937
2025	$130	$212	$361	$1,593	$2,028	$2,741	$40,036	$60,364	$95,363
2026	$136	$220	$373	$1,693	$2,146	$2,884	$41,805	$62,823	$98,891
2027	$142	$228	$386	$1,797	$2,268	$3,032	$43,629	$65,357	$102,520
2028	$148	$237	$399	$1,904	$2,394	$3,184	$45,510	$67,967	$106,255
2029	$153	$245	$412	$2,013	$2,523	$3,342	$47,448	$70,654	$110,100
2030	$159	$254	$425	$2,128	$2,657	$3,504	$49,445	$73,423	$114,055
2031	$166	$264	$439	$2,258	$2,809	$3,688	$51,540	$76,302	$118,129
2032	$173	$273	$453	$2,393	$2,966	$3,878	$53,700	$79,266	$122,320
2033	$180	$283	$467	$2,531	$3,129	$4,073	$55,925	$82,318	$126,632
2034	$186	$293	$482	$2,675	$3,297	$4,276	$58,218	$85,460	$131,067
2035	$193	$303	$498	$2,824	$3,470	$4,485	$60,580	$88,695	$135,630
2036	$201	$314	$513	$2,978	$3,648	$4,700	$63,013	$92,025	$140,321
2037	$208	$325	$530	$3,135	$3,832	$4,922	$65,518	$95,454	$145,147
2038	$216	$336	$547	$3,299	$4,023	$5,150	$68,100	$98,983	$150,109
2039	$225	$348	$563	$3,468	$4,220	$5,387	$70,758	$102,614	$155,212
2040	$233	$360	$581	$3,642	$4,422	$5,631	$73,496	$106,352	$160,459
2041	$242	$373	$599	$3,831	$4,641	$5,892	$76,494	$110,417	$166,111
2042	$251	$386	$618	$4,027	$4,868	$6,163	$79,583	$114,603	$171,926
2043	$260	$399	$638	$4,227	$5,101	$6,440	$82,764	$118,912	$177,905
2044	$271	$413	$658	$4,436	$5,342	$6,727	$86,040	$123,349	$184,056
2045	$281	$427	$679	$4,650	$5,590	$7,022	$89,416	$127,915	$190,382
2046	$291	$442	$701	$4,872	$5,846	$7,328	$92,891	$132,614	$196,887
2047	$302	$458	$723	$5,099	$6,110	$7,642	$96,471	$137,449	$203,575
2048	$314	$474	$745	$5,335	$6,382	$7,965	$100,155	$142,427	$210,453
2049	$325	$490	$768	$5,577	$6,663	$8,298	$103,948	$147,547	$217,525
2050	$337	$506	$792	$5,829	$6,953	$8,643	$107,854	$152,815	$224,794
2051	$349	$523	$816	$5,945	$7,092	$8,816	$111,751	$158,089	$232,106
2052	$361	$539	$839	$6,196	$7,386	$9,169	$115,762	$163,512	$239,618
2053	$373	$556	$865	$6,454	$7,689	$9,532	$119,888	$169,090	$247,340
2054	$386	$575	$889	$6,722	$7,999	$9,906	$124,134	$174,825	$255,273
2055	$399	$591	$916	$6,996	$8,320	$10,291	$128,499	$180,723	$263,425
EPA Discount Rate	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%

E. All Other Externality Costs

The values of the criteria pollutants are derived from the high and low values for each of the four locations, as determined in the Minnesota Commission Order Updating Environmental Cost Values in Docket No. E999/CI-14-643 issued January 3, 2018. The mid-point externality costs are the average of the low and high values. All prices

are escalated to 2023 real dollars using the 2022 GDP IPD. These costs are applied post processing and do not impact dispatch order.

Table F-5: Externality Costs

MPUC Low Externality Costs 2023 $ per short ton				
	Urban	Metro Fringe	Rural	<200mi
SO2	$6,976	$5,509	$4,156	$0
NOx	$3,347	$2,991	$2,407	$32
PM2.5	$12,202	$7,821	$4,168	$994
CO	$1.88	$1.34	$0.36	$0.36
Pb	$5,540	$2,923	$711	$711

MPUC High Externality Costs 2023 $ per short ton				
	Urban	Metro Fringe	Rural	<200mi
SO2	$17,439	$13,723	$10,128	$0
NOx	$9,571	$8,896	$7,724	$180
PM2.5	$30,481	$19,496	$10,235	$1,513
CO	$4.00	$2.37	$0.72	$0.72
Pb	$6,856	$3,530	$793	$793

MPUC Midpoint Externality Costs 2023 $ per short ton				
	Urban	Metro Fringe	Rural	<200mi
SO2	$12,208	$9,616	$7,142	$0
NOx	$6,459	$5,943	$5,066	$106
PM2.5	$21,341	$13,659	$7,202	$1,254
CO	$2.94	$1.85	$0.54	$0.54
Pb	$6,198	$3,226	$752	$752

F. Energy Efficiency (EE) Bundles

The Company based our EE bundles on our proposed 2024-2026 ECO Triennial Plan.[8] Three bundles of EE were developed: (1) a low-achievement bundle based on minimum statutory requirements in Minn. Stat. § 216B.241, (2) a mid-achievement bundle based on estimated savings derived from our 2024-2026 ECO Triennial, and (3) a high-achievement bundle based on the "Optimized Bundle" as part of the 2020-

[8] 2024-2026 ECO Triennial Plan, as filed, Docket No. G,E002/CIP-23-92, June 29, 2023.

2034 IRP which took into account the most recent state potential analysis.[9] Internal experts provided estimated costs, and energy and demand avoidance characteristics for the programs. Multiple sources were considered for the different bundles including the 2018 *Minnesota Energy Efficiency Potential Study* findings, the Company's ECO Triennial Plan, and IRA policies and funding. In addition to the bundles, naturally occurring EE is embedded in the load forecast.

Each bundle is modeled in Encompass in the same manner as a supply side resource. The first two bundles are forced into the model and are not selectable as they represent our planned program achievement for EE. The High Achievement Bundle (Bundle 3) was offered as a selectable resource by the EnCompass model as part of the optimization process. Bundle 3 was developed by the Company, drawing on the Optimal Bundle in the 2019 IRP.

[9] Upper Midwest Integrated Resource Plan 2020-2034, Xcel Energy, Docket No. E002/RP-19-368, 2019.

Table F-6: Energy Efficiency Bundles

	Energy (GWh)			Demand (MW)			Cost ($000)		
Year	Bundle 1: Statutory Minimum	Bundle 2: Programatic	Bundle 3: High	Bundle 1: Statutory Minimum	Bundle 2: Programatic	Bundle 3: High	Bundle 1: Statutory Minimum	Bundle 2: Programatic	Bundle 3: High
2024	477	138	159	91	26	30	$ 86,040	$ 47,971	$ 79,937
2025	887	256	310	169	49	59	$ 86,202	$ 54,143	$ 81,246
2026	1,298	400	460	247	76	88	$ 82,934	$ 62,811	$ 79,928
2027	1,691	531	654	322	101	124	$ 82,108	$ 57,926	$ 108,775
2028	2,075	659	864	395	125	164	$ 82,108	$ 57,926	$ 123,859
2029	2,455	785	1,023	467	149	195	$ 82,108	$ 57,926	$ 97,752
2030	2,832	835	1,268	539	159	241	$ 92,536	$ 31,685	$ 152,953
2031	3,204	893	1,498	610	170	285	$ 92,536	$ 31,685	$ 152,953
2032	3,565	948	1,725	678	180	328	$ 92,536	$ 31,685	$ 152,953
2033	3,908	1,010	1,947	744	192	371	$ 89,458	$ 34,764	$ 152,953
2034	4,234	1,066	2,161	806	203	411	$ 89,458	$ 34,764	$ 152,953
2035	4,554	1,121	2,327	867	213	443	$ 89,458	$ 34,764	$ 125,340
2036	4,419	1,089	2,259	841	207	430		$ -	
2037	4,347	1,069	2,222	827	203	423		$ -	
2038	4,270	1,049	2,181	813	200	415		$ -	
2039	4,113	1,007	2,116	783	192	403		$ -	
2040	3,963	969	2,050	754	184	390		$ -	
2041	3,807	925	1,980	725	176	377		$ -	
2042	3,591	863	1,882	683	164	358		$ -	
2043	3,379	802	1,779	643	153	339		$ -	
2044	3,012	692	1,635	573	132	311		$ -	
2045	2,655	599	1,470	505	114	280		$ -	
2046	2,316	501	1,312	441	95	250		$ -	
2047	1,986	409	1,144	378	78	218		$ -	
2048	1,658	324	957	315	62	182		$ -	
2049	1,330	241	787	253	46	150		$ -	
2050	1,009	184	599	192	35	114		$ -	
2051	774	143	455	147	27	87		$ -	
2052	541	103	314	103	20	60		$ -	
2053	321	61	183	61	12	35		$ -	
2054	160	30	84	30	6	16		$ -	
2055	-	-	-	-	-	-		$ -	

G. Demand Response Forecast

Like the process for EE, the Company created six bundles for demand response based on level of achievement and technology so that DR could be modeled in Encompass in the same manner as a supply-side resource. These bundles included: (1) Base DR, Saver's Switch, (2) Base DR, Other DR, (3) Incremental DR, Saver's Switch, (4) Incremental DR, Other DR, (5) High Potential, Saver's Switch, and (6) High Potential, Other DR.

Consistent with past practice, the Company developed a Base DR Forecast from existing programs at historical growth rates, which was included in all baseline resource modeling as the first level of DR achievement. The Company then developed two levels of DR achievement incremental to the Base DR Forecast. The second level of DR achievement represents a higher level of growth rate necessary to achieve the required 400 MW of incremental DR by the end of 2023,[10] and a continuation of that level of achievement beyond 2023. This level of achievement, represented by bundles 1 through 4, is included in the Encompass model as required resources as ordered by the Commission. The third level of DR achievement, represented by bundles 5 and 6, is based on the Brattle DR Potential Study included in the 2019 IRP. This level of achievement exceeds the achievement of the ordered 400 MW by 2023 at a higher cost. These bundles are included in the Encompass model as selectable resources to determine the cost-effective level of future DR achievement.

Within each level of achievement, the costs and impacts of the Saver's Switch program and all other DR programs were modeled separately. This was done as the Saver's Switch program controls air-conditioning,[11] resulting in load reductions that differ significantly from the load reductions from all other DR programs which control a wide variety of loads. This results in a total of six bundles modeled bundles as described above (each level broken into specific technology and control characteristics). Similar to EE, each level of achievement represents an incremental amount of DR and is dependent on the preceding level of achievement being selected (i.e., third level of achievement for the Saver's Switch program cannot be selected unless the second level of achievement is selected).

[10] *See Order Approving Plan with Modifications and Establishing Requirements For Future Filings*, Docket No. E002/RP-19-368, April 15, 2022 at Order Point 2.A.2.
[11] Saver's Switch was used as a proxy for characterization of the resource, other programs such as AC Rewards also hold these characteristics.

Table F-7: Demand Response Forecast

	Incremental Demand (MW)						Incremental Costs ($000's $2023)					
Year	Bundle 1	Bundle 2	Bundle 3	Bundle 4	Bundle 5	Bundle 6	Bundle 1	Bundle 2	Bundle 3	Bundle 4	Bundle 5	Bundle 6
2024	686	339	176	56	24	70	29,538	20,204	13,834	4,362	3,490	10,068
2025	689	350	177	57	27	59	29,665	20,894	13,893	4,511	3,877	8,482
2026	691	362	178	59	28	59	29,756	21,584	13,936	4,660	4,057	8,500
2027	692	369	178	61	30	59	29,790	22,025	13,952	4,756	4,273	8,518
2028	692	375	178	61	31	59	29,732	22,357	13,924	4,827	4,522	8,537
2029	691	380	177	62	33	59	29,657	22,656	13,889	4,892	4,806	8,555
2030	687	385	176	63	36	60	29,367	22,960	13,753	4,957	5,124	8,573
2031	683	390	174	64	38	60	29,079	23,268	13,619	5,024	5,463	8,592
2032	679	395	173	65	40	60	28,795	23,580	13,486	5,091	5,825	8,610
2033	675	401	171	66	43	60	28,513	23,896	13,354	5,160	6,211	8,628
2034	671	406	170	67	46	60	28,234	24,216	13,223	5,229	6,622	8,647
2035	667	412	168	67	49	60	27,958	24,541	13,094	5,299	7,060	8,665
2036	663	417	167	68	52	60	27,684	24,870	12,966	5,370	7,527	8,684
2037	660	423	166	69	56	60	27,413	25,203	12,839	5,442	8,026	8,702
2038	657	428	164	70	59	61	27,145	25,541	12,713	5,515	8,557	8,721
2039	654	434	163	71	63	61	26,880	25,883	12,589	5,589	9,123	8,739
2040	650	440	162	72	68	61	26,617	26,230	12,465	5,664	9,727	8,758
2041	647	446	161	73	72	61	26,356	26,582	12,343	5,740	10,371	8,777
2042	644	452	160	74	77	61	26,098	26,938	12,223	5,816	11,058	8,795
2043	641	458	158	75	82	61	25,843	27,300	12,103	5,894	11,790	8,814
2044	638	464	157	76	87	61	25,590	27,666	11,985	5,973	12,570	8,833
2045	635	470	156	77	93	61	25,340	28,036	11,867	6,054	13,402	8,852
2046	632	477	155	78	99	62	25,092	28,412	11,751	6,135	14,290	8,871
2047	629	483	154	79	106	62	24,846	28,793	11,636	6,217	15,236	8,890
2048	626	489	153	80	113	62	24,603	29,179	11,522	6,300	16,244	8,909
2049	623	496	152	81	120	62	24,362	29,570	11,410	6,385	17,319	8,928
2050	620	503	150	82	128	62	24,124	29,967	11,298	6,470	18,466	8,947
2051	617	509	149	83	137	62	23,888	30,368	11,187	6,557	19,688	8,966
2052	615	516	148	85	146	62	23,654	30,776	11,078	6,645	20,992	8,985
2053	612	523	147	86	156	62	23,423	31,188	10,970	6,734	22,381	9,004
2054	609	530	146	87	166	63	23,193	31,606	10,862	6,824	23,863	9,023
2055	606	537	145	88	177	63	22,966	32,030	10,756	6,916	25,443	9,043

H. Demand and Energy Forecast

The Company's Fall 2023 load forecast is used as the base assumption in this Resource Plan. The forecast assumes adoption of Electric Vehicle (EV), new Large Commercial & Industrial (C&I) customer additions, Beneficial Electrification (BE), and demographic/economic growth. These load increases are netted against reductions in consumption resulting from Energy Efficiency to result in an overall energy requirements outlook that increases two percent per year in the 2024-2040 timeframe.

The "Load Forecast with required MN EE Bundles" shown in Table F-8 below is the starting point for the load inputs. In all modeling sensitivities, the "EE" is removed; the removal of the impact of this future and historic EE achievement, each of which has a 14-year life, impacts the load forecast through the end of the modeling period. The EE impact was subsequently locked in all sensitivities. The resulting forecast, before the impacts of EE achievement are added, is shown below in Table F-8 as "Forecast without required MN EE Bundles." The forecasts shown do not include the impact of DG solar.

Table F-8: Demand and Energy Forecast

Seasonal Peak Demand and Energy Forecast										
Year	Peak Seasonal Demand (MW) without required MN EE Bundles				Peak Seasonal Demand (MW) with required MN EE Bundles				Energy (GWh)	
	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Forecast without required MN EE Bundles	Forecast with required MN EE Bundles
2024	9,408	7,528	6,612	7,043	9,309	7,433	6,525	6,949	44,439	43,823
2025	9,526	7,633	6,715	7,143	9,328	7,438	6,551	6,975	45,459	44,308
2026	9,946	7,987	7,036	7,500	9,650	7,697	6,798	7,249	48,238	46,524
2027	10,311	8,299	7,377	7,808	9,922	7,919	7,060	7,479	50,235	47,973
2028	10,511	8,423	7,526	7,955	10,029	7,954	7,138	7,560	50,971	48,170
2029	10,643	8,540	7,596	8,018	10,112	8,030	7,124	7,541	51,661	48,339
2030	10,835	8,689	7,750	8,158	10,207	8,060	7,215	7,632	52,630	48,866
2031	11,040	8,850	7,913	8,314	10,354	8,155	7,304	7,723	53,659	49,436
2032	11,331	9,060	8,146	8,504	10,574	8,308	7,495	7,852	54,974	50,305
2033	11,573	9,285	8,428	8,679	10,748	8,466	7,724	7,968	56,363	51,291
2034	11,902	9,564	8,574	8,923	11,065	8,769	7,794	8,193	58,051	52,555
2035	12,212	9,836	8,851	9,185	11,312	8,984	8,021	8,407	59,665	53,763
2036	12,496	10,034	9,080	9,404	11,563	9,111	8,277	8,626	61,053	55,302
2037	12,686	10,218	9,392	9,577	11,768	9,311	8,599	8,811	62,319	56,674
2038	12,890	10,373	9,565	9,703	11,987	9,500	8,785	8,950	63,482	57,934
2039	13,088	10,517	9,786	9,858	12,218	9,696	9,046	9,131	64,569	59,222
2040	13,202	10,616	9,681	9,918	12,414	9,901	8,958	9,238	65,390	60,215
2041	13,296	10,691	9,807	9,989	12,489	9,942	9,190	9,317	66,124	61,161
2042	13,389	10,757	9,966	10,061	12,628	10,050	9,639	9,446	66,861	62,174
2043	13,461	10,807	10,401	10,119	12,743	10,142	10,093	9,554	67,480	63,066
2044	13,542	10,859	10,436	10,258	12,903	10,277	10,160	10,016	68,166	64,220
2045	13,594	10,890	11,361	10,809	13,058	10,408	11,102	10,558	68,749	65,264
2046	13,642	11,095	11,848	11,245	13,173	10,883	11,622	11,026	69,373	66,338
2047	13,676	11,500	12,318	11,657	13,251	11,311	12,133	11,475	69,885	67,276
2048	13,703	11,885	12,302	12,041	13,345	11,725	12,147	11,887	70,391	68,194
2049	13,712	12,324	13,307	12,509	13,423	12,194	13,180	12,383	70,830	69,056
2050	13,775	12,608	13,675	12,823	13,555	12,503	13,574	12,723	71,343	69,951
2051	13,990	12,868	13,970	13,142	13,915	12,790	13,884	13,056	71,715	70,602
2052	14,247	13,158	13,676	13,514	14,190	13,099	13,609	13,447	72,164	71,321
2053	14,462	13,398	14,548	13,640	14,426	13,351	14,504	13,595	72,532	71,958
2054	14,683	13,656	14,833	13,954	14,660	13,623	14,802	13,922	73,096	72,715
2055	14,916	13,949	15,125	14,265	14,907	13,929	15,107	14,246	73,717	73,528

*Winter peak does not include December because EnCompass model does not assume December as the peak month so that consecutive winter periods from one year to the next never occur.

High and low load sensitivity assumptions are summarized below in Table F-9. Our high load forecast sensitivity assumes increased BE, full achievement of Minnesota's "20% by 2030" goal for EV penetration with similar increases in EV adoption in other states served by NSP, and additional large data center loads locating in

Minnesota. All other assumptions are held the same as in the base case outlook. The resulting high load forecast is shown below in Table F-10. The low load sensitivity assumes increased adoption of rooftop solar generation, no beneficial electrification, slower adoption of EVs, and less new load from data centers than was assumed in the Base Case. The resulting low load forecast is show below in Table F-11.

Table F-9: High and Low Load Sensitivity Assumptions

Component	High Load Case	Low Load Case
Base Load	Base Case	Base Case
Solar	Base Case	High Solar
Demand-Side Management	Base Case	Base Case
Beneficial Electrification	High BE	No BE
Electric Vehicles	Full Achievement	Low Achievement
Large Commercial & Industrial Customers	High LCI	Low LCI

Table F-10: High Load Sensitivity

High Load Sensitivity					
	Peak Seasonal Demand (MW)				Energy (GWh)
Year	Summer	Fall	Winter	Spring	
2024	9,524	7,653	6,730	7,125	45,219
2025	9,716	7,844	6,884	7,282	46,739
2026	10,236	8,300	7,362	7,721	50,174
2027	10,823	8,823	7,857	8,202	53,786
2028	11,240	9,160	8,316	8,649	56,033
2029	11,454	9,368	8,345	8,708	57,219
2030	11,772	9,642	8,545	8,902	58,866
2031	12,152	9,979	8,876	9,229	61,193
2032	12,529	10,294	9,374	9,568	63,514
2033	12,884	10,620	9,902	9,919	65,948
2034	13,255	10,975	10,144	10,244	68,159
2035	13,626	11,339	10,582	10,576	70,377
2036	13,927	11,567	10,732	10,816	72,105
2037	14,191	11,856	11,224	11,098	74,060
2038	14,445	12,084	11,501	11,302	75,783
2039	14,721	12,325	11,890	11,543	77,563
2040	14,876	12,488	11,897	11,660	78,837
2041	15,002	12,594	12,700	12,070	79,976
2042	15,092	12,644	13,224	12,485	80,871
2043	15,200	12,964	13,848	13,097	81,948
2044	15,364	13,608	14,061	13,836	83,367
2045	15,500	14,370	15,484	14,619	84,760
2046	15,830	15,069	16,233	15,407	85,957
2047	16,567	15,813	17,062	16,250	87,274
2048	16,975	16,323	17,032	16,783	87,984
2049	17,754	17,205	18,645	17,712	89,420
2050	18,239	17,670	19,252	18,264	90,570
2051	19,021	18,322	19,945	18,891	91,855
2052	19,427	18,756	19,618	19,433	92,801
2053	19,784	19,122	20,850	19,725	93,655
2054	20,153	19,539	21,295	20,208	94,703
2055	20,541	19,967	21,748	20,689	95,810

*Winter peak does not include December because EnCompass model does not assume December as the peak month so that consecutive winter periods from one year to the next never occur.

Table F-11: Low Load Sensitivity

Low Load Sensitivity					
	Peak Seasonal Demand (MW)				Energy (GWh)
Year	Summer	Fall	Winter	Spring	
2024	9,401	7,521	6,606	7,038	44,394
2025	9,513	7,618	6,702	7,134	45,146
2026	9,821	7,863	6,905	7,382	46,766
2027	9,970	7,963	7,029	7,476	47,359
2028	10,153	8,070	7,150	7,601	47,964
2029	10,264	8,165	7,213	7,659	48,502
2030	10,431	8,287	7,336	7,775	49,267
2031	10,602	8,412	7,464	7,893	50,036
2032	10,827	8,564	7,611	8,034	51,006
2033	10,993	8,713	7,813	8,162	52,005
2034	11,244	8,906	7,956	8,355	53,243
2035	11,490	9,110	8,168	8,545	54,419
2036	11,727	9,260	8,328	8,697	55,446
2037	11,878	9,406	8,526	8,810	56,408
2038	12,044	9,524	8,653	8,879	57,267
2039	12,207	9,633	8,820	8,995	58,042
2040	12,287	9,687	8,697	9,021	58,545
2041	12,350	9,714	8,752	9,062	58,984
2042	12,415	9,736	8,810	9,107	59,436
2043	12,463	9,750	8,957	9,137	59,795
2044	12,527	9,771	9,014	9,146	60,239
2045	12,565	9,773	9,109	9,170	60,609
2046	12,601	9,778	9,463	9,185	61,025
2047	12,626	9,767	9,805	9,374	61,348
2048	12,650	9,752	9,751	9,521	61,693
2049	12,661	9,799	10,567	9,884	62,015
2050	12,711	10,048	10,891	10,156	62,422
2051	12,744	10,272	11,146	10,511	62,698
2052	12,803	10,533	10,906	10,779	63,056
2053	12,017	10,748	11,647	10,874	63,341
2054	12,059	10,977	11,899	11,155	63,820
2055	12,207	11,243	12,158	11,435	64,358

*Winter peak does not include December because EnCompass model does not assume December as the peak month so that consecutive winter periods from one year to the next never occur.

I. Fuel and Market Price Forecasts

To derive the forecast of monthly delivered gas prices at Ventura Hub, the Company uses a combination of market indicators such as New York Mercantile Exchange (NYMEX) and long-term price forecasts published by highly respected, industry-leading sources such as Wood Mackenzie and S&P Global. The forecast is NYMEX-based for the first few years, and then it transitions into blending the NYMEX curve with the vendor forecasts to develop a composite forecast. The Company used the following weightings for each component at various time intervals:

Period	NYMEX	S&P Global	Wood Mackenzie
Balance of the year + 2 years	100%	0%	0%
Years 3 and Beyond	25%	37.5%	37.5%
	10 yr trendline extension		

The final years of the forecasts vary between sources; Wood Mackenzie and S&P Global provide data through 2050, and NYMEX through 2035. The Company uses linear extrapolation to extend the data of each forecast out to 2050 and beyond. The Ventura Hub is later adjusted for specific delivery costs at each generating unit to develop the final model inputs.

Coal price forecasts at mine mouth are based on a combination of the short-term spot market forecast from Coaldesk, LLC in the near term and a simple average of long-term coal price forecasts provided by Wood Mackenzie and S&P Global. Added to the coal price forecast at mine mouth, which is just for the coal commodity, are: transportation charges (rail and diesel fuel), SO_2 costs, freeze control, and dust suppressant, as required. Coal price forecasts are shown below in Table F-12.

Table F-12: Coal Price Forecasts

Coal Price Forecast		
Year	AS King (Delivered) $/mmBtu	Sherco (Delivered) $/mmBTU
2024	$2.62	$2.37
2025	$2.71	$2.52
2026	$2.78	$2.57
2027	$2.81	$2.60
2028	$2.89	$2.67
2029	$2.95	$2.72
2030	$3.01	$2.78

In addition to resources that exist within the NSP System, the Company is a participant in the MISO Market. To derive the forecast of monthly On and Off-peak electricity prices, the Company uses a simple average of On and Off-peak power price forecasts provided by Wood Mackenzie and S&P Global. Table F-13 below shows the market prices under zero CO_2 cost assumptions. To generate the hourly market prices, the Company uses the hourly energy price forecasts from the Horizons Energy EnCompass National Database, specifically the energy prices at the MISO-ND-MN node and scales it to match the monthly On and Off-peak price forecasts in Table F-13.

High and low-price sensitivities were performed by adjusting the base forecast up and down by 50 percent.

Table F-13: Gas and Market Price Forecast

	Base Forecast			Low Forecast			High Forecast		
	Gas Price ($/mmBTu)	Market Price ($/MWh)		Gas Price ($/mmBTu)	Market Price ($/MWh)		Gas Price ($/mmBTu)	Market Price ($/MWh)	
Year	Ventura Hub	Minn Hub On-Peak	Minn Hub Off-Peak	Ventura Hub	Minn Hub On-Peak	Minn Hub Off-Peak	Ventura Hub	Minn Hub On-Peak	Minn Hub Off-Peak
2024	$3.36	$39.74	$30.58	$1.68	$19.87	$15.29	$5.04	$59.61	$45.88
2025	$3.95	$34.84	$26.39	$1.98	$17.42	$13.19	$5.93	$52.26	$39.58
2026	$3.71	$38.11	$28.81	$1.86	$19.05	$14.41	$5.57	$57.16	$43.22
2027	$4.07	$38.04	$29.23	$2.03	$19.02	$14.61	$6.10	$57.05	$43.84
2028	$4.12	$37.25	$29.02	$2.06	$18.62	$14.51	$6.18	$55.87	$43.53
2029	$4.09	$35.21	$28.30	$2.05	$17.60	$14.15	$6.14	$52.81	$42.45
2030	$4.06	$35.52	$29.11	$2.03	$17.76	$14.55	$6.09	$53.28	$43.66
2031	$4.07	$35.57	$30.60	$2.03	$17.78	$15.30	$6.10	$53.35	$45.90
2032	$4.16	$35.72	$31.58	$2.08	$17.86	$15.79	$6.24	$53.59	$47.37
2033	$4.31	$34.78	$31.79	$2.15	$17.39	$15.89	$6.46	$52.17	$47.68
2034	$4.49	$34.15	$32.02	$2.24	$17.08	$16.01	$6.73	$51.23	$48.02
2035	$4.62	$33.96	$32.59	$2.31	$16.98	$16.30	$6.93	$50.94	$48.89
2036	$4.68	$33.21	$32.58	$2.34	$16.60	$16.29	$7.01	$49.81	$48.87
2037	$4.81	$33.60	$32.86	$2.41	$16.80	$16.43	$7.22	$50.39	$49.30
2038	$4.95	$32.83	$33.05	$2.48	$16.41	$16.52	$7.43	$49.24	$49.57
2039	$5.07	$32.93	$33.28	$2.54	$16.47	$16.64	$7.61	$49.40	$49.91
2040	$5.37	$33.04	$35.28	$2.68	$16.52	$17.64	$8.05	$49.56	$52.92
2041	$5.53	$35.19	$37.40	$2.77	$17.59	$18.70	$8.30	$52.78	$56.10
2042	$5.62	$34.30	$36.76	$2.81	$17.15	$18.38	$8.44	$51.45	$55.14
2043	$5.86	$34.04	$37.19	$2.93	$17.02	$18.60	$8.79	$51.05	$55.79
2044	$6.19	$34.50	$37.35	$3.10	$17.25	$18.68	$9.29	$51.76	$56.03
2045	$6.48	$35.08	$41.40	$3.24	$17.54	$20.70	$9.72	$52.62	$62.10
2046	$6.61	$36.25	$40.19	$3.30	$18.12	$20.10	$9.91	$54.37	$60.29
2047	$6.77	$36.81	$42.23	$3.38	$18.40	$21.11	$10.15	$55.21	$63.34
2048	$6.92	$36.70	$43.07	$3.46	$18.35	$21.54	$10.37	$55.05	$64.61
2049	$7.19	$37.53	$44.27	$3.59	$18.77	$22.13	$10.78	$56.30	$66.40
2050	$7.54	$37.61	$46.10	$3.77	$18.81	$23.05	$11.31	$56.42	$69.16
2051	$7.68	$40.59	$47.30	$3.84	$20.29	$23.65	$11.51	$60.88	$70.95
2052	$7.89	$41.75	$48.64	$3.95	$20.87	$24.32	$11.84	$62.62	$72.97
2053	$8.11	$42.91	$49.99	$4.06	$21.45	$25.00	$12.17	$64.36	$74.99
2054	$8.33	$44.07	$51.36	$4.17	$22.03	$25.68	$12.50	$66.10	$77.04
2055	$8.55	$45.22	$52.72	$4.28	$22.61	$26.36	$12.83	$67.84	$79.08

J. Baseload Retirement "Leave Behind" Costs

The Company includes "leave behind" estimates, which reflect costs required to mitigate localized grid impacts of baseload resource retirements. For the retiring coal units, these costs are largely attributed to synchronous condensers that will likely be needed to maintain grid stability. For the nuclear units, the Company conducted a "leave behind" study to determine the transmission system impacts of the nuclear plants' retirement. The reinforcement costs are included as capital expenditure based on the timing of the resource retirement.

Specifically, we have included the following proxy leave behind costs related to our baseload resource retirements as estimated by the Company. We applied these costs in the modeling as soon as the resource is retired to reflect the estimated local transmission reinforcement costs assumed to be required upon retirement. All numbers below are in real dollar terms ($2023).

- King: $50 million
- Sherco 1: $50 million
- Sherco 2: $50 million
- Sherco 3: $50 million

Table F-14: Nuclear Leave Behind Costs

[PROTECTED DATA BEGINS

Baseload Scenario Name	Nuclear Unit	Retirement Date	Leave Behind Cost (2023$)	Year(s) when LBC incurs
Reference Case	Monticello	2040		2035-2040
	Prairie Island	2033/34		2028-2033
Prairie Island Extension	Monticello	2040		2036-2040
	Prairie Island	2053/54		N/A
Extend All Nuclear	Monticello	2050		2045-2050
	Prairie Island	2053/54		2048-2053

PROTECTED DATA ENDS]

K. Market Capacity Price

Surplus capacity up to 500 MW can receive surplus capacity credit and is priced at the avoided capacity cost of a generic greenfield H-Class combustion turbine on an economic carrying charge basis.

Table F-15: Market Capacity Price

Surplus Capacity Credit																
	2024	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**
$/kw-mo	8.75	8.92	9.10	9.28	9.47	9.66	9.85	10.05	10.25	10.45	10.66	10.88	11.09	11.32	11.54	11.77
	2040	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**2053**	**2054**	**2055**
$/kw-mo	12.01	12.25	12.49	12.74	13.00	13.26	13.52	13.79	14.07	14.35	14.64	14.93	15.23	15.53	15.84	16.16

L. Seasonal Accredited Capacity Assumptions for Wind, Solar, and Battery Resources

The seasonal accredited capacity (SAC) values for wind, solar, and battery resources vary according to whether a resource is already in existence or is a new resource option for the model. The Effective Load Carrying Capability (ELCC) for existing NSP wind and solar resources is based on the 2023-2024 MISO planning year seasonal accreditation capacity[12] with an annual degradation assumption for solar resources.[13] For years beyond 2024, the seasonal accredited capacity of existing wind, solar, and battery resources trends over multiple years so it meets the assumptions used in MISO's November 2022 Regional Resource Assessment (RRA) as depicted in Figures F-1, F-2, and F-3 below. As outlined by MISO, there was an unexpected deviation from the anticipated declining trend in ELCC when more of a resource type is added to the system. Specifically, the average solar ELCC for the winter season increased from one percent in 2031 to 11 percent in 2041. This increase can be attributed to the hour in which risk emerged during the winter months. In 2041, the evening risk materialized two hours earlier than it did in 2031. This change, attributed to low wind output, resulted in a ten percent change to the solar ELCC outcome when using the average ELCC methodology as described further below.[14]

[12] MISO Planning Year 2023-2034 Wind and Solar Capacity Credit Report (March 2023). Available at https://cdn.misoenergy.org/2023%20Wind%20and%20Solar%20Capacity%20Credit%20Report628118.pdf.
[13] The seasonal accredited capacity percentages are applied to the installed capacity of each existing NSP resource. In the case of solar resources, the maximum capacity declines slightly each year, due to slight degradation in the installed solar modules. NSP incorporates a 0.5 percent decrease in existing solar resources' installed capacity to mimic this effect in addition to the ELCC assumptions described in this section.
[14] MISO Regional Resource Assessment (November 2022) at p. 45. Available at https://cdn.misoenergy.org/2022%20Regional%20Resource%20Assessment%20Report627163.pdf.

Figure F-1: Average seasonal ELCC for Existing Wind Resources[15]

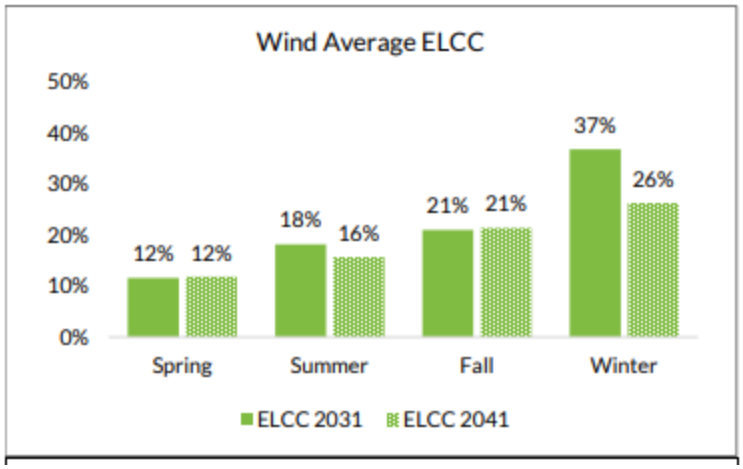
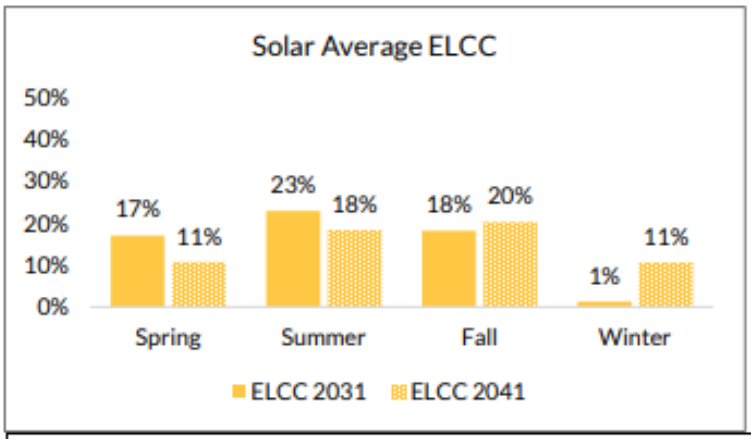
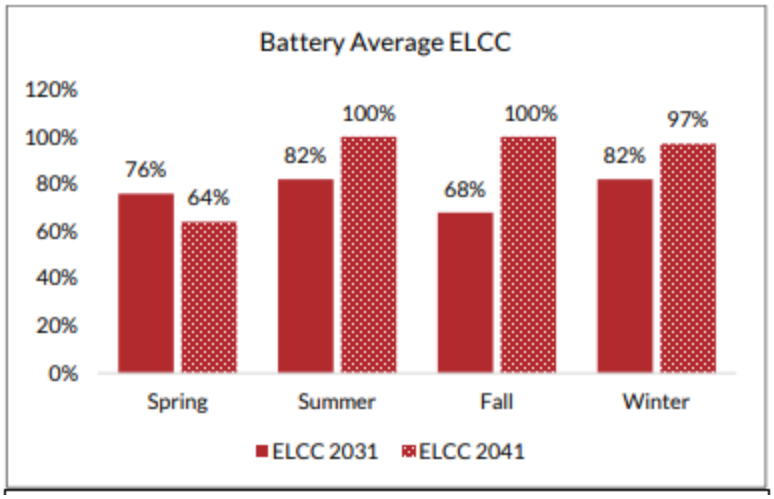


Figure F-2: Average seasonal ELCC for Existing Solar Resources[16]



[15] *Id.* at p. 47.
[16] *Id.* at p. 45.

Figure F-3: Average seasonal ELCC for Battery Resources[17]



The seasonal accreditation assumptions for generic wind, solar, battery, and solar + battery hybrid resources are shown on Table F-16. The seasonal accreditation assumptions for generic wind resources are based on values used in MISO's 2022 and 2023 Regional Resource Assessment (RRA); and stem from MISO's March 2023 Planning Year 2023-2024 Wind and Solar Capacity Credit Report.

The seasonal accreditation for generic solar resources starts with the values in the MISO 2023/2024 PY Planning Reserve Margin and Local Reliability Requirements. These values then trend to the long-term ELCC assumptions in the MISO November 2022 RRA.

The battery seasonal accreditation starts with the MISO October 2023 Resource Adequacy Business Practice Manual (BPM) section 4.2.9.4, which provides the five percent forced outage (95% accredited capacity assumptions) for new energy storage resources. The accreditation trends over several years from the 95% capacity accreditation to the long-term assumptions for battery storage resources in the MISO November 2022 RRA. The MISO battery accreditation is based on a four-hour battery. In the case of a 10-hour battery, we conservatively apply the same value since MISO does not provide an ELCC for a 10-hour duration.

The solar plus battery hybrid accreditation value is calculated using the methodology in the MISO October 2023 Resource Adequacy Business Practice Manual BPM,

[17] *Id.* at p. 51.

Section 4.2.11. This section details the Phase I "sum of parts" method for hybrid systems, applying it to the assumed generic solar and storage units in our model. For each year within the modeling horizon, the "sum of parts" methodology from the current MISO BPM is replicated. However, in this case, the components combined are the standalone storage and solar generic units, each component part – solar and storage – with accreditation assumptions that trend over time to align with the long-term November 2022 MISO RRA values for standalone storage and standalone solar.[18]

A key trend over time here is that many of the seasonal values for different generic resource types trend down from the single year MISO PY 2023/2034 to MISO PY 2031/2032 and then back up again by MISO PY 2041/2042. This occurs in part because the studies for MISO PY 2023/2024 assumptions differ from those for the later years and also because of the methodology and assumptions being used for PY 2031/2032 and PY 2041/2041.

In the case of MISO PY 2031/2032 and MISO PY 2041/2042 variations, ELCC assumptions for intermittent resources are affected by the system-wide generation resource mixes MISO projects for those years. Additionally, the average ELCC method MISO uses for this study heavily depends on projected resource output for a few key Loss of Load Probability (LOLP) hours each season. While MISO notes that average ELCC methodology "may not be adequate for a system with large amounts of intermittent generation" and that "changes to the accreditation methodology applied to non-thermal technologies are currently being considered by MISO's Resource Adequacy Subcommittee (RASC) stakeholders," in the absence of other long-term data, the Company has adopted these ELCC values for its long-term modeling purposes.

[18] The total resource accreditation for hybrid units used this method instead of matching to MISO 2022 RRA values for hybrids because the sizes of the solar and storage components relative to total asset size that MISO had used in their analysis were unknown and may have differed from the hybrid generic unit configuration used by the Company in IRP modeling.

Table F-16. Generic Wind, Solar, Battery, and Solar + Battery Hybrid Resource ELCC

PY 2023/2024

Generic Resource Type	Summer	Fall	Winter	Spring
Wind[19]	18.1%	23.1%	40.3%	23.0%
Solar[20]	45.4%	25.3%	6.3%	15.0%
Battery	95.0%	95.0%	95.0%	95.0%
Solar + Battery Hybrid	52.6%	43.3%	33.3%	37.9%

PY 2031/2032

Generic Resource Type	Summer	Fall	Winter	Spring
Wind	18.0%	21.0%	37.0%	12.0%
Solar	23.0%	18.0%	1.0%	17.0%
Battery	82.0%	68.0%	82.0%	76.0%
Solar + Battery Hybrid	38.0%	30.9%	26.4%	32.9%

PY 2041/2042

Generic Resource Type	Summer	Fall	Winter	Spring
Wind	16.0%	21.0%	26.0%	12.0%
Solar	18.0%	20.0%	11.0%	11.0%
Battery	100.0%	100.0%	97.0%	64.0%
Solar + Battery Hybrid	41.1%	42.1%	36.4%	26.0%

M. Spinning Reserve Requirement

The total spinning requirement in the model consists of spinning reserve and supplemental reserve. Spinning reserve is the on-line reserve capacity that is synchronized to the grid to maintain system frequency stability during contingency events and unforeseen load swings. Supplemental reserve is the off-line capacity capable of quick start within 10 minutes. On an hourly basis, each ancillary type for NSP is calculated as the NSP load ratio of the published MISO System Wide Ancillary Requirements. The level of total spinning requirement modeled is 125.17 MW and is based on a 12-month historical average in 2022.

[19] MISO Planning Year 2023-2024 Wind and Solar Capacity Credit Report. (March 2023). Available at: https://cdn.misoenergy.org/2023%20Wind%20and%20Solar%20Capacity%20Credit%20Report628118.pdf
[20] MISO 2023/24 PY Planning Reserve Margin and Local Reliability Requirements – Final Results. October 3, 2022. Available at: https://cdn.misoenergy.org/20221003%20LOLEWG%20Item%2003%20PY%202023-24%20Final%20LOLE%20Study%20Results626468.pdf.

N. Emergency Energy

Emergency energy is used to cover events where there are not enough resources or market purchase energy available to meet system energy requirements. In EnCompass, we use the value of $1,000,000/MWh. Emergency energy is a "soft constraint" in EnCompass modeling that allows emergency energy to "dispatch" as a last resort resource, in order for the model to find a feasible solution. The EnCompass price is set to a high level to ensure that all other available resources – including those that may have a very high effective $/MWh cost resulting from startup costs spread over a very small, required run time – are utilized before emergency energy.

O. Cost Assumptions for Transmission Tie Lines and New Resource Interconnections

Interconnection costs of $250/kw[21] are included in addition to the capital costs and operating expenses for utility-scale generic resource options.[22] These interconnection costs represent "grid upgrades" to ensure deliverability of energy from these facilities to the overall bulk electric system and are the "behind the fence" costs associated with substation and representative gen-tie construction.

In this IRP, a new distribution-interconnected resource, solar used to comply with the 3% Distributed Solar Energy Storage (DSES) legislation, also includes an interconnection cost as part of its total modeled cost. Costs from our recently filed Integrated Distribution Plan (IDP) were used as shown in Table F-17.[23]

[21] The basis for this cost assumption is discussed in Appendix L: System Planning Integration.
[22] Generic resources interconnecting to the Sherco and King transmission tie-lines do not have this cost as part of their capital cost assumption since they will not need to have a new, dedicated Generator Interconnection Agreement (GIA) with MISO.
[23] *See* Integrated Distribution Plan, Appendix I: Distribution System Upgrades, November 1, 2023, Docket No. E002/M-23-452, for more information on the development of interconnection cost assumptions.

Table F-17: 3% DSES Interconnection Cost Assumptions

Years	3% Distributed Solar Energy Standard Interconnection Cost Assumption (Nominal $/kW)
2024-2029	$225
2030-2040	$184
2041-2055	$149

Regarding transmission tie-lines, in the Alternate Plan, we proposed to build transmission tie-lines from our Sherco and King sites that can interconnect incremental renewable and/or firm dispatchable resources. The total costs of the tie lines include capital costs plus VAR support, such as installing tie-line synchronous condensers and series compensation of the lines; while these are general cost estimates and subject to change during detailed project design, they are in line with the Company's experience on other projects. The total capacities of generator reuse are based on the existing interconnection rights at Sherco and King.

Table F-18: Sherco and King Gen-tie Assumptions

	Total Capital Costs (in 2023 Dollars)	Interconnection Rights
Sherco gen-tie	$1.139 billion	1996 MW
King gen-tie	$177 million	591 MW

Table F-19: Retiring Coal Units and Selection Windows for Gen-tie Resources[24]

Retiring Unit	Open Interconnection	Replacement Resource Window	Replacement Resources Allowed
Sherco 2	710 MW	2024-2026	Solar[25]
Sherco 1	720 MW	2027-2029	Solar, and Wind + ~400 MW of CTs (2028-2029)
Sherco 3	566 MW	2030-2032	Solar + Wind
AS King	591 MW	2028-2030	Solar only

[24] It was discovered that we inadvertently transposed the interconnection values for Sherco coal units 1 and 2 in the previous IRP. This has been corrected in this IRP model. The overall replacement MW indicated in the IRP Order for Units 1 and 2 together is correct and has not changed.
[25] Collectively, the Sherco Solar 1, 2, and 3 projects reutilize the interconnection capacity made available with the retirement of Sherco Coal Unit 2.

P. Distributed Generation and Community Solar Gardens

The distributed solar and Community Solar Gardens inputs are based on the most recent Company forecasts and an estimated ramp up of resources that comply with the Distributed Solar Energy Standard (DSES). Distributed Solar is modeled assuming a degradation of half a percent annually in generation. Community Solar Gardens are modeled assuming a degradation of half a percent annually in generation, and a 25-year service life.

Table F-20: Distributed Solar Nameplate capacity Forecast

Distributed Solar (Nameplate MWac)					
Year	CSG Legacy (2016-2024)	Non-Legacy CSGs	Customer Sited DG Solar	Distributed Solar Energy Standard (3%)	Total
2024	881	18	192		1,091
2025	877	100	239		1,215
2026	872	199	284		1,356
2027	868	298	325	62	1,553
2028	864	377	364	250	1,854
2029	859	455	382	373	2,069
2030	855	533	422	497	2,306
2031	851	610	481	494	2,436
2032	846	667	551	506	2,570
2033	842	724	610	517	2,693
2034	838	780	652	529	2,799
2035	834	836	683	540	2,893
2036	830	892	729	551	3,002
2037	825	948	792	562	3,127
2038	821	1,003	851	574	3,249
2039	817	1,058	919	585	3,379
2040	813	1,113	947	596	3,468
2041	841	1,167	993	607	3,608
2042	1,022	1,221	1,056	618	3,917
2043	1,246	1,275	1,167	629	4,316
2044	1,372	1,329	1,272	640	4,612
2045	1,478	1,382	1,353	650	4,864
2046	1,511	1,435	1,420	661	5,028
2047	1,534	1,488	1,540	672	5,233
2048	1,557	1,540	1,735	682	5,515
2049	1,554	1,609	1,906	693	5,762
2050	1,547	1,733	2,075	704	6,058
2051	1,539	1,872	2,210	714	6,335
2052	1,531	2,011	2,310	724	6,577
2053	1,524	2,132	2,520	735	6,911
2054	1,516	2,252	2,797	745	7,310
2055	1,508	2,371	3,051	755	7,686

*Customer sited DG solar capacity is reported as the max capacity of each year.

Table F-21: Distributed Solar Cost Forecast[26]

Distributed Solar ($nominal/MWh)				
Year	CSG Legacy (2016-2024)	Non-Legacy CSGs	Customer Sited DG Solar	Distributed Solar Energy Standard (3%)
2024	121.25	121.25	144.84	
2025	124.06	124.06	147.74	
2026	126.94	126.94	150.69	
2027	129.89	129.89	153.71	51.54
2028	132.90	132.90	156.78	50.79
2029	135.98	135.98	159.92	50.36
2030	139.14	139.14	163.11	49.33
2031	142.36	142.36	166.38	49.33
2032	145.67	145.67	169.70	49.20
2033	149.05	149.05	173.10	49.05
2034	152.51	152.51	176.56	48.88
2035	156.04	156.04	180.09	48.68
2036	159.66	159.66	183.69	48.49
2037	163.37	163.37	187.37	48.31
2038	167.16	167.16	191.11	48.14
2039	171.04	171.04	194.94	47.98
2040	175.00	175.00	198.83	47.82
2041	179.06	179.06	202.81	47.61
2042	183.22	183.22	206.87	47.41
2043	187.47	187.47	211.00	47.22
2044	191.82	191.82	215.22	47.12
2045	196.27	196.27	219.53	47.12
2046	200.82	200.82	223.92	47.29
2047	205.48	205.48	228.40	47.46
2048	210.25	210.25	232.97	47.62
2049	215.13	215.13	237.63	47.77
2050	220.12	220.12	242.38	47.93
2051	225.22	225.22	247.23	48.09
2052	230.45	230.45	252.17	48.27
2053	235.79	235.79	257.21	48.46
2054	241.27	241.27	262.36	48.66
2055	246.86	246.86	267.60	48.87

[26] Costs for each resource are derived from the following data sources: (1) CSG: Value of Solar Bill Credit Rates, (2) Customer Sited DG Solar: Xcel Energy A50 Rate Code, and (3) Distributed Solar Energy Standard (3 percent): combination of NREL ATB Utility-Scale Solar and Distributed Commercial PV resource types.

Q. Owned Unit Modeled Operating Characteristics and Costs

Company owned units are modeled based upon their tested operating characteristics and projected costs. Below is a list of typical operating and cost inputs for each company owned resource.

a. Retirement Date
b. Maximum Capacity
c. Seasonal Accredited Capacity Ratings
d. Minimum Capacity Rating
e. Heat Rate Profiles
f. Variable O&M
g. Start up fuel usage and start up charge
h. Fixed O&M
i. Maintenance Schedule
j. Forced Outage Rate
k. Emission rates for SO_2, NO_x, CO_2, CO, CH_4, N_2O, Pb and particulate matter
l. Contribution to spinning reserve
m. Fuel prices
n. Fuel delivery charges

R. Thermal Power Purchase Agreement (PPA) Operating Characteristics and Costs

PPAs are modeled based upon their tested operating characteristics and contracted costs. Below is a list of typical operating and cost inputs for each thermal PPA.

a. Contract term
b. Maximum Capacity
c. Minimum Capacity Rating
d. Seasonal Accredited Capacity Ratings
e. Heat Rate Profiles
f. Energy Schedule
g. Capacity Payments
h. Energy Payments
i. Start up fuel usage and start up charge
j. Maintenance Schedule
k. Forced Outage Rate
o. Emission rates for SO_2, NO_x, CO_2, CO, CH_4, N_2O, Pb and particulate matter

l. Contribution to spinning reserve
m. Fuel prices
n. Fuel delivery charges

S. Renewable Energy (PPAs and Owned) Operating Characteristics and Costs

Below is a list of typical operating and cost inputs for each renewable energy unit.

a. Contract term
b. Name Plate Capacity
c. Seasonal Accredited Capacity
d. Annual Energy
e. Hourly Patterns
f. Capacity and Energy Payments
g. Whether curtailed energy is compensable or not

T. Park Potential profiles for modeling wind and solar generation on the NSP System

This section discusses the process used to create Park (i.e., wind or solar farm) Potential profiles of wind and solar generation for Xcel Energy's upper Midwest region.

1. Annual Expected Park Potential

The Company combined monthly generation and curtailment data to derive the monthly Park Potential for each renewable generation Commercial Pricing Node (CP Node) from January, 2018 through November, 2022. The monthly Park Potentials were summed on a rolling 12-month basis to derive 48 annual Park Potential values. The Company averaged the 48 annual values to determine the annual expected Park Potential value for each CP Node. For renewable generation without sufficient historic data, the most recent Energy Production Estimate (EPE) from pre-construction developer software or the Annual Committed Energy from the Purchase Power Agreement was used as the annual PP value.

2. Monthly Allocation of Annual Park Potential

For new wind plants, the pre-construction developer software uses 30 years' worth of

meteorological weather reanalysis data to determine the expected monthly generation expressed as a percentage of the annual EPE. The Company used the average of the monthly percentages from new wind plants to allocate the CP Node annual Park Potential values to each calendar month. For solar plants, the Company calculated the ratio of monthly Park Potential relative to annual Park Potential for each month from the years 2018-2022. Table F-22 shows the monthly allocations for wind and solar plants expressed as a percentage of the annual expected Park Potential.

Table F-22: Monthly Percentage of Annual Wind and Solar Plant Park Potential

Month	Wind Allocation (%)	Solar Allocation (%)
January	9.1	3.7
February	8.2	5.4
March	9.1	9.0
April	9.4	10.0
May	9.1	11.9
June	7.7	13.2
July	6.3	13.1
August	6.1	11.6
September	7.7	9.2
October	9.1	6.6
November	9.2	3.8
December	9.0	2.7

3. Hourly Allocation of Monthly Park Potential

For most wind plants, the Company has wind speed data measured at the turbine anemometers.[27] The Company gathered hourly averaged wind speed data from 2020 for each wind CP Node and used empirical power conversions specific to those CP Nodes to convert the hourly wind speed to hourly generation. The summed monthly generation for each CP Node was compared to the volume of generation derived from the monthly allocation of the annual Park Potential. A constant wind speed adjustment was made to each hour so that the sum of the hourly generation based on the hourly wind speed data matched the monthly allocation of the annual Park Potential.

[27] The Company has turbine wind speed data for approximately 91% of Company-controlled wind generation capacity.

For wind generation at CP Nodes without wind speed data, the Company generated a single empirical power conversion derived from the simple average of all wind speed data for each hour in 2021 and the paired sum-of-generation from all CP Nodes without wind speed data. For each of these CP Nodes, the Company calculated the pro rata ratio of the CP Node annual Park Potential relative to the sum of annual Park Potentials for all CP Nodes without wind speed data. A constant wind speed adjustment was applied to the system average wind speed profile for each month so that the resulting generation profile matched the monthly allocation of the sum of annual Park Potentials for all CP Nodes without wind speed data. Each CP Node without wind speed data was assigned their pro-rata share of this hourly generation profile for each month.

For solar generation, the Company used hourly irradiance and generation data from 2020 for each solar plant and used empirical power conversions to convert the hourly irradiance to hourly generation. The summed monthly generation for each plant was compared to the volume of generation derived from the monthly allocation of the annual Park Potential. An irradiance adjustment was made to each hour in a given month so that the sum of the hourly generation based on the hourly irradiance data matched the monthly allocation of the annual Park Potential.

For plants without historic irradiance or generation data, the Company used 2020 hourly irradiance data for each plant location sourced from the National Solar Radiation DataBase (NSRDB) maintained by the National Renewable Energy Laboratory (NREL). The same process was used to derive the hourly generation profiles for these solar plants as for the existing solar plants in the Company's portfolio of renewable generation.

U. Generic Assumptions

Generic resources are modeled based upon their expected operating characteristics and projected costs. Generic thermal assumptions are based on the Company's internal estimates informed by external consultants and original equipment manufacturers. Generic renewable and battery costs, as well as battery operational characteristics such as cycle limit and Round-Trip Efficiency (RTE) are from National Renewable Energy Laboratory (NREL) 2023 Annual Technology Baseline (ATB) data. High and low technology cost sensitivities are created based on NREL ATB "Conversative" and "Advanced" forecasts. We also have a sensitivity where the wind,

solar and solar + battery hybrid LCOEs prior to 2030 are adjusted to match the 2023 Q1-Q3 actual PPA prices in MISO, reported in the Edison Energy Global Renewable Market Update quarterly reports. Utility-scale wind, solar, solar plus battery hybrid and battery costs, with and without interconnection costs for the base case and all sensitivities, are shown in Tables F-24 – F-38.

The costs used for wind, solar, and storage assets fully incorporate the Production Tax Credit (PTC) or Investment Tax Credit (ITC) in the Inflation Reduction Act (IRA). The costs of wind and solar resources selected to replace the interconnection capacity of Sherco and King are calculated without incremental transmission costs (as the gen-tie costs are already accounted for elsewhere in the model). In addition, we do not make cost adjustments to the Company's owned units selected to replace the retired coal capacities. The IRA allows the transferability of tax credits, allows utilities to elect out from normalization for storage facilities, and allows owners of solar facilities to claim a PTC in lieu of the ITC, which is subject to normalization. All of these combine to create a more level playing field for utilities to build/own solar and storage assets.

Below is a list of typical operating and cost inputs for each generic resource.

<u>Thermal</u>

a. Retirement Date
b. Maximum Capacity
c. Seasonal Accredited Capacity
d. Minimum Capacity Rating
e. Heat Rate Profiles
f. Variable O&M
g. Fixed O&M
h. Maintenance Schedule
i. Forced Outage Rate
j. Emission rates for SO_2, NO_x, CO_2, CO, CH_4, N_2O, Pb and particulate matter
k. Contribution to spinning reserve
l. Fuel prices
m. Fuel delivery charges

<u>Renewable</u>

a. Contract term

b. Name Plate Capacity
c. Seasonal Accredited Capacity
d. Annual Energy
e. Hourly Patterns
f. Capacity and Energy Payments
g. Whether curtailed energy is compensable or not

Table F-23: Thermal Generic Information (Costs in 2023 Dollars)

Thermal Generic Information			
Resource	**Generic CT**	**Generic CT**	**Reciprocating Engine**
Technology	7H DF	7F DF	Medium Speed reciprocating engine DF
Location Type	Greenfield	Greenfield	Greenfield
Cooling Type	Dry	Dry	Dry
On Site Fuel Storage Full Load Duration (hours)	48	48	50
Book life	40	40	40
Nameplate Capacity (MW)	374	225	108
Summer Peak Capacity (MW)	331	210	108
Minimum Emissions-Compliant Load Capacity (MW)	149	106	7.0
Capital Cost ($000) 2023$	$280,000	$215,000	$316,000
Capital Cost ($/kW) 2023$	$749	$954	$2,926
Ongoing Capital Expenditures ($000-yr) 2023$	$1,784	$1,320	$108
Ongoing Capital Expenditures ($/kW-yr) 2023$	$4.77	$5.86	$1.00
Fixed O&M Cost ($000/yr) 2023$	$1,524	$1,463	$1,277
Variable O&M Cost ($/MWh) 2023$	$1.20	$1.26	$6.30
Interruptible Gas Demand Cost ($/mmBTU) 2023$	$0.49	$0.49	$0.49
Startup Cost ($/start)	$5,809	$3,872	$0.00
Cold Startup Fuel Usage (mmBTU/start)	110	73	$0.00
Summer HHV Heat Rate 100% Loading (btu/kWh)	9,264	10,113	8,275
Summer HHV Heat Rate 75% Loading (btu/kWh) (70% loading for reciprocating engine)	9,738	10,567	8,739
Summer HHV Heat Rate 50% Loading (btu/kWh)	11,120	12,711	9,437
Summer HHV Heat Rate MECL Loading (btu/kWh)	11,558	12,592	9,979
Winter HHV Heat Rate 100% Loading (btu/kWh)	9,066	10,157	8,275
Winter HHV Heat Rate 75% Loading (btu/kWh) (70% loading for reciprocating engine)	9,647	10,952	8,739
Winter HHV Heat Rate 50% Loading (btu/kWh)	10,964	12,924	9,437
Winter HHV Heat Rate MECL Loading (btu/kWh)	11,443	12,837	9,979
Forced Outage Rate	3%	3%	3%
Maintenance (weeks/yr)	2	2	2
CO2 Emissions (lbs/MMBtu)	118	118	118
CO Emissions (lbs/MWh)	0.14	0.15	0.12
SO2 Emissions (lbs/MWh)	0.00	0.02	0.09
NOx Emissions (lbs/MWh)	0.90	0.32	0.08
PM10 Emissions (lbs/MWh)	0.03	0.03	0.10
PM2.5 Emissions (lbs/MWh)	0.03	0.03	0.10
Notes:			
1. Summer capacity and heat rate for generic 7H CT are based on an ambient temperature of 95 degrees F, 40% relative humidity.			
2. Winter capacity and heat rate for generic 7H CT are based on an ambient temperature of -6 degrees F, 60% relative humidity.			
3. Summery capacity and heat rate for generic 7F CT are based on an ambient temperature of 86.7 degrees F, 59.6% relative humidity.			
4. Winter capacity and heat rate for generic 7F CT are based on an ambient temperature of 18 degrees F, 74.2% relative humidity.			
5. Capacity and heat rate for generic reciprocating engine are based on an inlet air temperature of 86.7 degree F, 59.6% relative humidity.			

Table F-24: Renewable and Battery Generic Information

Renewable Generic Information				
Resource	**Wind**	**Utility Scale Solar**	**Utility Scale PV + Battery**	**Utility Scale Battery**
Representative Plan Size (MW)	200 MW	100 MWDC*	130 MWDC Solar + 60 MWAC Battery, 100 MWAC Inverter	60 MW
Capacity Factor	44.3%	23.0%	Subject to dispatch	Subject to dispatch
Book life (years)	30	30	30	15
PTC or ITC applied	PTC	PTC	ITC	ITC
Electric Transmission Delivery ($/kW)	250	250	250	250
Storage Characteristics	NA	NA	NA	1 cycle/day; 85% RTE

*Solar capacity assumes 0.5 percent annual degradation.

Table F-25: Storage Generic Information with Transmission Cost Adder

Lithium-Ion Battery, 60 MW 85% RTE *with* Transmission Cost				
	Capex with TRX ($nominal/kW)		Fixed Operation & Maintenance Cost (FOM) ($nominal/kW-yr)	
Year	4 hr duration	10 hr duration	4 hr duration	10 hr duration
2024	$2,004.38	$4,101.77	$43.48	$95.91
2025	$1,825.17	$3,688.93	$38.86	$85.46
2026	$1,810.38	$3,632.95	$38.36	$83.92
2027	$1,794.27	$3,573.10	$37.82	$82.29
2028	$1,776.78	$3,509.23	$37.24	$80.55
2029	$1,757.86	$3,441.16	$36.62	$78.71
2030	$1,737.48	$3,368.73	$35.97	$76.75
2031	$1,749.60	$3,383.17	$36.12	$76.96
2032	$1,761.50	$3,396.87	$36.27	$77.15
2033	$1,773.19	$3,409.80	$36.40	$77.32
2034	$1,784.63	$3,421.91	$36.53	$77.46
2035	$1,795.83	$3,433.19	$36.65	$77.58
2036	$1,806.76	$3,443.58	$36.76	$77.68
2037	$1,817.42	$3,453.06	$36.86	$77.75
2038	$1,827.77	$3,461.58	$36.94	$77.79
2039	$1,837.82	$3,469.10	$37.02	$77.80
2040	$1,847.53	$3,475.59	$37.08	$77.78
2041	$1,856.90	$3,481.00	$37.14	$77.74
2042	$1,865.91	$3,485.29	$37.17	$77.66
2043	$1,874.54	$3,488.42	$37.20	$77.55
2044	$1,882.77	$3,490.34	$37.21	$77.40
2045	$1,890.58	$3,491.00	$37.21	$77.22
2046	$1,897.95	$3,490.37	$37.19	$77.01
2047	$1,904.86	$3,488.39	$37.16	$76.75
2048	$1,911.28	$3,485.02	$37.11	$76.46
2049	$1,917.21	$3,480.20	$37.05	$76.12
2050	$1,922.61	$3,473.88	$36.97	$75.75
2051	$1,961.06	$3,543.36	$37.71	$77.26
2052	$2,000.29	$3,614.23	$38.46	$78.81
2053	$2,040.29	$3,686.51	$39.23	$80.38
2054	$2,081.10	$3,760.24	$40.01	$81.99
2055	$2,122.72	$3,835.45	$40.81	$83.63

Table F-26: Storage Generic Information without transmission cost adder

Lithium-Ion Battery, 60 MW 85% RTE *without* Transmission Cost				
	Capex ($nominal/kW)		Fixed Operation & Maintenance Cost (FOM) ($nominal/kW-yr)	
Year	4 hr duration	10 hr duration	4 hr duration	10 hr duration
2024	$1,739.08	$3,836.46	$43.48	$95.91
2025	$1,554.56	$3,418.32	$38.86	$85.46
2026	$1,534.36	$3,356.93	$38.36	$83.92
2027	$1,512.72	$3,291.56	$37.82	$82.29
2028	$1,489.60	$3,222.06	$37.24	$80.55
2029	$1,464.95	$3,148.25	$36.62	$78.71
2030	$1,438.71	$3,069.96	$35.97	$76.75
2031	$1,444.85	$3,078.42	$36.12	$76.96
2032	$1,450.66	$3,086.03	$36.27	$77.15
2033	$1,456.13	$3,092.74	$36.40	$77.32
2034	$1,461.23	$3,098.51	$36.53	$77.46
2035	$1,465.96	$3,103.32	$36.65	$77.58
2036	$1,470.30	$3,107.11	$36.76	$77.68
2037	$1,474.22	$3,109.86	$36.86	$77.75
2038	$1,477.71	$3,111.52	$36.94	$77.79
2039	$1,480.75	$3,112.04	$37.02	$77.80
2040	$1,483.33	$3,111.38	$37.08	$77.78
2041	$1,485.42	$3,109.51	$37.14	$77.74
2042	$1,487.00	$3,106.37	$37.17	$77.66
2043	$1,488.04	$3,101.92	$37.20	$77.55
2044	$1,488.54	$3,096.11	$37.21	$77.40
2045	$1,488.47	$3,088.89	$37.21	$77.22
2046	$1,487.79	$3,080.22	$37.19	$77.01
2047	$1,486.50	$3,070.04	$37.16	$76.75
2048	$1,484.56	$3,058.29	$37.11	$76.46
2049	$1,481.95	$3,044.94	$37.05	$76.12
2050	$1,478.65	$3,029.92	$36.97	$75.75
2051	$1,508.22	$3,090.52	$37.71	$77.26
2052	$1,538.39	$3,152.33	$38.46	$78.81
2053	$1,569.16	$3,215.38	$39.23	$80.38
2054	$1,600.54	$3,279.68	$40.01	$81.99
2055	$1,632.55	$3,345.28	$40.81	$83.63

Table F-27: High Storage Generic Information with Transmission Cost Adder

Lithium-Ion Battery, 60 MW 85% RTE *with* Transmission Cost - high sensitivity		
Capex with TRX ($nominal/kW)		Fixed Operation & Maintenance Cost (FOM) ($nominal/kW-yr)
Year	4 hr duration	4 hr duration
2024	$2,242.64	$49.43
2025	$2,258.87	$49.71
2026	$2,228.10	$48.80
2027	$2,195.20	$47.84
2028	$2,160.08	$46.82
2029	$2,122.69	$45.74
2030	$2,082.94	$44.60
2031	$2,112.14	$45.18
2032	$2,141.67	$45.77
2033	$2,171.54	$46.36
2034	$2,201.75	$46.96
2035	$2,232.30	$47.56
2036	$2,263.19	$48.17
2037	$2,294.42	$48.78
2038	$2,325.99	$49.40
2039	$2,357.92	$50.02
2040	$2,390.18	$50.65
2041	$2,422.80	$51.28
2042	$2,455.76	$51.92
2043	$2,489.07	$52.56
2044	$2,522.74	$53.21
2045	$2,556.75	$53.87
2046	$2,591.12	$54.52
2047	$2,625.83	$55.19
2048	$2,660.90	$55.85
2049	$2,696.32	$56.53
2050	$2,732.10	$57.20
2051	$2,786.74	$58.35
2052	$2,842.48	$59.51
2053	$2,899.33	$60.70
2054	$2,957.31	$61.92
2055	$3,016.46	$63.16

Table F-28: High Storage Generic Information without Transmission Cost Adder

Lithium-Ion Battery, 60 MW 85% RTE *without* Transmission Cost - high sensitivity		
Capex with TRX ($nominal/kW)		Fixed Operation & Maintenance Cost (FOM) ($nominal/kW-yr)
Year	4 hr duration	4 hr duration
2024	$1,977.34	$49.43
2025	$1,988.27	$49.71
2026	$1,952.08	$48.80
2027	$1,913.66	$47.84
2028	$1,872.91	$46.82
2029	$1,829.78	$45.74
2030	$1,784.17	$44.60
2031	$1,807.39	$45.18
2032	$1,830.83	$45.77
2033	$1,854.48	$46.36
2034	$1,878.35	$46.96
2035	$1,902.43	$47.56
2036	$1,926.72	$48.17
2037	$1,951.22	$48.78
2038	$1,975.93	$49.40
2039	$2,000.85	$50.02
2040	$2,025.98	$50.65
2041	$2,051.31	$51.28
2042	$2,076.84	$51.92
2043	$2,102.58	$52.56
2044	$2,128.51	$53.21
2045	$2,154.64	$53.87
2046	$2,180.96	$54.52
2047	$2,207.48	$55.19
2048	$2,234.18	$55.85
2049	$2,261.07	$56.53
2050	$2,288.14	$57.20
2051	$2,333.90	$58.35
2052	$2,380.58	$59.51
2053	$2,428.19	$60.70
2054	$2,476.75	$61.92
2055	$2,526.29	$63.16

Table F-29: Low Storage Generic Information with Transmission Cost Adder

Lithium-Ion Battery, 60 MW 85% RTE *with* Transmission Cost - low sensitivity		
Capex with TRX ($nominal/kW)		Fixed Operation & Maintenance Cost (FOM) ($nominal/kW-yr)
Year	4 hr duration	4 hr duration
2024	$1,550.82	$32.14
2025	$1,515.12	$31.11
2026	$1,491.54	$30.39
2027	$1,466.41	$29.62
2028	$1,439.68	$28.81
2029	$1,411.30	$27.96
2030	$1,381.22	$27.06
2031	$1,389.48	$27.12
2032	$1,397.53	$27.17
2033	$1,405.32	$27.21
2034	$1,412.88	$27.24
2035	$1,420.21	$27.26
2036	$1,427.22	$27.27
2037	$1,433.96	$27.27
2038	$1,440.40	$27.26
2039	$1,446.53	$27.24
2040	$1,452.30	$27.20
2041	$1,457.75	$27.16
2042	$1,462.86	$27.10
2043	$1,467.57	$27.03
2044	$1,471.85	$26.94
2045	$1,475.75	$26.84
2046	$1,479.21	$26.73
2047	$1,482.22	$26.60
2048	$1,484.73	$26.45
2049	$1,486.77	$26.29
2050	$1,488.34	$26.11
2051	$1,518.11	$26.63
2052	$1,548.47	$27.16
2053	$1,579.44	$27.71
2054	$1,611.03	$28.26
2055	$1,643.25	$28.83

Table F-30: Low Storage Generic Information without Transmission Cost Adder

Lithium-Ion Battery, 60 MW 85% RTE *without* Transmission Cost - low sensitivity		
Capex with TRX ($nominal/kW)		Fixed Operation & Maintenance Cost (FOM) ($nominal/kW-yr)
Year	4 hr duration	4 hr duration
2024	$1,285.51	$32.14
2025	$1,244.51	$31.11
2026	$1,215.52	$30.39
2027	$1,184.87	$29.62
2028	$1,152.51	$28.81
2029	$1,118.38	$27.96
2030	$1,082.45	$27.06
2031	$1,084.74	$27.12
2032	$1,086.68	$27.17
2033	$1,088.26	$27.21
2034	$1,089.48	$27.24
2035	$1,090.34	$27.26
2036	$1,090.75	$27.27
2037	$1,090.76	$27.27
2038	$1,090.34	$27.26
2039	$1,089.47	$27.24
2040	$1,088.10	$27.20
2041	$1,086.26	$27.16
2042	$1,083.95	$27.10
2043	$1,081.07	$27.03
2044	$1,077.63	$26.94
2045	$1,073.64	$26.84
2046	$1,069.06	$26.73
2047	$1,063.86	$26.60
2048	$1,058.01	$26.45
2049	$1,051.52	$26.29
2050	$1,044.38	$26.11
2051	$1,065.27	$26.63
2052	$1,086.57	$27.16
2053	$1,108.30	$27.71
2054	$1,130.47	$28.26
2055	$1,153.08	$28.83

Table F-31: Base Renewable Levelized Costs by In-Service Year with transmission cost

Levelized Costs by In-Service Year (30 year life) with Transmission Cost			
Year	Wind	Utility Scale Solar	Battery + Solar Hybrid
2024	$21.19	$47.81	$92.69
2025	$21.09	$47.12	$90.02
2026	$20.98	$46.38	$89.54
2027	$20.86	$45.59	$89.01
2028	$20.72	$44.75	$88.42
2029	$20.56	$43.86	$87.77
2030	$20.39	$42.91	$87.06
2031	$20.50	$41.90	$86.75
2032	$20.60	$40.84	$86.39
2033	$20.70	$39.71	$85.98
2034	$20.80	$38.51	$85.53
2035	$20.89	$37.25	$85.02
2036	$20.97	$37.36	$85.90
2037	$21.05	$37.46	$86.79
2038	$21.12	$37.54	$87.67
2039	$21.19	$37.61	$88.56
2040	$21.25	$37.68	$89.45
2041	$21.30	$37.72	$90.33
2042	$21.35	$37.75	$91.22
2043	$21.39	$37.77	$92.11
2044	$27.41	$43.18	$98.53
2045	$33.29	$48.53	$104.67
2046	$43.64	$58.24	$115.14
2047	$44.12	$58.63	$116.09
2048	$44.60	$59.01	$117.04
2049	$45.08	$59.39	$117.97
2050	$45.57	$59.75	$118.90
2051	$46.48	$60.77	$121.28
2052	$47.41	$61.79	$123.70
2053	$48.36	$62.81	$126.18
2054	$49.32	$63.83	$128.70
2055	$50.31	$64.85	$131.28

Table F-32: Base Renewable Levelized Costs by In-Service Year without Transmission Cost Adder

Levelized Costs by In-Service Year (30 year life) without Transmission Cost			
Year	**Wind**	**Utility Scale Solar**	**Battery + Solar Hybrid**
2024	$15.53	$38.56	$82.45
2025	$15.29	$37.65	$88.34
2026	$15.04	$36.69	$88.90
2027	$14.77	$35.67	$91.50
2028	$14.48	$34.59	$88.54
2029	$14.17	$33.45	$87.89
2030	$13.84	$32.25	$87.18
2031	$13.80	$30.98	$86.41
2032	$13.76	$29.64	$85.57
2033	$13.71	$28.22	$84.67
2034	$13.65	$26.73	$84.18
2035	$13.58	$25.16	$83.64
2036	$13.50	$25.00	$83.05
2037	$13.42	$24.83	$82.40
2038	$13.32	$24.63	$81.69
2039	$13.22	$24.42	$82.46
2040	$13.10	$24.18	$83.23
2041	$12.98	$23.93	$83.99
2042	$12.84	$23.65	$84.75
2043	$12.69	$23.35	$85.51
2044	$19.01	$29.03	$86.26
2045	$25.20	$34.68	$87.01
2046	$36.44	$45.40	$87.75
2047	$36.78	$45.53	$93.33
2048	$37.11	$45.65	$98.62
2049	$37.44	$45.76	$107.62
2050	$37.78	$45.85	$108.34
2051	$38.53	$46.87	$110.50
2052	$39.30	$47.89	$112.71
2053	$40.09	$48.91	$114.97
2054	$40.89	$49.93	$117.27
2055	$41.71	$50.95	$119.61

Table F-33: Low Renewable Levelized Costs by In-Service Year with Transmission Cost Adder

Levelized Costs by In-Service Year (30 year life) with Transmission Cost		
Year	**Wind**	**Utility Scale Solar**
2024	$18.54	$44.27
2025	$17.62	$42.51
2026	$16.68	$40.69
2027	$15.73	$38.81
2028	$14.76	$36.88
2029	$13.78	$34.88
2030	$12.79	$32.81
2031	$12.67	$30.67
2032	$12.54	$28.47
2033	$12.40	$26.18
2034	$12.25	$23.82
2035	$12.09	$21.38
2036	$11.92	$21.42
2037	$11.73	$21.45
2038	$11.54	$21.48
2039	$11.33	$21.50
2040	$11.10	$21.51
2041	$10.87	$21.52
2042	$10.62	$21.52
2043	$10.36	$21.51
2044	$16.49	$27.45
2045	$22.49	$33.35
2046	$33.47	$44.22
2047	$33.67	$44.64
2048	$33.86	$45.06
2049	$34.05	$45.48
2050	$34.23	$45.90
2051	$34.92	$46.92
2052	$35.62	$47.94
2053	$36.33	$48.96
2054	$37.06	$49.98
2055	$37.80	$51.00

Table F-34: Low Renewable Levelized Costs by In-Service Year without Transmission Cost Adder

Levelized Costs by In-Service Year (30 year life) without Transmission Cost		
Year	Wind	Utility Scale Solar
2024	$13.15	$35.34
2025	$12.18	$33.43
2026	$11.19	$31.46
2027	$10.19	$29.43
2028	$9.17	$27.33
2029	$8.13	$25.16
2030	$7.08	$22.92
2031	$6.84	$20.60
2032	$6.58	$18.21
2033	$6.32	$15.74
2034	$6.04	$13.17
2035	$5.74	$10.52
2036	$5.43	$10.33
2037	$5.11	$10.14
2038	$4.77	$9.93
2039	$4.42	$9.71
2040	$4.05	$9.48
2041	$3.66	$9.23
2042	$3.26	$8.98
2043	$2.83	$8.70
2044	$9.23	$14.90
2045	$15.51	$21.07
2046	$27.26	$32.85
2047	$27.34	$33.06
2048	$27.41	$33.27
2049	$27.48	$33.47
2050	$27.53	$33.67
2051	$28.08	$34.69
2052	$28.65	$35.71
2053	$29.22	$36.73
2054	$29.80	$37.75
2055	$30.40	$38.77

Table F-35: High Renewable Levelized Costs by In-Service Year with Transmission Cost Adder

Levelized Costs by In-Service Year (30 year life) with Transmission Cost		
Year	**Wind**	**Utility Scale Solar**
2024	$22.22	$49.56
2025	$22.50	$49.81
2026	$22.79	$50.05
2027	$23.07	$50.29
2028	$23.37	$50.52
2029	$23.66	$50.74
2030	$23.96	$50.96
2031	$24.24	$51.18
2032	$24.52	$51.39
2033	$24.81	$51.60
2034	$25.09	$51.81
2035	$25.37	$52.02
2036	$25.66	$52.17
2037	$25.95	$52.30
2038	$26.24	$52.43
2039	$26.53	$52.53
2040	$26.82	$52.61
2041	$27.11	$52.68
2042	$27.41	$52.73
2043	$27.70	$52.75
2044	$33.68	$57.64
2045	$39.51	$62.46
2046	$49.44	$71.05
2047	$50.15	$71.39
2048	$50.86	$71.72
2049	$51.58	$72.04
2050	$52.32	$72.34
2051	$53.36	$73.36
2052	$54.43	$74.38
2053	$55.52	$75.40
2054	$56.63	$76.42
2055	$57.76	$77.44

Table F-36: High Renewable Levelized Costs by In-Service Year without transmission cost adder

Levelized Costs by In-Service Year (30 year life) without Transmission Cost		
Year	**Wind**	**Utility Scale Solar**
2024	$16.26	$39.47
2025	$16.35	$39.49
2026	$16.43	$39.50
2027	$16.52	$39.50
2028	$16.60	$39.49
2029	$16.68	$39.46
2030	$16.76	$39.42
2031	$16.83	$39.36
2032	$16.91	$39.30
2033	$16.98	$39.22
2034	$17.04	$39.12
2035	$17.11	$39.01
2036	$17.17	$38.60
2037	$17.22	$38.16
2038	$17.27	$37.70
2039	$17.32	$37.21
2040	$17.36	$36.70
2041	$17.40	$36.17
2042	$17.43	$35.61
2043	$17.46	$35.02
2044	$23.72	$39.99
2045	$29.86	$44.95
2046	$40.76	$54.56
2047	$41.26	$54.40
2048	$41.75	$54.22
2049	$42.26	$54.03
2050	$42.76	$53.81
2051	$43.62	$54.83
2052	$44.49	$55.85
2053	$45.38	$56.87
2054	$46.29	$57.89
2055	$47.21	$58.91

Table F-37: Wind, Solar, Battery + Solar Hybrid Market Forecast-Adjusted LCOE with Transmission Cost

Edison Energy Market Forecast Adjusted LCOE			
Levelized Costs by In-Service Year (30 year life) with Transmission Cost			
Year	Wind	Solar	Battery + Solar Hybrid
2026	41.52	54.67	105.55
2027	36.24	51.73	101.00
2028	30.96	48.79	96.40
2029	25.68	45.85	91.76
2030	20.39	42.91	87.06

Table F-38: Wind, Solar, Battery + Solar Hybrid Market Forecast-Adjusted LCOE without Transmission Cost

Edison Energy Market Forecast Adjusted LCOE			
Levelized Costs by In-Service Year (30 year life) without Transmission Cost			
Year	Wind	Solar	Battery + Solar Hybrid
2028	21.64	37.71	88.77
2029	17.69	34.97	84.30
2030	13.84	32.25	79.78

V. Advanced Technology

The Company modeled three advanced technologies in this Resource Plan as discussed be below: small modular reactors, long-duration batteries, and hydrogen.

1. Small Modular Reactors

The small modular reactor (SMR) cost forecast uses the NREL 2023 ATB conservative projection and SMR operation parameter assumptions.

Table F-39: SMR Modeling Assumptions

SMR	
Representative Plan Size (MW)	600
Capacity Factor	92.7%
Book life (years)	60
PTC or ITC applied	ITC
Electric Transmission Delivery ($/kW)	250
Forced outage rate	7.3%

Table F-40: SMR LCOE with Transmission Cost

Levelized Costs by In-Service Year (30 year life) with Transmission Cost	
Year	**SMR**
2035	$105.26
2036	$107.36
2037	$109.51
2038	$111.70
2039	$113.93
2040	$116.21
2041	$118.53
2042	$120.90
2043	$123.32
2044	$133.16
2045	$142.50
2046	$157.12
2047	$160.26
2048	$163.46
2049	$166.73
2050	$170.06
2051	$173.46
2052	$176.93
2053	$180.47
2054	$184.08
2055	$187.76

2. Long Duration Batteries

Long duration batteries are modeled as those capable of discharging for 100 contiguous hours. Cost projections for long duration batteries are based on the 2030 cost projection detailed in the "Form Energy White Paper" in Great River Energy's 2023 - 2037 INTEGRATED RESOURCE PLAN, in Minnesota Public Utilities Commission Docket No. ET-2/RP-22-75 (March 31st, 2023) and assume a one percent cost decline trend. Operational parameters of the long duration batteries were developed based on information provided by Form Energy.

Table F-41: Long Duration Energy Storage Modeling Assumptions

Long Duration Energy Storage	
Representative Plan Size (MW)	100 MW
Battery Duration	100 hours
Capacity Factor	Subject to dispatch
Book life (years)	15
PTC or ITC applied	ITC
Electric Transmission Delivery ($/kW)	250

Table F-42: Long Duration 100 Hour Energy Storage Capital and Fixed O&M Cost Assumptions

Long Duration 100 hr Energy Storage		
Year	Capex with TRX ($nominal/kW)	Fixed Operation & Maintenance Cost (FOM) ($nominal/kW-yr)
2030	$2,698.77	$19.00
2031	$2,728.27	$19.38
2032	$2,758.11	$19.77
2033	$2,788.31	$20.16
2034	$2,818.87	$20.57
2035	$2,849.80	$20.98
2036	$2,881.09	$21.40
2037	$2,912.76	$21.83
2038	$2,944.80	$22.26
2039	$2,977.23	$22.71
2040	$3,010.05	$23.16
2041	$3,043.26	$23.62
2042	$3,076.88	$24.10
2043	$3,110.90	$24.58
2044	$3,145.32	$25.07
2045	$3,180.17	$25.57
2046	$3,215.44	$26.08
2047	$3,251.13	$26.60
2048	$3,287.26	$27.14
2049	$3,323.83	$27.68
2050	$3,360.84	$28.23
2051	$3,398.31	$28.80
2052	$3,436.23	$29.37
2053	$3,474.61	$29.96
2054	$3,513.47	$30.56
2055	$3,552.81	$31.17

3. Hydrogen

Modeling assumptions for hydrogen production come from the S&P Global green hydrogen production cost forecast released in June 2023. We apply the IRA PTC

($3/kg) to hydrogen production costs, with the phase-out period starting in 2032 and ending in 2036. The EPRI US-REGEN model assumption is used for estimating the hydrogen delivery cost. An estimate of the additional capital investment needed, and timeline required to enable hydrogen blending capabilities for generic CTs was provided by GE.

Table F-43: Hydrogen Production Cost Assumption

Year	H2 Production Cost ($/mmBTU)	H2 Delivery Cost ($/mmBTU)	H2 PTC ($/mmBTU)	Overall H2 Fuel Cost ($/mmBTU)
2024	$ 38.72	$ 6.12	$ 22.67	$ 22.17
2025	$ 37.07	$ 6.24	$ 23.12	$ 20.19
2026	$ 34.50	$ 6.37	$ 23.58	$ 17.28
2027	$ 32.57	$ 6.49	$ 24.05	$ 15.01
2028	$ 31.73	$ 6.62	$ 24.54	$ 13.82
2029	$ 30.98	$ 6.76	$ 25.03	$ 12.71
2030	$ 30.23	$ 6.89	$ 25.53	$ 11.60
2031	$ 29.56	$ 7.03	$ 26.04	$ 10.55
2032	$ 28.96	$ 7.17	$ 26.56	$ 9.57
2033	$ 28.41	$ 7.31	$ 27.09	$ 8.63
2034	$ 27.93	$ 7.46	$ 27.63	$ 7.76
2035	$ 27.49	$ 7.61	$ 28.18	$ 6.92
2036	$ 27.08	$ 7.76	$ 28.75	$ 6.10
2037	$ 26.66	$ 7.92	$ 29.32	$ 5.25
2038	$ 25.25	$ 8.08	$ 29.91	$ 3.42
2039	$ 24.98	$ 8.24	$ 30.51	$ 2.71
2040	$ 24.74	$ 8.40	$ 31.12	$ 2.02
2041	$ 24.61	$ 8.57	$ 31.74	$ 1.44
2042	$ 24.50	$ 8.74	$ 32.37	$ 0.87
2043	$ 24.47	$ 8.92	$ 33.02	$ 0.37
2044	$ 24.47	$ 9.09	$ 33.68	$ (0.12)
2045	$ 24.50	$ 9.28	$ 34.36	$ (0.58)
2046	$ 24.54	$ 9.46	$ -	$ 34.00
2047	$ 24.63	$ 9.65	$ -	$ 34.28
2048	$ 24.74	$ 9.84	$ -	$ 34.59
2049	$ 24.86	$ 10.04	$ -	$ 34.90
2050	$ 25.04	$ 10.24	$ -	$ 35.28
2051	$ 25.54	$ 10.45	$ -	$ 35.99
2052	$ 26.05	$ 10.66	$ -	$ 36.71
2053	$ 26.58	$ 10.87	$ -	$ 37.44
2054	$ 27.11	$ 11.09	$ -	$ 38.19
2055	$ 27.65	$ 11.31	$ -	$ 38.96

W. Market Purchases and Sales Import/Export Limits and Carbon Rate

In order to account for emissions rates associated with market purchases, the Company assumes an annual average carbon emissions pounds/MWh rate, as shown in the table below. These estimates were developed based on MISO's MTEP21 Future 2 modeling results. Market sales emissions rates reflect an average emissions rate for our system resources and vary according to each individual scenario and sensitivity capacity expansion portfolio.

Table F-44: Market Purchase Carbon Rate

Market Purchase CO2 Rate																
	2024	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**
lbs/MWh	1119	1029	938	848	758	668	578	560	542	524	506	489	481	463	446	428
	2040	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**2053**	**2054**	**2055**
lbs/MWh	452	424	414	403	393	383	373	362	352	342	331	321	311	301	290	280

ATTACHMENT A: HEAT RATE UPDATED

In Docket No. E999/CI-06-159 (In the Matter of Commission Investigation and Determination under the Electricity Title, Section XII, of the Federal Energy Policy Act of 2005), the Minnesota Commission required the Company to file information on the fossil fuel efficiency (heat rate) of our generation units, and actions we are taking to increase the fuel efficiency of those units.

Heat rate data for the Company's owned generating units is provided publicly in our annual Federal Energy Regulatory Commission (FERC) Financial Report, FERC Form No. 1. We include a copy of the pertinent unit heat rate data from FERC Form No. 1 for 2022 in Table F-45 below.

Table F-45: 2022 FERC Heat Rates

Unit	Heat Rate
A.S. King	15,223
Sherco	10,235
Monticello	10,244
Prairie Island	10,675
Black Dog (NG)	11,436
High Bridge	7,940
Riverside	7,116
French Island	24,327
Wilmarth	22,659

The Company's Performance Optimization department performs online heat rate and performance analysis. In addition, testing, assessments, and reporting on boilers, air heaters, cooling towers, and enthalpy drop tests on steam turbines are also conducted as needed. These tools factor into our assessment of the condition of these individual components, as well as how their respective performance levels will impact the overall efficiency of a given generating unit. Table F-46 below shows a summary of NSP System heat rate testing from 2016-2023.

Table F-46: Heat Rate Tests – 2016-2023

Plant/Unit	Type of Unit Test	Type of Test	Year Tested
Sherco U1	Coal Boiler	Performance	2019
King U1	Coal Boiler	Performance	2019
Sherco U2	Coal Boiler	Performance	2016
Black Dog U5/U2	Combined Cycle	Performance	2021
High Bridge CC	Combined Cycle	Heat Rate	2018
Sherco U3	Coal Boiler	Heat Rate	2017
Black Dog U6	Combustion Turbine	Heat Rate	2018
Riverside U7,U9,U10	Combined Cycle	Heat Rate	2018

As part of its heat rate testing and reporting protocol, the Performance Optimization group identifies potential heat rate improvement opportunities and validates actual performance enhancements. The Company does not look at heat rate improvements in isolation when considering plant improvement projects; rather, we perform a

collective assessment of potential safety, efficiency, and environmental performance improvements as well as overall economics in developing our generation asset management objectives. Looking forward, the Company plans to continue our proactive cycle of performance monitoring and testing, heat rate curve updates, and overall unit assessments at our generation units and implement improvements as opportunities arise.

ATTACHMENT B: WATER AND PLANT OPERATIONS

The Minnesota Commission's August 5, 2013 Notice of Information in Future Resource Plan Filings in Docket No. E002/RP-10-825 suggested utilities should consider adding to their initial resource plan filings the supplemental information listed at page 4 of the Commission's May 10, 2013 Order in Minnesota Power Docket No. E015/RP-13-53 (Order Point No. 4).

The Company's generating units are geographically positioned along major Minnesota waterways. The access to water accommodates the thermal needs of these generating units. As such, the Company's plant operations are governed by and comply with all applicable cooling water intake and discharge rules and regulations, which may indirectly affect EnCompass modeling as discussed below.

The Clean Water Act Section 316(a) sets thermal limitations for discharges and the criteria and processes for allowing thermal variances. The Company's power plant discharge temperature limits and allowances for thermal emergency provisions are outlined in the plants' National Pollutant Discharge Elimination System (NPDES) permits. Additionally, Xcel Energy has policies which outline the conditions and procedures to implement during periods of energy emergencies that provide a temporary pathway for enforcement discretion for thermal discharge compliance if Xcel Energy has taken the prescribed actions and coordinates with the Minnesota Pollution Control Agency before, during, and post an actual energy emergency. Xcel Energy is not granted authority to exceed our thermal discharge limits by our permit conditions at any time by our NPDES permit conditions.

Section 316(b) of the Clean Water Act governs the design and operation of intake structures in order to minimize adverse environmental impacts to aquatic life. EPA issued new rules in August 2014 that impacts all plants that withdraw water for cooling purposes. The rules require improvements to intake screening technology to minimize the number of aquatic organisms that are killed due to being stuck to the

screens (referred to as "impingement). The rules also created a process for the state permitting agency to evaluate and determine if additional improvements are required to minimize the number of smaller organisms that pass through the intake screens and enter the plant cooling water system (referred to as "entrainment"). While the costs associated with the impingement compliance requirements are definable, the costs associated with the entrainment compliance requirements are uncertain and are determined by the permitting agency just prior to any planned capital improvements to each plant.

Timing of the compliance requirements is site-specific and is determined by each site's NPDES permit renewal timeline.

While specific conditions, such as the effects of drought, are not directly modeled in EnCompass, the model reflects the impact of reducing plant output to comply with each site's NPDES permit thermal discharge limits. Modeling in EnCompass includes two methods to account for impacts due to changes in plant operations: each resource is modeled using a unit specific median accredited capacity rating, and the system needs are modeled with a planning reserve margin. By modeling the system needs with a planning reserve margin, the base level of required resources is assumed to be higher than those needed to meet the forecasted peak system demand. By modeling all units with an assumed level of forced outage, the base level of all available resources, modeled in aggregate, is assumed to be sufficient to represent resource availability due to emergency changes in plant operations. Thus, the impact of reducing plant output due to drought conditions and/or plant thermal discharge limitations is reflected through corrections to both obligation and resource adjustments.

ATTACHMENT C: ICAP LOAD AND RESOURCES TABLE

The following tables shows load and resources using Installed Capacity Rating (ICAP) for the planning period for each season, in compliance with the Minnesota Commission's August 5, 2013 Notice of Information in Future Resource Plan Filings.[28]

Table F-47: Load and Resources Tables, 2024-2040 Planning Period, Summer Season

ICAP Rating - Load and Resources 2024-2040 Planning Period Determination of Need	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Forecasted Net Load	9,408	9,526	9,946	10,311	10,511	10,643	10,835	11,040	11,331	11,573	11,902	12,212	12,496	12,686	12,890	13,088	13,202
MISO System Coincidence	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Coincident Load	9,408	9,526	9,946	10,311	10,511	10,643	10,835	11,040	11,331	11,573	11,902	12,212	12,496	12,686	12,890	13,088	13,202
MISO Planning Reserve Margin (ICAP)	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%
Obligation (Summer)	**11,073**	**11,212**	**11,706**	**12,136**	**12,371**	**12,527**	**12,753**	**12,994**	**13,337**	**13,621**	**14,009**	**14,373**	**14,708**	**14,932**	**15,171**	**15,405**	**15,539**
Existing & Approved Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response, Existing	1,020	1,034	1,048	1,057	1,062	1,066	1,067	1,069	1,070	1,071	1,073	1,020	1,020	1,020	1,020	1,020	1,020
Coal	1,697	1,697	1,697	1,019	1,019	517	517	0	0	0	0	0	0	0	0	0	0
Nuclear	1,657	1,657	1,657	1,657	1,657	1,657	1,657	1,657	1,657	1,657	1,136	617	617	617	617	617	617
Natural Gas/Oil	3,975	3,670	3,925	3,925	3,396	3,094	2,842	2,724	2,442	2,442	2,442	2,442	2,442	2,442	2,442	2,133	2,133
Storage	0	0	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0
Biomass/RDF	128	70	70	70	70	70	70	70	70	70	70	44	44	44	12	12	12
Hydro	803	303	301	301	301	301	301	301	184	180	151	134	124	120	120	120	120
Wind	4,520	4,310	4,321	4,310	4,261	4,094	4,067	3,984	3,960	3,338	3,313	3,313	3,033	2,933	3,013	3,013	2,908
Solar (Utility-Scale System Resources)	1,351	2,138	3,487	3,671	3,814	3,956	4,096	4,236	4,336	4,432	4,529	4,627	4,631	4,729	4,826	4,923	5,019
Solar (Legacy CSGs)	881	877	872	868	864	859	855	851	846	842	838	834	830	825	821	817	813
Solar (Net Metered as of 2024)	153	151	150	149	148	148	147	146	145	145	144	143	142	142	141	140	140
Existing Resources	**16,185**	**15,906**	**17,539**	**17,037**	**16,602**	**15,772**	**15,629**	**15,047**	**14,721**	**14,187**	**13,706**	**13,185**	**12,884**	**12,873**	**13,013**	**12,796**	**12,782**
Summer Existing & Approved Net Resource (Need)/Surplus	**5,112**	**4,694**	**5,833**	**4,901**	**4,231**	**3,245**	**2,876**	**2,053**	**1,384**	**566**	**(303)**	**(1,188)**	**(1,823)**	**(2,059)**	**(2,158)**	**(2,609)**	**(2,757)**
Incremental Distributed Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response (Incremental)	231	234	236	238	239	239	238	238	237	236	236	235	235	234	234	233	233
Energy Efficiency (EE) Bundles	114	215	321	426	528	628	712	801	883	963	1,047	1,125	1,094	1,077	1,060	1,023	988
Solar (Non-Legacy CSGs)	18	100	199	298	377	455	533	610	667	724	780	836	892	948	1,003	1,058	1,113
Solar (Net Metered Installed after 2024)	0	37	76	109	149	210	254	288	326	375	477	520	567	580	609	667	787
Solar (3% Distributed Solar Energy Standard)	0	0	0	62	250	373	497	494	506	517	529	540	551	562	574	585	596
Incremental Distributed Resources Brought Forth in This Plan	**363**	**586**	**832**	**1,133**	**1,542**	**1,905**	**2,234**	**2,430**	**2,619**	**2,815**	**3,068**	**3,256**	**3,339**	**3,402**	**3,479**	**3,566**	**3,717**
Summer Net Resource (Need)/Surplus Even After Additional Distributed Resources	**5,475**	**5,279**	**6,665**	**6,034**	**5,772**	**5,150**	**5,110**	**4,483**	**4,003**	**3,382**	**2,765**	**2,068**	**1,516**	**1,343**	**1,321**	**957**	**960**
Reference Plan Resource Additions / Retirements	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Solar (Utility-Scale System Resources)	0	0	0	0	0	100	500	700	700	1,600	1,600	2,400	2,400	2,400	2,400	2,400	2,400
Storage	0	0	0	480	480	600	600	780	960	960	960	960	1,440	1,920	2,220	2,220	2,220
Firm Dispatchable	0	0	0	748	1,496	1,496	2,244	2,244	2,618	2,992	2,992	3,740	3,740	3,740	3,740	4,488	4,488
Wind	0	0	0	400	2,200	2,600	2,600	3,800	4,600	5,000	6,600	7,600	8,200	8,600	9,000	9,600	11,000
Reference Plan Resource Adjustments	**0**	**0**	**0**	**1,628**	**4,176**	**4,796**	**5,944**	**7,524**	**8,878**	**10,552**	**12,152**	**14,700**	**15,780**	**16,660**	**17,360**	**18,708**	**20,108**
Reference Plan Net Resource (Need)/Surplus	**5,475**	**5,279**	**6,665**	**7,662**	**9,949**	**9,946**	**11,054**	**12,007**	**12,881**	**13,934**	**14,918**	**16,768**	**17,296**	**18,003**	**18,681**	**19,665**	**21,068**

[28] *See* Docket No. E002/RP-10-825. In addition to noting amendments to Minn. Stat. § 216B.2422, subd. 4, the Notice suggested utilities should consider adding to their initial resource plan filings the supplemental information listed at page 4 of the Commission's May 10, 2013 Order in Minnesota Power Docket No. E015/RP-13-53 (Order Point No. 2).

Table F-48: Load and Resources Tables, 2024-2040 Planning Period, Fall Season

ICAP Rating - Load and Resources 2024-2040 Planning Period Determination of Need	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Forecasted Net Load	7,528	7,633	7,987	8,299	8,423	8,540	8,689	8,850	9,060	9,285	9,564	9,836	10,034	10,218	10,373	10,517	10,616
MISO System Coincidence	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Coincident Load	7,528	7,633	7,987	8,299	8,423	8,540	8,689	8,850	9,060	9,285	9,564	9,836	10,034	10,218	10,373	10,517	10,616
MISO Planning Reserve Margin (ICAP)	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Obligation (Fall)	**9,425**	**9,556**	**9,999**	**10,390**	**10,545**	**10,692**	**10,879**	**11,080**	**11,343**	**11,625**	**11,974**	**12,315**	**12,562**	**12,793**	**12,987**	**13,168**	**13,291**
Existing & Approved Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response, Existing	734	747	759	767	772	776	779	781	784	787	790	1,020	1,020	1,020	1,020	1,020	1,020
Coal	1,705	1,705	1,705	1,027	1,027	517	517	0	0	0	0	0	0	0	0	0	0
Nuclear	1,698	1,698	1,698	1,698	1,698	1,698	1,698	1,698	1,698	1,698	1,165	632	632	632	632	632	632
Natural Gas/Oil	4,363	4,268	4,268	4,268	3,383	3,383	3,053	2,913	2,624	2,624	2,624	2,624	2,624	2,624	2,624	2,289	2,289
Storage	0	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0
Biomass/RDF	128	70	70	70	70	70	70	70	70	70	70	44	44	44	12	12	12
Hydro	803	301	301	301	301	301	301	301	184	180	151	134	124	120	120	120	120
Wind	4,520	4,310	4,321	4,310	4,257	4,094	4,067	3,974	3,755	3,338	3,313	3,112	3,033	2,933	3,013	3,013	2,908
Solar (Utility-Scale System Resources)	1,351	2,138	3,487	3,671	3,814	3,956	4,095	4,236	4,336	4,432	4,529	4,627	4,631	4,729	4,826	4,923	5,019
Solar (Legacy CSGs)	881	877	872	868	864	859	855	851	846	842	838	834	830	825	821	817	813
Solar (Net Metered as of 2024)	154	151	150	149	148	148	147	146	145	145	144	143	142	142	141	140	140
Existing Resources	**16,336**	**16,274**	**17,642**	**17,138**	**16,343**	**15,812**	**15,591**	**14,980**	**14,452**	**14,126**	**13,634**	**13,171**	**13,081**	**13,070**	**13,210**	**12,967**	**12,953**
Fall Existing & Approved Net Resource (Need)/Surplus	**6,911**	**6,718**	**7,642**	**6,748**	**5,798**	**5,119**	**4,712**	**3,900**	**3,110**	**2,501**	**1,660**	**856**	**519**	**277**	**223**	**(201)**	**(338)**
Incremental Distributed Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response (Incremental)	143	146	148	149	150	150	150	150	150	150	150	150	150	150	150	150	150
Energy Efficiency (EE) Bundles	116	218	325	432	536	637	723	812	895	976	1,061	1,139	1,108	1,091	1,073	1,036	1,000
Solar (Non-Legacy CSGs)	18	100	199	298	377	455	533	610	667	724	780	836	892	948	1,003	1,058	1,113
Solar (Net Metered Installed after 2024)	0	37	76	109	149	210	254	288	326	375	477	520	567	580	609	667	787
Solar (3% Distributed Solar Energy Standard)	0	0	0	62	250	373	497	494	506	517	529	540	551	562	574	585	596
Incremental Distributed Resources Brought Forth in This Plan	**277**	**501**	**748**	**1,050**	**1,460**	**1,826**	**2,156**	**2,354**	**2,544**	**2,742**	**2,996**	**3,184**	**3,268**	**3,331**	**3,409**	**3,495**	**3,646**
Fall Net Resource (Need)/Surplus Even After Additional Distributed Resources	**7,188**	**7,218**	**8,390**	**7,798**	**7,259**	**6,945**	**6,868**	**6,254**	**5,654**	**5,243**	**4,656**	**4,041**	**3,787**	**3,607**	**3,632**	**3,294**	**3,308**
Reference Plan Resource Additions / Retirements	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Solar (Utility-Scale System Resources)	0	0	0	0	0	100	500	700	700	1,600	1,600	2,400	2,400	2,400	2,400	2,400	2,400
Storage	0	0	0	480	480	600	600	780	960	960	960	960	1,440	1,920	2,220	2,220	2,220
Firm Dispatchable	0	0	0	748	1,496	1,496	2,244	2,244	2,618	2,992	2,992	3,740	3,740	3,740	3,740	4,488	4,488
Wind	0	0	0	400	2,200	2,600	2,600	3,800	4,600	5,000	6,600	7,600	8,200	8,600	9,000	9,600	11,000
Reference Plan Resource Adjustments	**0**	**0**	**0**	**1,628**	**4,176**	**4,796**	**5,944**	**7,524**	**8,878**	**10,552**	**12,152**	**14,700**	**15,780**	**16,660**	**17,360**	**18,708**	**20,108**
Reference Plan Net Resource (Need)/Surplus	**7,188**	**7,218**	**8,390**	**9,426**	**11,435**	**11,741**	**12,812**	**13,778**	**14,532**	**15,795**	**16,808**	**18,741**	**19,567**	**20,267**	**20,992**	**22,002**	**23,416**

Table F-49: Load and Resources Tables, 2024-2040 Planning Period, Winter Season

ICAP Rating - Load and Resources 2024-2040 Planning Period																	
Determination of Need	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Forecasted Net Load	6,612	6,889	7,225	7,377	7,526	7,596	7,750	7,913	8,146	8,428	8,641	8,899	9,094	9,392	9,565	9,786	9,728
MISO System Coincidence	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Coincident Load	6,612	6,889	7,225	7,377	7,526	7,596	7,750	7,913	8,146	8,428	8,641	8,899	9,094	9,392	9,565	9,786	9,728
MISO Planning Reserve Margin (ICAP)	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%
Obligation (Winter)	**9,879**	**10,293**	**10,794**	**11,022**	**11,243**	**11,348**	**11,578**	**11,822**	**12,170**	**12,591**	**12,910**	**13,295**	**13,586**	**14,032**	**14,290**	**14,620**	**14,534**
Existing & Approved Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response, Existing	367	379	390	401	406	411	416	421	427	432	437	1,020	1,020	1,020	1,020	1,020	1,020
Coal	1,705	1,705	1,705	1,027	1,027	517	517	0	0	0	0	0	0	0	0	0	0
Nuclear	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,738	1,192	646	646	646	646	646	646
Natural Gas/Oil	4,687	4,617	4,478	4,478	4,244	3,538	3,538	3,031	3,031	2,733	2,733	2,733	2,733	2,733	2,733	2,733	2,372
Storage	0	0	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0
Biomass/RDF	128	70	70	70	70	70	70	70	70	70	70	44	44	44	12	12	12
Hydro	753	753	301	301	301	301	301	301	184	184	151	137	124	124	120	120	120
Wind	4,520	4,312	4,485	4,310	4,273	4,094	4,088	4,023	3,960	3,349	3,337	3,313	3,313	2,933	3,013	3,013	2,908
Solar (Utility-Scale System Resources)	1,315	1,968	3,487	3,671	3,814	3,956	4,096	4,236	4,336	4,432	4,529	4,627	4,725	4,729	4,826	4,923	5,019
Solar (Legacy CSGs)	881	877	872	868	864	859	855	851	846	842	838	834	830	825	821	817	813
Solar (Net Metered as of 2024)	171	151	150	149	148	148	147	146	145	145	144	143	142	142	141	140	140
Existing Resources	**16,265**	**16,568**	**17,687**	**17,023**	**16,895**	**15,642**	**15,776**	**14,828**	**14,748**	**13,934**	**13,441**	**13,508**	**13,578**	**13,197**	**13,333**	**13,425**	**13,050**
Winter Existing & Approved Net Resource (Need)/Surplus	**6,386**	**6,275**	**6,893**	**6,001**	**5,652**	**4,293**	**4,199**	**3,005**	**2,577**	**1,343**	**531**	**214**	**(8)**	**(835)**	**(956)**	**(1,195)**	**(1,484)**
Incremental Distributed Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response (Incremental)	41	43	45	47	48	48	49	50	51	52	53	54	55	56	57	57	58
Energy Efficiency (EE) Bundles	130	243	363	482	597	710	805	904	997	1,087	1,179	1,265	1,230	1,211	1,191	1,150	1,110
Solar (Non-Legacy CSGs)	0	100	199	298	377	455	533	610	667	724	780	836	892	948	1,003	1,058	1,113
Solar (Net Metered Installed after 2024)	0	37	76	109	149	210	254	288	326	375	477	520	567	580	609	667	787
Solar (3% Distributed Solar Energy Standard)	0	0	0	62	250	373	497	494	506	517	529	540	551	562	574	585	596
Incremental Distributed Resources Brought Forth in This Plan	**171**	**424**	**683**	**998**	**1,420**	**1,797**	**2,138**	**2,346**	**2,547**	**2,754**	**3,017**	**3,214**	**3,295**	**3,357**	**3,434**	**3,517**	**3,665**
Winter Net Resource (Need)/Surplus Even After Additional Distributed Resources	**6,557**	**6,699**	**7,576**	**6,999**	**7,072**	**6,090**	**6,336**	**5,351**	**5,124**	**4,098**	**3,548**	**3,428**	**3,287**	**2,523**	**2,478**	**2,322**	**2,181**
Reference Plan Resource Additions / Retirements	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Solar (Utility-Scale System Resources)	0	0	0	0	0	100	500	700	700	1,600	1,600	2,400	2,400	2,400	2,400	2,400	2,400
Storage	0	0	0	480	480	600	600	780	960	960	960	960	1,440	1,920	2,220	2,220	2,220
Firm Dispatchable	0	0	0	748	1,496	1,496	2,244	2,244	2,618	2,992	2,992	3,740	3,740	3,740	3,740	4,488	4,488
Wind	0	0	0	400	2,200	2,600	2,600	3,800	4,600	5,000	6,600	7,600	8,200	8,600	9,000	9,600	11,000
Reference Plan Resource Adjustments	**0**	**0**	**0**	**1,628**	**4,176**	**4,796**	**5,944**	**7,524**	**8,878**	**10,552**	**12,152**	**14,700**	**15,780**	**16,660**	**17,360**	**18,708**	**20,108**
Reference Plan Net Resource (Need)/Surplus	**6,557**	**6,699**	**7,576**	**8,627**	**11,248**	**10,886**	**12,280**	**12,875**	**14,002**	**14,650**	**15,700**	**18,129**	**19,067**	**19,183**	**19,838**	**21,030**	**22,289**

Table F-50: Load and Resources Tables, 2024-2040 Planning Period, Spring Season

ICAP Rating - Load and Resources 2024-2040 Planning Period Determination of Need	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Forecasted Net Load	7,043	7,143	7,500	7,808	7,955	8,018	8,158	8,314	8,504	8,679	8,923	9,185	9,404	9,577	9,703	9,858	9,918
MISO System Coincidence	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Coincident Load	7,043	7,143	7,500	7,808	7,955	8,018	8,158	8,314	8,504	8,679	8,923	9,185	9,404	9,577	9,703	9,858	9,918
MISO Planning Reserve Margin (ICAP)	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%
Obligation (Spring)	**9,916**	**10,058**	**10,560**	**10,994**	**11,201**	**11,289**	**11,487**	**11,707**	**11,974**	**12,220**	**12,564**	**12,933**	**13,241**	**13,484**	**13,662**	**13,879**	**13,965**
Existing & Approved Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response, Existing	683	696	709	719	725	729	733	737	741	745	749	1,020	1,020	1,020	1,020	1,020	1,020
Coal	1,705	1,705	1,705	1,027	1,027	517	517	0	0	0	0	0	0	0	0	0	0
Nuclear	1,698	1,698	1,698	1,698	1,698	1,698	1,698	1,698	1,698	1,698	1,165	632	632	632	632	632	632
Natural Gas/Oil	4,363	4,363	4,268	4,268	4,042	3,383	3,383	2,913	2,913	2,624	2,624	2,624	2,624	2,624	2,624	2,624	2,289
Storage	0	0	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0
Biomass/RDF	128	70	70	70	70	70	70	70	70	70	70	44	44	44	12	12	12
Hydro	803	803	301	301	301	301	301	301	184	184	151	134	124	120	120	120	120
Wind	4,520	4,310	4,325	4,310	4,262	4,094	4,088	3,984	3,960	3,338	3,313	3,313	3,313	2,933	3,013	3,013	2,908
Solar (Utility-Scale System Resources)	1,351	2,138	3,487	3,671	3,814	3,956	4,096	4,236	4,336	4,432	4,529	4,627	4,725	4,729	4,826	4,923	5,019
Solar (Legacy CSGs)	881	877	872	868	864	859	855	851	846	842	838	834	830	825	821	817	813
Solar (Net Metered as of 2024)	166	151	150	149	148	148	147	146	145	145	144	143	142	142	141	140	140
Existing Resources	**16,297**	**16,810**	**17,596**	**17,090**	**16,961**	**15,765**	**15,898**	**14,945**	**14,904**	**14,088**	**13,593**	**13,382**	**13,455**	**13,070**	**13,210**	**13,302**	**12,953**
Spring Existing & Approved Net Resource (Need)/Surplus	**6,381**	**6,752**	**7,036**	**6,096**	**5,761**	**4,476**	**4,411**	**3,239**	**2,930**	**1,868**	**1,030**	**449**	**214**	**(415)**	**(452)**	**(577)**	**(1,012)**
Incremental Distributed Resources	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Demand Response (Incremental)	136	138	140	142	143	144	144	144	145	145	145	146	146	146	147	147	148
Energy Efficiency (EE) Bundles	124	233	348	462	573	682	773	870	959	1,046	1,137	1,222	1,189	1,170	1,151	1,111	1,074
Solar (Non-Legacy CSGs)	18	100	199	298	377	455	533	610	667	724	780	836	892	948	1,003	1,058	1,113
Solar (Net Metered Installed after 2024)	0	37	76	109	149	210	254	288	326	375	477	520	567	580	609	667	787
Solar (3% Distributed Solar Energy Standard)	0	0	0	62	250	373	497	494	506	517	529	540	551	562	574	585	596
Incremental Distributed Resources Brought Forth in This Plan	**278**	**508**	**763**	**1,073**	**1,491**	**1,864**	**2,200**	**2,405**	**2,603**	**2,807**	**3,068**	**3,263**	**3,345**	**3,407**	**3,484**	**3,568**	**3,717**
Spring Net Resource (Need)/Surplus Even After Additional Distributed Resources	**6,659**	**7,260**	**7,799**	**7,169**	**7,252**	**6,340**	**6,612**	**5,644**	**5,533**	**4,674**	**4,097**	**3,713**	**3,559**	**2,992**	**3,032**	**2,991**	**2,705**
Reference Plan Resource Additions / Retirements	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Solar (Utility-Scale System Resources)	0	0	0	0	0	100	500	700	700	1,600	1,600	2,400	2,400	2,400	2,400	2,400	2,400
Storage	0	0	0	480	480	600	600	780	960	960	960	960	1,440	1,920	2,220	2,220	2,220
Firm Dispatchable	0	0	0	748	1,496	1,496	2,244	2,244	2,618	2,992	2,992	3,740	3,740	3,740	3,740	4,488	4,488
Wind	0	0	0	400	2,200	2,600	2,600	3,800	4,600	5,000	6,600	7,600	8,200	8,600	9,000	9,600	11,000
Reference Plan Resource Adjustments	**0**	**0**	**0**	**1,628**	**4,176**	**4,796**	**5,944**	**7,524**	**8,878**	**10,552**	**12,152**	**14,700**	**15,780**	**16,660**	**17,360**	**18,708**	**20,108**
Reference Plan Net Resource (Need)/Surplus	**6,659**	**7,260**	**7,799**	**8,797**	**11,428**	**11,136**	**12,556**	**13,168**	**14,411**	**15,227**	**16,249**	**18,413**	**19,339**	**19,653**	**20,392**	**21,699**	**22,814**

APPENDIX G: SCENARIO SENSITIVITY ANALYSIS: PVRR & PVSC SUMMARY

NPV ($m) 2024-2040

	PVSC	PVRR	High Fuel/Mkt Price	Low Fuel Mkt Price	High Load	Low Load	High Tech Cost	Low Tech Cost	Edison Market Cost	High Reg High SC-GHG	Low Reg Low SC-GHG	0 Reg high SC-GHG	0 Reg Mid SC-GHG	0 Reg Low SC-GHG	Mkt Off	Environ Policies	High Tech + High Load	Low Tech + Low Load	Carbon Free - PVSC	Carbon Free - PVRR
Scenario 1	$51,037	$34,678	$52,373	$46,682	$56,185	$48,909	$52,049	$49,435	$51,621	$59,243	$47,395	$68,735	$55,329	$47,871	$54,853	$50,683	$57,941	$45,679	$50,703	$34,819
Scenario 2	$50,624	$34,581	$51,900	$46,281	$55,618	$48,611	$51,447	$49,303	$51,279	$58,537	$47,052	$68,128	$54,901	$47,570	$54,258	$50,288	$57,712	$45,559	$50,406	$34,619
Scenario 3	$50,252	$34,215	$51,516	$45,923	$55,348	$48,375	$51,095	$48,920	$50,913	$58,084	$46,655	$67,761	$54,529	$47,204	$53,896	$49,902	$57,304	$45,218	$50,041	$34,207

NPV ($m) 2024-2047

	PVSC	PVRR	High Fuel/Mkt Price	Low Fuel Mkt Price	High Load	Low Load	High Tech Cost	Low Tech Cost	Edison Market Cost	High Reg High SC-GHG	Low Reg Low SC-GHG	0 Reg high SC-GHG	0 Reg Mid SC-GHG	0 Reg Low SC-GHG	Mkt Off	Environ Policies	High Tech + High Load	Low Tech + Low Load	Carbon Free - PVSC	Carbon Free - PVRR
Scenario 1	$63,635	$44,948	$65,112	$59,034	$71,674	$60,616	$65,543	$60,627	$64,373	$72,700	$59,742	$84,553	$69,086	$60,433	$69,807	$63,273	$75,761	$55,450	$62,974	$46,314
Scenario 2	$63,198	$45,239	$64,537	$58,689	$71,125	$60,472	$64,806	$60,662	$64,030	$71,694	$59,518	$83,659	$68,622	$60,241	$68,978	$62,855	$75,464	$55,562	$62,589	$45,991
Scenario 3	$62,695	$44,994	$63,973	$58,249	$70,720	$60,056	$64,248	$60,265	$63,536	$70,946	$58,952	$82,987	$68,104	$59,821	$68,310	$62,339	$74,686	$55,228	$62,042	$45,373

NPV ($m) 2024-2050

	PVSC	PVRR	High Fuel/Mkt Price	Low Fuel Mkt Price	High Load	Low Load	High Tech Cost	Low Tech Cost	Edison Market Cost	High Reg High SC-GHG	Low Reg Low SC-GHG	0 Reg high SC-GHG	0 Reg Mid SC-GHG	0 Reg Low SC-GHG	Mkt Off	Environ Policies	High Tech + High Load	Low Tech + Low Load	Carbon Free - PVSC	Carbon Free - PVRR
Scenario 1	$68,788	$48,927	$70,352	$64,038	$78,299	$65,403	$71,005	$65,289	$69,567	$78,268	$64,739	$91,077	$74,695	$65,496	$75,914	$68,415	$83,315	$59,292	$70,930	$54,273
Scenario 2	$68,275	$49,317	$69,670	$63,648	$77,703	$65,275	$70,150	$65,315	$69,158	$77,029	$64,491	$90,010	$74,150	$65,287	$74,942	$67,925	$82,947	$59,387	$69,927	$53,326
Scenario 3	$67,762	$49,166	$69,080	$63,219	$77,286	$64,776	$69,559	$64,942	$68,656	$76,210	$63,916	$89,263	$73,620	$64,889	$74,217	$67,401	$82,041	$59,083	$69,080	$52,407

NPV ($m) 2024-2040

DELTA	PVSC	PVRR	High Fuel/Mkt Price	Low Fuel Mkt Price	High Load	Low Load	High Tech Cost	Low Tech Cost	Edison Market Cost	High Reg High SC-GHG	Low Reg Low SC-GHG	0 Reg high SC-GHG	0 Reg Mid SC-GHG	0 Reg Low SC-GHG	Mkt Off	Environ Policies	High Tech + High Load	Low Tech + Low Load	Carbon Free - PVSC	Carbon Free - PVRR
Scenario 1	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$
Scenario 2	($413)	($97)	($473)	($400)	($567)	($298)	($601)	($132)	($342)	($707)	($343)	($607)	($428)	($301)	($595)	($396)	($230)	($120)	($298)	($200)
Scenario 3	($785)	($464)	($856)	($758)	($837)	($534)	($954)	($514)	($708)	($1,160)	($739)	($974)	($800)	($667)	($957)	($781)	($638)	($461)	($662)	($612)

NPV ($m) 2024-2047

DELTA	PVSC	PVRR	High Fuel/Mkt Price	Low Fuel Mkt Price	High Load	Low Load	High Tech Cost	Low Tech Cost	Edison Market Cost	High Reg High SC-GHG	Low Reg Low SC-GHG	0 Reg high SC-GHG	0 Reg Mid SC-GHG	0 Reg Low SC-GHG	Mkt Off	Environ Policies	High Tech + High Load	Low Tech + Low Load	Carbon Free - PVSC	Carbon Free - PVRR
Scenario 1	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$
Scenario 2	($437)	$291	($575)	($345)	($548)	($143)	($737)	$35	($343)	($1,006)	($224)	($894)	($463)	($192)	($829)	($419)	($297)	$112	($385)	($323)
Scenario 3	($941)	$46	($1,139)	($785)	($953)	($560)	($1,294)	($362)	($837)	($1,754)	($790)	($1,565)	($982)	($612)	($1,497)	($934)	($1,075)	($222)	($931)	($941)

NPV ($m) 2024-2050

DELTA	PVSC	PVRR	High Fuel/Mkt Price	Low Fuel Mkt Price	High Load	Low Load	High Tech Cost	Low Tech Cost	Edison Market Cost	High Reg High SC-GHG	Low Reg Low SC-GHG	0 Reg high SC-GHG	0 Reg Mid SC-GHG	0 Reg Low SC-GHG	Mkt Off	Environ Policies	High Tech + High Load	Low Tech + Low Load	Carbon Free - PVSC	Carbon Free - PVRR
Scenario 1	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$
Scenario 2	($513)	$391	($681)	($390)	($596)	($128)	($855)	$26	($409)	($1,239)	($248)	($1,067)	($544)	($209)	($972)	($490)	($368)	$95	($1,003)	($947)
Scenario 3	($1,025)	$239	($1,272)	($819)	($1,013)	($627)	($1,446)	($347)	($911)	($2,058)	($823)	($1,814)	($1,074)	($607)	($1,697)	($1,014)	($1,273)	($209)	($1,850)	($1,865)

APPENDIX G: SCENARIO SENSITIVITY ANALYSIS: PVRR & PVSC SUMMARY

NPV ($m) 2024-2040

			B	C														Carbon Free	Carbon Free - PVRR
	PVSC	**PVRR**	**52372.82408**	**46681.52128**	**Low Load**	**High Load**	**Low Resource Cost**	**High Resource Cost**	**Low Externality**	**59243.3568**	**47394.61049**	**68734.93935**	**55328.98018**	**47871.48993**	**High Load High Gas/Coal/ Mkts Low Resource Cost**	**Low Load Low Gas/Coal/Mkts Low Resource Cost**			50703.399	34818.623
Scenario 1	$51,037	$34,678	$51,900	$46,281	$46,328	$49,952	$44,760	$46,813	$40,949	$58,537	$47,052	$68,128	$54,901	$47,570	$49,797	$45,359			50405.716	34619.049
Scenario 2	$34,678	$37,495	$51,516	$45,923	$46,258	$49,795	$44,703	$46,499	$40,570	$58,084	$46,655	$67,761	$54,529	$47,204	$49,787	$45,276			50041.16	34206.581
Scenario 3	$45,563	$37,662	$45,018	$46,420	$46,373	$49,940	$44,828	$46,593	$40,643	$38,975	$42,418	$51,868	$37,235	$44,993	$49,935	$45,396				
																			Carbon Free	Carbon Free - PVRR
			65111.68638	59033.6772						72699.81835	59742.1552	84552.92726	69085.81243	60432.5742					62973.604	46313.848
			64536.73403	58688.66102						71693.89084	59517.90803	83658.68946	68622.33833	60240.52433					62588.761	45991.288
NPV ($m) 2024-2047			**63972.99985**	**58249.10305**						**70945.80894**	**58951.83002**	**82987.44469**	**68103.96931**	**59820.80352**					62042.215	45373.171

			B	C														Carbon Free	Carbon Free - PVRR
	PVSC	**PVRR**	**High Fuel/Mkt Price**	**High Gas/Coal/ Mkts**	**Low Load**	**High Load**	**Low Resource Cost**	**High Resource Cost**	**Low Externality**	**Low Externality, Low Regulatory**	**Mid Externality, Mid Regulatory**	**High Externality**	**No Reg or Externality Costs**	**Market sales off**	**High Load High Gas/Coal/ Mkts Low Resource Cost**	**Low Load Low Gas/Coal/Mkts Low Resource Cost**				
Scenario 1	$51,037	$34,678	$70,352	$64,038	$46,328	$49,952	$44,760	$46,813	$40,949	$78,268	$64,739	$91,077	$74,695	$65,496	$49,797	$45,359			70930.327	54272.774
Scenario 2	$34,678	$37,495	$69,670	$63,648	$46,258	$49,795	$44,703	$46,499	$40,570	$77,029	$64,491	$90,010	$74,150	$65,287	$49,787	$45,276			69927.29	53325.749
Scenario 3	$45,563	$37,662	$69,080	$63,219	$46,373	$49,940	$44,828	$46,593	$40,643	$76,210	$63,916	$89,263	$73,620	$64,889	$49,935	$45,396			69079.946	52407.373

																			Carbon Free	Carbon Free - PVRR
NPV ($m) 2024-2050																				
			B	C															-297.68355	-199.57344
	PVSC	**PVRR**	**High Fuel/Mkt Price**	**High Gas/Coal/ Mkts**	**Low Load**	**High Load**	**Low Resource Cost**	**High Resource Cost**	**Low Externality**	**Low Externality, Low Regulatory**	**Mid Externality, Mid Regulatory**	**High Externality**	**No Reg or Externality Costs**	**Market sales off**	**High Load High Gas/Coal/ Mkts Low Resource Cost**	**Low Load Low Gas/Coal/Mkts Low Resource Cost**				
Scenario 1	51036.59026	34678.04172	45215.8322	46359.70261	46328.46081	49951.59724	44759.56228	46813.2613	40948.6664	39008.09178	42541.44966	52889.73956	37276.22999	45260.30446	near	45359.21943				

NPV ($m) 2024-2047

																			Carbon Free	Carbon Free - PVRR
Scenario 3	$45,563	$37,662	$45,018	$46,420	$46,373	$49,940	$44,828	$46,593	$40,643	$38,975	$42,418	$51,868	$37,235	$44,993	$49,935	$45,396				

																			Carbon Free	Carbon Free - PVRR
										($1,239)	($248)									
										($2,058)										

APPENDIX H – RESOURCE OPTIONS

I. INTRODUCTION

Our planning horizon spans from 2024 to 2040, during which customer peak demand is projected to rise from 9,400 MW to over 13,200 MW, before Demand Side Management (DSM) adjustments. With our existing and approved resources, we face a capacity deficiency in the late-2020s due to resource retirements and contract expirations. We have identified a portfolio of resources that addresses not only our projected capacity shortfall but also aligns with our core principles of cost-effectiveness, reliability, environmental stewardship and risk mitigation.

The next section delves into our existing resources, offering a comprehensive look at our current system capacity and future system plans thus setting the stage for a deeper discussion on bridging the gap between current capabilities and future resource needs.

II. EXISTING RESOURCES

The Company currently owns and has under contract approximately 15,000 MW of capacity plus 211 MW of distributed solar, although as stated above, many of our current resources are slated to retire over the current planning period. Below, we include discussion of each resource type, and tables showing each generating unit, whether it is owned or contracted, the capacity we own or contract,[1] and the retirement year if known, as reflected in the EnCompass model. These numbers have been rounded to the nearest whole number for simplicity, where applicable.

A. Coal

The Company owns and operates three coal-fired generating units at two sites. The Sherburne County Generation Station (Sherco) previously had three operating units. On December 31, 2023, we reached an exciting milestone in the clean energy transition with the retirement of Sherco Unit 2. The closing of Sherco 2 resulted in a loss of 682 MW of firm dispatchable generation from the NSP system. We are planning to retire Sherco 1 and 3 by December 31, 2026 and 2030, respectively. We are planning to retire the Allen S. King plant in 2028. Retirements of these plants will result in the loss of an additional 1,705 MW of firm dispatchable generation from the NSP system.

[1] Expected as of January 2024.

Table H-1: Existing Coal Resources

Name of Unit or Contract	Type	Owned or Contracted (PPA)	Maximum Capacity (MW)	Existing Retirement/Contract Expiration
Allen S King[2]	Steam Turbine (ST)	Own	510	2028
Sherco 1	ST	Own	678	2026
Sherco 2	ST	Own	682	Closed as of 2023
Sherco 3[3]	ST	Own	517	2030

B. Nuclear

The Company owns and operates three nuclear units – two units at Prairie Island Nuclear Generating Plant and one at Monticello Nuclear Generating Plant – with a total net capacity of approximately 1,650 MW. These units operate at high-capacity factors and provide nearly 30 percent of the total electric energy and approximately 40 percent of the carbon-free energy our customers consume. Between 2019 and 2023, we have consistently maintained production costs at $31.25 per megawatt-hour (MWh) or less, which is a decrease of more than 20 percent when compared to 2013 production costs. In this plan, we are seeking to extend both nuclear facilities to meet future capacity needs beyond their existing retirement dates.

Table H-2: Existing Nuclear Resources

Name of Unit or Contract	Type	Owned or Contracted (PPA)	Capacity (MW)	Existing Retirement/Contract Expiration
Monticello	Boiling Water Reactor	Own	617	2040
Prairie Island 1	Pressurized Water Reactor (PWR)	Own	521	2033
Prairie Island 2	PWR	Own	519	2034

**Net summer capacity shown.*

[2] Asset is in seasonal operation now. Capacity represented above is maximum capacity offered during one of the seasons – winter – in which it operates.
[3] This represents the portion of Sherco 3 under our ownership.

C. Natural Gas and Oil

The Company owns or contracts for several natural gas and oil facilities. Our current natural gas and oil generators are configured as either simple-cycle Combustion Turbines (CTs), Combined Cycle Gas Turbine (CCs) or reciprocating internal combustion engines (RICE). The CTs are located at seven different sites and provide peaking capacity, meaning they are typically only dispatched a limited number of times a year during peak demand and/or net load conditions. The CCs are located at five sites and provide intermediate capacity, meaning they tend to operate at higher capacity factors due to better efficiencies and lower dispatch prices when compared to CTs. RICE units are located at existing CT sites. Our current natural gas and oil fleet provides nearly 4,726 MW of firm dispatchable capacity.

Table H-3: Existing Natural Gas and Oil Resources

Name of Unit(s)	Type	Owned or Contracted (PPA)	Maximum Capacity (MW)	Existing or Planned Retirement/Contract Expiration
Black Dog 5/2	CC	Own	298	2032
High Bridge	CC	Own	580	2048
Riverside	CC	Own	508	2049
Mankato Energy Center	CC	PPA	711	2028, 2039
Cottage Grove	CC	PPA	245	2027
Angus Anson 2-4	CT	Own	386	2041, 2045
Angus Anson RICE	IC	Own	28	2068
Black Dog 6	CT	Own	228	2058
Blue Lake 7,8	CT	Own	350	2045
Inver Hills 1-6	CT	Own	345	2030
Wheaton [4]	CT	Own	225	2065
Wheaton Recip	IC	Own	45	2065
Cannon Falls Energy Center	CT	PPA	356	2028
Blue Lake 1-4	CT (Oil)	Own	192	2025
French Island 3,4	CT (Oil)	Own	159	2030
Wheaton 6	CT (Oil)	Own	70	2024

D. Biomass

The company owns or contracts for various biomass facilities. Refuse-derived fuel (RDF), landfill (LND,) and digester (DIGT) resources are also generally considered biomass resources and therefore included in this category. These facilities total nearly 134 MW of capacity and are located at six sites on our system. More about the Company's RDF plants can be found in Appendix W: RDF Plants.

[4] Capacity and retirement date shown for repowered asset, pending approval before the Wisconsin Public Utilities Commission.

Table H-4: Existing Biomass Resources

Name of Unit or Contract	Type	Owned or Contracted (PPA)	Maximum Capacity (MW)	Retirement/Contract Expiration
Bayfront 5,6	Bio	Own	26	2035
French Island 1,2	Bio	Own	15	2027
Red Wing 1,2	Bio	Own	18	2027
Wilmarth 1,2	Bio	Own	17	2027
St. Paul Cogen	Bio	PPA	24	2024
Hennepin Energy Recovery Center	RDF	PPA	34	2024

E. Hydroelectric

The Company owns or contracts for hydropower resources with a number of different counterparties, totaling nearly 800 MW of capacity. The majority of our current hydro capacity is provided by our PPAs with Manitoba Hydro, which expire in 2025. While the Company is considering contract renewals with Manitoba Hydro, they are not included here as they are not finalized at the time of final modeling.[5] Further, the Company currently has a 350 MW Diversity Agreement with Manitoba Hydro, wherein we receive 350 MW of capacity in the summer and Manitoba Hydro receives 350 MW of capacity in the winter. Due to the unique nature of the agreement, it is not included in the list below or reflected in the total hydro capacity specified above.

[5] The Company considers its overall system needs as well as the reasonableness of the costs to customers when determining whether to pursue a PPA or an extension. In the case of the contract with Manitoba Hydro, it is a system capacity service contract and not a standard PPA, as it is not an actual facility resource and is not a dispatchable generation resource like a typical large-scale generator. However, it can provide the necessary baseload capacity and energy. A short-term renewal of the Manitoba Hydro System capacity contract would contribute to the baseload capacity available to meet our near-term capacity obligation while we continue to pursue longer-term resource options, including those that are firm and fully dispatchable on a real time basis. We are currently in negotiations with Manitoba Hydro to extend the system capacity contract, however, because Manitoba Hydro has to serve increasing needs of its own domestic customers, we anticipate any extension to be for a much smaller capacity amount over a shorter duration, likely 5 years or less. We will keep the Commission informed if negotiations are successful.

Table H-5: Existing Hydroelectric Resources

Name of Contract or Unit	Type	Owned or Contracted (PPA)	Capacity (MW)	Retirement/Contract Expiration
Hastings	Hydro	PPA	4	2033
St. Cloud	Hydro	PPA	9	2041
Dairyland	Hydro	PPA	1.2	2037
Eau Galle	Hydro	PPA	0.3	2026
DG Hydro	Hydro	PPA	0.4	-
SAF Hydro	Hydro	PPA	9	2031
WTC Angelo Dam	Hydro	PPA	0.2	2024
MN Grouped Hydro	Hydro	Own	14	-
WI Grouped Hydro	Hydro	Own	260	-
Manitoba Hydro	Large Hydro	PPA	500	2025

F. Wind

The Company owns or contracts for over 4,300MW of wind power. Over the next two to three years, the Company intends to add 2,800 MW of wind generation from recent acquisitions and Requests for Proposals (RFPs), as well as additional capacity to serve other customer programs.

Table H-6: Existing and Near-Term Wind Resources

Name of Contract or Unit(s)	Type	Owned or Contracted (PPA)	Maximum Capacity (MW)	Retirement/Contract Expiration
Big Blue	Wind	PPA	36	2032
Community Wind North	Wind	Own	26	2044
Fenton	Wind	PPA	206	2032
Garwin	Wind	PPA	37	2028
Jeffers	Wind	Own	44	2044
MinnDakota	Wind	PPA	150	2026
Moraine II	Wind	PPA	50	2029
Community Wind South (Zephyr)	Wind	PPA	31	2032
Lake Benton I	Wind	PPA	104	2028
Odell	Wind	PPA	200	2036
Prairie Rose	Wind	PPA	190	2032
Mower County	Wind	Own	99	2045
Ridgewind	Wind	PPA	25	2031
Border Winds*	Wind	Own	150	2051
Heartland Divide	Wind	PPA	200	2047
Deuel Harvest	Wind	PPA	100	2036
Courtenay	Wind	Own	200	2041
Fowke Wind Energy Center[6]	Wind	Own	100.5	2044
Nobles (Repowered)	Wind	Own	201	2035
Pleasant Valley*	Wind	Own	200	2051
Crowned Ridge (Owned)	Wind	Own	300	2045
Freeborn	Wind	Own	200	2045
Foxtail	Wind	Own	150	2044
Blazing Star I	Wind	Own	200	2045
Blazing Star II	Wind	Own	200	2045
Lake Benton Repower	Wind	Own	100	2044
Dakota Range 1 & 2	Wind	Own	296	2046
Dakota Range 3	Wind	PPA	150	2032
Clean Energy	Wind	PPA	106	2039
Crowned Ridge (PPA)	Wind	PPA	300	2044

**Unit to be repowered*

[6] Formerly known Grand Meadows, the asset has been repowered and renamed.

G. Solar

By 2024 the Company anticipates it will maintain a total of 2,276 MW of solar capacity, via ownership or PPA, to serve our customers. This includes approximately 1,152 MW of large grid-scale solar, over 899 MW of Community Solar Gardens (interconnected by 2024), 3 MW of Solar*Connect Community in Wisconsin, and nearly 202 MW of small-scale distributed solar, and an additional 20 MWs small-scale distributed solar in Wisconsin.

Table H-7: Existing and Near-Term Solar Resources

Name of Contract or Unit	Type	Owned or Contracted (PPA)	Capacity (MW)	Retirement/Contract Expiration
Slayton	PV	PPA	2	2033
St. John's	PV	PPA	0.4	2030
School Sisters of Notre Dame	PV	PPA	0.7	2030
Other RDF & Small Solar	PV	PPA	3	Various after 2030
Lake Hallie Solar	PV	PPA	5	2050
Apple River	PV	PPA	100	2045
Aurora	PV	PPA	100	2036
Fillmore	PV	PPA	30	2041
Louise	PV	PPA	50	2041
Marshall	PV	PPA	62	2042
North Star	PV	PPA	100	2042
Sherco Solar 1 (West)	PV	Own	230	2059
Sherco Solar 2 (East)	PV	Own	230	2060
Sherco Solar 3	PV	Own	250	2060
WI DG Solar	PV		20	Various
DG Solar[7]	PV		191 (2023)	Various
WI Solar*Connect Community	PV		3	
Community Solar Gardens	PV	PPA	899(2023)	Various

[7] Includes Solar*Rewards and Made in MN Solar.

III. GENERIC FUTURE RESOURCE OPTIONS

For this Resource Plan, we employed generically defined potential additions resources in our EnCompass modeling. We utilized EnCompass modeling to develop a set of generic resources, informed by project experience and expertise, stakeholder input, and third-party studies like the National Renewable Energy Laboratory's (NREL's) 2023 Annual Technology Baseline (ATB). These potential additions of non-specific resources are used to represent the size, type, and timing of future resource additions to our system. The performance and cost metrics for these generic resources are derived from third-party studies like NREL's 2023 ATB, consultant estimates, and/or our own internal data. Our analysis covers both supply-side and demand-side resources, as well as the transmission cost implications within the MISO network. See Appendix F: EnCompass Modeling Assumptions and Inputs for further details.

We have accounted for the impacts of the Inflation Reduction Act (IRA) financing within the stated cost assumptions. Costs to transfer credits are not specifically included. Generic resources are not tied to specific locations or ownership models for purposes of the IRA; instead, they guide the overall dimensions of future resource needs. In general, specific resources are acquired through a competitive resource acquisition process, following approval in a Resource Plan proceeding. For further discussion surrounding the impacts of the IRA, refer to Appendix U: Inflation Reduction Act.

A. Supply Side Resources

Centralized supply-side resources available for capacity expansion includes renewables such as battery, hybrid, and thermal generation facilities. Our modeling includes various resource types such as wind and solar, standalone battery and hybrid solar plus battery storage, combustion turbines, and reciprocating engines. Unlike previous resource plans, we have not included a combined cycle resource option. Within our modeling, the generic representative plant size is consistent with NREL ATB assumptions. We are not assuming any difference in costs between Company-owned assets, or those subject to PPAs. Detailed attributes for each resource are further elaborated, with cost and performance assumptions specified in Appendix F.

1. Wind

Wind generators designed to generate electricity by harnessing the kinetic energy of wind. These plants consist of multiple wind turbines strategically placed in areas with high wind speeds to maximize energy production. The turbines are equipped with

blades that rotate when exposed to wind, driving a generator that converts mechanical energy into electrical energy. The electricity generated is then fed into the electrical grid, contributing to overall energy supply. Our generic wind resource option is based on the 2023 NREL ATB study, and therefore reflects a 200 MW nameplate capacity and net capacity factor of approximately 44 percent. The forecasted wind costs in our modeling also reflect the 2023 NREL ATB study. IRA production tax credits (PTCs) are included in the NREL ATB "Market + Policies" case and converted to nominal dollar terms. A transmission cost adder is included in the levelized cost of energy (LCOE) calculation for generics not reusing existing interconnection.

2. Solar

Solar power plants generate electricity by capturing sunlight and converting it into electrical energy. These plants use photovoltaic panels or concentrating solar power systems to capture solar radiation. Our generic large-scale solar resource option based on the 2023 NREL ATB study, and therefore is sized at 100 MW on a nameplate capacity basis with a net capacity factor of is approximately 23 percent. We use forecasted solar costs from the publicly available LCOE data in the 2023 NREL ATB. Similar to the adjustments for wind resources, this cost has been adjusted for IRA PTCs in the NREL ATB "Market + Policies" case and converted to nominal dollar terms. Transmission cost adder is included in the LCOE calculation for generics not reusing existing interconnection.

For this Resource Plan, our modeling also includes a forecast of distributed solar bundles adoption, applied as a supply-side resource with an assumed adoption rate. See Section III.C.1 below.

3. Standalone Battery Energy Storage

A battery system is standalone energy storage designed to store electrical energy for later use, independent of any other energy generation source. The generic units are sized at 60 MW with either a four-hour or 10-hour configuration. An annual net capacity factor limit is applied to each generic battery to reflect the one cycle per day operational constraint and the model can economically dispatch batteries based on system needs. We use forecasted standalone battery capital and fixed O&M costs from the publicly available data in the 2023 NREL ATB. These costs are converted to nominal dollar terms and the IRA Investment Tax Credits (ITCs) are applied in the model; as the NREL ATB cost does not include ITCs for standalone storage. A transmission cost adder is included in the capital cost calculation for generics not

reusing existing interconnection. For more discussion on storage, see Appendix I: Minnesota Energy Storage Systems Assessment.

4. Solar-Plus-Storage Hybrid

Hybrid solar plus energy storage combines solar power generation with battery storage that integrates solar power generation capabilities with energy storage solutions to create a more reliable and efficient energy supply. In our planning, we developed a hybrid unit sized at 130 MW-DC solar plus 60 MW-AC four-hour battery with a 100 MW-AC Inverter. We use the forecasted LCOE from the publicly available data in 2023 NREL ATB. This cost was adjusted for IRA ITCs and converted to nominal dollar terms in the NREL ATB "Market + Policies" case. A transmission cost adder is included in the capital cost calculation for generics not reusing existing interconnection.

5. Natural Gas Combustion Turbines

Combustion Turbines (CTs) are a type of power-generating resource that utilize the combustion of fuel, often natural gas, to drive turbines and produce electricity. In our planning, we have developed two generic CT options with capacities of 232 MW and 374 MW. We identified generator cost and performance assumptions from external sources, original equipment manufacturers, and internal engineering assessments.

6. Reciprocating (RICE) Engines

Reciprocating engines operate on the principle of converting linear motion into rotational motion through the use of pistons and a crankshaft—like the internal combustion engines in most vehicles. They are highly flexible and can ramp up quickly, making them suitable for peaking and load-following applications. In our planning, we modeled reciprocating engines in modular increments of 6 × 18 MW engine configurations. The cost and performance assumptions for these engines are derived from a combination of industry data, original equipment manufacturers, and our internal engineering assessments.

B. Demand Side Resources

Demand-side resources continue to evolve as the efficiency of equipment grows, beneficial electrification is expanded, and we begin to address not only customer equipment but how energy is being used within a home or business. This evolution requires careful consideration of how best to model resources moving forward. In this

plan, the Company has updated energy efficiency based on our proposed 2024-2026 Energy Conservation and Optimization (ECO) Triennial Plan and has modeled the significant demand response portfolio available today against other resource alternatives in EnCompass modeling. We believe these modeling approaches will be modified further in future planning years as differing technologies are available, including streamlined customer-sited batteries, advanced metering technologies, and Distributed Energy Resource Management Systems, impacting the modeling approaches specific to customer energy usage and flexible load resulting from customer actions.

1. Energy Efficiency (EE)

The Company continues their commitment to aggressively pursuing EE as an alternative least cost resource. Three scenarios of achievement based on statutory requirements, our most recent 2024-2026 ECO Triennial filing[8], and the optimized scenario of high achievement (as identified in the 2019 IRP) were created to model EE. Each bundle is modeled in Encompass in the same manner as a supply side resource. In addition to bundles, naturally occurring EE is embedded in the load forecast.

2. Demand Response (DR)

Demand Response (DF) resources can offset the need for additional resources. The Company recently exceeded the Commission's 2019 requirements to secure an additional 400 MW of load[9] significantly increasing these resources. In this resource plan, the Company reviewed these changes and modeled various bundles to incorporate DR in the same manner as a supply-side resource.

Further detail regarding specific modeling scenarios for both EE and DR can be found in Appendix F. Detailed descriptions of these resources can be found in Appendix J: Distributed Energy Resources.

[8] 2024-2026 ECO Triennial Plan, as filed, Docket No. G,E002/CIP-23-92, June 29, 2023.
[9] *See Order Approving Plan with Modifications And Establishing Requirements for Future Filings,* Docket No. E002/RP-19-368, April 15, 2022 at Order Point 2.A.2

C. Resource Option Sensitivities

Sensitivities on the Preferred Plan were run on all baseload scenarios, and in discrete special cases to help us understand potential differential futures. Sensitivities help us assess risk for individual scenarios by isolating the effects of each sensitivity. We run through the impacts of each below.

1. DG Solar Special Study

Our modeling includes a forecast of distributed rooftop solar bundles adoption, applied as a supply-side resource with an assumed adoption rate. In addition to these static forecasts, we include an additional model sensitivity on the Preferred Plan involving amounts of distributed rooftop solar resources.[10] Unlike the forecasted distributed rooftop solar bundles adoption already included in the Preferred Plan, these rooftop solar projects incur an acquisition cost from the Company. Unlike nearly every other resource option considered in this resource plan, the only costs for this resource that are included in EnCompass are acquisition costs and mandatory tariff payments. While these costs are the only new costs borne by the NSP system, they do not represent the customer's (i.e., the solar owner's) full cost of the distributed rooftop solar system, nor do they represent the bill or rate impacts for all other customers from their implementation.[11] The assumptions used in modeling are discussed in more detail in Appendix J and Appendix S: Stakeholder Engagement

2. Emerging Technology

Achieving our Company-wide vision of a carbon-free electricity supply by 2050 will require significant technological developments that either do not yet exist or are not yet commercialized. In particular, our system will need stable baseload and dispatchable carbon-free generation, and energy storage technologies that can help us maintain reliability for every hour of every day, while simultaneously keeping electricity safe and affordable for customers. As such we have developed sensitivities to account for: (1) hydrogen, (2) long duration storage, and (3) advanced nuclear/small modular reactors in our special study on the Preferred Plan.

[10] DG solar forecasted by the Company includes base level (naturally occurring customer-owned solar, Solar*Rewards, small qualified facility (QF) solar, existing/approved NSP system solar resources & CSGs), and mandated (New CSGs & Large DERs (3% legislation, 0 – 10 MW)) solar.
[11] Given the way net metering is structured, although it does not create a revenue requirement impact on the resource side of the ledger, it artificially decreases sales, thereby increasing the revenue requirement to be recovered from all other customers.

For hydrogen, we modeled green hydrogen cost from the S&P Global forecast paired with renewable sources and blended the hydrogen with natural gas. Assumptions were sourced from vendors and industry research. For the long duration storage, we assumed 100-hour duration and sourced assumptions from vendors. For the advanced nuclear/small modular reactors, we took costs from 2023 NREL ATB conservative case assumption on costs and operating parameters. Discussion of these advanced emerging technologies is included in Appendix X: Advanced Technologies. We are continually assessing innovative technologies that may be viable options for future resource plans.

IV. POTENTIAL RESOURCES NOT CONSIDERED IN MODELING

We considered several additional technologies in initial screening that were not included in our modeling due to economic viability, technical limitations, operational complexity, or otherwise not aligning with the Company's strategic priorities. We will continue to monitor and screen these options for possible pilot programs or inclusion in future resource plans, pilot programs, and/or allow them to compete in competitive resource acquisitions so that we may gain additional information on their potential operating characteristics and costs. Although we are excluding such resources from our modeling for the reasons set forth below, that does not mean we will necessarily preclude participation of such resources from future acquisition proceedings. It is possible that as part of a future resource acquisition or contract extension, some of these resource types could potentially displace other generic resource options identified in this Plan. For example, a cost-effective biomass plant could potentially beat out a natural gas peaking plant, or a pumped-hydro facility could beat a battery energy storage system, in future resource acquisition proceedings.

A. Biomass

New biomass resources were excluded from consideration as generic options, primarily due to cost. Generic estimates for biomass resources from the U.S. Energy Information Administration (EIA), and other sources, indicate that the capital costs of new biomass resources are substantially higher than those associated with generic wind, solar, and natural gas resource options. As a result, we did not include a generic biomass resource for consideration in the modeling.

B. Combined Heat and Power (CHP)

Combined Heat and Power (CHP) was not included as a generic resource option, as studies indicate it will have limited economic potential during the planning period.

As part of a prior resource plan, the Company worked with Electric Power Research Institute (EPRI) and ICF International to evaluate the technical and economic potential for CHP applications in our Minnesota service area. The study estimated a total of 319 MW of technical potential from 239 sites and 145 MW of economic CHP potential inthe Company's Minnesota service territory. Under the base scenario, CHP adoption was estimated at 43 MW through 2039. The study was provided as Appendix S to our 2020-2034 Upper Midwest Integrated Resource Plan.

C. Pumped Hydro

Pumped hydro is a mature flexible-duration storage technology with a relatively long operational life; however, environmental challenges and resource economics have generally limited its growth. Further, pumped hydro unit configurations and costs are largely site specific, which makes it a difficult resource to represent generically. As a result, the Company did not include a generic pumped hydro resource for consideration in modeling.

D. Coal

New generic coal resources were eliminated from the list of resource options due to cost, environmental challenges, and non-alignment with the Company's strategic goals. Capital costs for generic coal resources are high relative to other resource types. With low natural gas prices, increased renewable penetration, policy and regulatory risk, new coal resources are not competitive and are faced with significant environmental challenges. Furthermore, adding coal resources with high carbon emission levels would not align with our commitment to a 100 percent carbon-free electric system.

E. Combined Cycle (CC)

New generic Combined Cycle (CC) resources were eliminated from the list of resource options primarily due to their cost and environmental impact. Studies and market data indicate that the capital and operational costs of new CCs are not competitive when compared to renewable energy options like wind and solar. Additionally, the emissions profile of CCs does not align with our Company vision and state policy objectives. As a result, the Company did not include a generic CC resource for consideration in modeling.

APPENDIX I – MINNESOTA ENERGY STORAGE SYSTEMS ASSESSMENT

I. INTRODUCTION

We are seeing a growing interest in the benefits and potential of energy storage systems as we transition to a cleaner, more renewable, future. Pilot programs are being implemented to evaluate the benefits of using energy storage to manage grid reliability, storage is being co-located along with generation, and we are witnessing the rise of hybrid storage plus assets to help utilities transition to a cleaner more renewable future. We expect adoption of energy storage technology to grow as costs decrease; renewable generation increases; and regulators, utilities, and the public across the country increasingly prioritize clean energy and decarbonization goals.

Xcel Energy has long taken a leading role in integrating energy storage into our operations in investing in energy storage projects across our system. Our continuing targeted initiatives and programs will assist us in prioritizing the cost-effective use cases for energy storage as we gain further experience and expertise in energy storage deployment. As we continue to develop operational experience and greater understanding of storage's strengths, and operational constraints, we will utilize this experience as we progress toward aggressive carbon reduction goals.

II. ENERGY STORAGE ASSESMENT

Minn. Stat. § 216B.2422 requires that utilities include an assessment of energy storage systems in their resource plan filing:

> Subd. 7. **Energy storage systems assessment.**(a) Each public utility required to file a resource plan under subdivision 2 must include in the filing an assessment of energy storage systems that analyzes how the deployment of energy storage systems contributes to:
>
> (1) meeting identified generation and capacity needs; and
>
> (2) evaluating ancillary services.
>
> (b) The assessment must employ appropriate modeling methods to enable the analysis required in paragraph (a).

Energy storage itself is nothing new and has existed for decades.[1] FERC defines energy storage as any energy asset that is:

[1] Krista Hughes, Stacey Simone Garfinkle*, Planning for A Rainy Day: The Future of Energy Storage and the Policies Driving Its Growth*, Nat. Resources & Env't, Spring 2018, at 31, 33.

> Interconnected to the electrical grid and is designed to receive electrical energy, to store such electrical energy as another energy form, and to convert such energy back to electricity and deliver such electricity for sale, or to use such energy to provide reliability or economic benefits to the grid.[2]

Energy storage encompasses a wide variety of technologies that store electrical energy directly (e.g., capacitors) or after converting to some other form of potential or kinetic energy. Energy storage can take the form of pumped hydro, compressed air, flywheels, various types of batteries, thermal technologies, and hydrogen. While we have deployed a number of these technologies across our system in the past, we will continue to gain experience with others in the future.

We envision four key areas in which energy storage can add value to our system: renewable integration, grid support, deferred investment, and power quality. First, energy storage can support integrating renewables generation into the grid by helping to shift renewable energy to time periods when it is needed, especially for short-term deviations of a few minutes to a few hours. Second, energy storage can help with grid reliability and resilience by providing voltage support, and various ancillary services such as frequency regulation, spinning reserves, operating reserves, energy arbitrage, readily available reserves, and black start capability. Third, energy storage has the potential to replace large traditional grid investments across our system, including investments in peaking generation, transmission and distribution upgrades, and reliability investments to maintain grid support.[3] Finally, energy storage can improve power quality by helping avoid momentary outages that interfere with the operation of sensitive electronic equipment. Because of these benefits, we are optimistic about the role of energy storage in our transition to a cleaner and more renewable future.

Storage has inherent limitations that policymakers and utilities must keep in mind as we invest in the energy system of the future. Energy storage for instance has a declining marginal capacity value; therefore, it is not technically or economically feasible to use storage to continue to shift energy from off-peak to on-peak periods. MISO does not provide accreditation based on storage duration. While energy storage can shave off and lower the top of peaks, it also widens them, thus requiring larger, more expensive storage systems to reduce system energy needs. This problem is

[2] *Third-Party Provision of Ancillary Services; Accounting & Fin. Reporting for New Elec. Storage Techs.*, 144 FERC ¶ 61056 (July 18, 2013).

[3] Though we note that storage has the potential to replace large amount of traditional grid investments in certain instances, we note that generation or transmission and distribution upgrades will continue to be necessary, and the most effective solution in certain applications and locations.

compounded during periods of low renewable production, when excess generation may not be available to re-charge batteries for the next peak. Further, while storage can stack multiple values together, not all benefits can be recognized simultaneously. For instance, a battery cannot simultaneously integrate renewables and provide black start capability. The value of storage must be determined based on the value streams storage provides, and the ability and efficiency of storage to meet our system needs. Finally additional reliability checks may be necessary to ensure that storage is the appropriate resource if it is selected in capacity expansion model runs based on its capacity credit. Given these challenges, a broader suite of resources will be necessary to help us reach our clean energy goals. For further information on storage's ability to provide ancillary services, please see Appendix D: Energy Adequacy Analysis, and for further information on regarding the capacity credit for modeled storage, see Appendix F: EnCompass Modeling Assumptions and Inputs.

Key to capturing the full spectrum of these benefits of storage is the recognition that storage is first and foremost a grid asset. As more and more energy storage is deployed on our system and across the country, it is important that the rules governing ownership and operation of energy storage assets are clear and aimed at maximizing the grid benefits of storage while encouraging its affordable, reliable, and safe deployment. Utilities are uniquely situated to understand the grid and its needs and should play an important role both in owning and operating grid-scale storage. However, at the same time, we are looking for ways to consider how to incorporate the benefits of customer-owned storage, such as working with their customers to aggregate these facilities into Virtual Power Plants (VPPs) or other resources that can provide utility benefits. For example, Xcel Energy's Colorado Subsidiary, Public Service Company's Residential Battery Connect Demand Response Pilot ran for 18 months and aimed to understand the performance and demand management capabilities of residential battery storage systems. Key findings included that batteries can be dispatched quickly during events, their performance is not diminished during back-to-back events, and most participants were highly satisfied with the pilot, citing various motivations for enrollment including grid reliability and environmental benefits. We are developing a similar program in Minnesota.[4] We have provided an analysis of these options, and how they may fit within our resource plan, in this matter in Appendix E: Load and Distributed Energy Resources Forecasting and Appendix H: Resource Options.

[4] The Company intends to propose this demand response battery program as part of our 2024-2026 Energy Conservation and Optimization (ECO) Triennial via a modification sometime in 2024. We proposed a related Energy Storage Incentive Program, pursuant to Minn. Stat. § 216C.379; *see* Docket No. E002/M-23-459.

III. ENERGY STORAGE ANALYSIS IN THE RESOURCE PLAN

On December 31, 2019, the Minnesota Department Commerce released its "Minnesota Energy Storage Cost-Benefit Analysis," which recommended energy storage become a regular part of the resource planning and competitive bidding processes and emphasized the importance of gaining experience in operating energy storage and understanding both its limits and benefits to the grid. Further, the Commission's April 15, 2022, Order approving the Company's last Resource Plan in Docket No. E002/RP-19-368, required that we "include a deeper analysis of (1) storage options, including options combining solar generation and battery storage...."

Xcel Energy is committed to incorporating energy storage in our resource planning activities. While we see storage as a growing part of our energy system, it must be part of a diverse clean energy portfolio. In this Resource Plan, we developed standalone storage, and solar plus storage hybrid modules for use in our EnCompass resource modeling. The standalone energy storage unit was given the opportunity to select between 4- and 10-hour configurations, while the solar plus storage unit assumed a 4-hour configuration. These energy storage configurations were allowed to compete with other resources to meet energy and capacity needs per the statutory requirement and were able to provide ancillary service to meet spinning reserve requirement of 125.17 MWs based on a 12-month rolling average of spinning reserves carried by the NSP System within MISO.

Our Preferred plan proposes to add 2,100 MWs of storage between 2027 and 2040, including 600 MWs by 2030. We expect battery storage to play an important role in our resource portfolio. Presently, the most cost-effective Lithium-ion batteries have a four-hour duration. This is not sufficient to meet our reliability needs in most cases, such as when we need added capacity for multi-day contiguous periods. Still, our modeling analysis finds value in the short-duration resources currently available for peak shaving and possibly extending the duration of solar resources into periods of high-load.

Our assumptions for standalone storage, and solar plus storage, were based on the National Renewable Energy Laboratory's (NREL's) 2023 Annual Technology Baseline (ATB). NREL's 2023 ATB was designed to (1) document transparent, normalized technology cost and performance assumptions using published sources; (2) document potential pathways for impacts of R&D on renewable energy technologies; (3) enable consistency in technology assumptions across analysis projects; (4) facilitate the tracking and sourcing of input assumptions; and (5) reduce the lead time required when conducting scenario analysis of 5- to 30-year futures. The NREL ATB is updated

each year to provide technology cost and performance assumptions. We have traditionally utilized the ATB to provide cost assumptions for different nonthermal resource types. The characteristics and cost assumptions for storage resources can be found in Appendix F.

We continue to consider new tools and processes to analyze the energy storage solutions including the evaluation of potential values storage assets might provide to the system. For instance, Appendix Y: Life Cycle Emissions Impacts provides a literature review to examine a comparison between different electricity generation and storage technologies. The goal was to examine the carbon impacts throughout the life cycle of different electric generation alternatives to provide a comprehensive assessment of the environmental footprint of a resource over the life of the asset. The literature review suggested that renewable energy sources and storage paired with renewable generation exhibit much lower life cycle emissions compared to fossil fuel-based technologies. We are also examining long duration storage as a sensitivity, as discussed in Appendix X: Advanced Technologies, though we note the long duration storage, such as our Form Energy Pilot, is in test phases, and not ready yet for commercial deployment.

IV. CONCLUSION

Our Preferred Plan adds storage, and we expect storage to be part of our resource portfolio as costs continue to decline and we add more renewables to our system. Like other resources, much of the value of storage is in its ability to provide capacity and energy (arbitrage). We expect these needs to help drive storage additions in the future as we continue to explore near-term storage opportunities that could provide value to our system.

APPENDIX J – DISTRIBUTED ENERGY RESOURCES

I. INTRODUCTION

For purposes of this Resource Plan, Distributed Energy Resource (DER) is defined as supply and demand side resources that can be used throughout an electric distribution system to meet energy and reliability needs of customers, whether installed on the customer or utility side of the electric meter. The definition further clarifies that for the IRP, DER may include, but is not limited to distributed generation, energy storage,[1] electric vehicles,[2] and demand side management. As discussed in our November 1, 2023, Integrated Distribution Plan,[3] future grid modernization investments will be necessary to integrate more DERs, keep pace with load growth, and ensure efficient and sound operations in an increasingly complex environment.

In the context of this IRP, DERs are an essential part of our path towards carbon reduction and often keep costs low to customers. In this appendix we describe in more detail the importance of these resources and how they have been addressed as part of our Preferred Plan.

II. DEMAND SIDE MANAGEMENT

Demand Side Management (DSM) is the modification of customer demand for energy through various customer changes including installing more efficient equipment, altering usage patterns of energy (such as washing laundry at a certain time of the day), or reducing overall energy consumption through energy conservation. The methods utilities use to influence these decisions are typically through education and financial incentives. DSM enhances our customers' experience with opportunities to reduce energy and ways to manage their energy differently. By empowering customers with insights and technology, we can provide tools for them to lower their overall energy bills. In addition, DSM, through these customer actions, will help avoid the need for future generation resources and enable CO_2 emissions reductions.

Xcel Energy is proud to contribute to Minnesota's status as a national leader in DSM. Minnesota has held this designation for more than a decade. In fact, the state's utility-sponsored energy efficiency programs are among the longest standing in the country, and Minnesota is the only Midwestern state that has consistently ranked in the top ten on the American Council for Energy Efficient Economy's (ACEEE) State Energy

[1] Energy storage is discussed in Appendices E, H, and I.
[2] Electric vehicles are discussed in Appendix E.
[3] Docket No. E002/M-23-452.

Efficiency Scorecard. Minnesota utilities' energy savings achievements through DSM have saved billions of dollars for customers and avoided millions of tons of greenhouse gas and other pollutants while creating and supporting jobs in the state.[4] In 2023, ACEEE's utility energy efficiency scorecard designated Xcel Energy Minnesota 10th out of 53 large electric utilities.[5]

The value of DSM continues to evolve from traditional energy efficiency (EE) measures that permanently reduce customer consumption and demand response (DR) efforts that reduce customer load during traditional system peak hours, to programs that leverage the additional benefits of reducing energy at certain times of the day, typically when energy supply costs are cleaner and/or less costly. These traditional EE and DR resources will continue to have a significant role in future DSM portfolios. As the future unfolds, however, the portfolio will need to explore new integrated technologies that optimize DSM solutions by location and time impacting energy usages versus demand. For example, new technologies (such as smart thermostats) also offer benefits beyond simply reducing overall and peak usage, including features that make it easier for customers to shift energy use to non-peak times when energy is less expensive. As we begin to shift our efforts towards optimization of energy use, the impacts of DSM as a resource will simultaneously evolve. Whereas energy savings targets were once focused on permanent reduction of load, we instead see benefit in focusing on the timing of energy use. This adjustment will be seen in resource planning as incremental demand reductions that grow smaller over time or even a slight reduction in the overall future demand reduction opportunity. This does not represent t a reduction in the Company's commitment to DSM.

The Company is pleased to be part of a broad bipartisan coalition who supported passage of the landmark Energy Conservation and Optimization (ECO) Act of 2021. ECO has modernized the framework for customer-funded utility programs and re-imagined the scope of what such programs can include as we begin to embrace new technologies and optimization efforts leading to the future of these portfolios as described above. In our first ECO Triennial Plan,[6] the Deputy Commissioner approved the Company's proposal to achieve electric savings of two percent of sales and 1.5 percent of natural gas sales, both of which exceed the statutory minimum.[7,8]

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[4] The Aggregate Economic Impact of the Conservation Improvement Program 2008-2013, Minnesota Department of Commerce, Division of Energy Resources, Cadmus, October 2015. https://mn.gov/commerce-stat/pdfs/card-reportaggregate-eco-impact-cip-2008-2013.pdf
[5] 2023 Utility Energy Efficiency Score Card, ACEEE, August 2023
[6] Docket No. E002/CIP-23-92.
[7] Decision, *In the Matter of Xcel Energy's 2024-2026 Energy Conservation and Optimization Triennial Plan*, Department of Commerce, December 1, 2023.
[8] Minn. Stat. 216B.241.

Our Triennial Plan proposed programs and savings targets that continued our long-standing commitment to energy efficiency and recognized the value of customer programs does not stem solely from the reduction of energy consumption. The ECO Act opened the door for load management (demand response) programs that go beyond traditional peak-hour load shedding and seek to optimize the time at which customers use energy. With this change, the Company can work with customers to help them use electricity at low-cost and low-emission times of day, benefitting the grid, the climate and the customer simultaneously.

In perhaps the most transformational change enabled by ECO, the Triennial Plan also includes proposals to support customers who seek not only to use energy more efficiently, but to change the form of energy they use through efficient fuel-switching (EFS). The Company believes that the incentives and support for EFS included here will both support customers interested in fuel-switching and provide avenues to learn and develop enhancements that can help scale EFS activity in future years.

Our Preferred Plan complies with Commission orders and continues our commitment to energy efficiency and demand response, with total energy efficiency reductions (including both programmatic and naturally occurring energy efficiency) of 780 GWh on an average annual basis and demand response of 1,385 MW throughout our plan. We summarize DSM efforts in more detail below.

Energy Efficiency

The Company is committed to aggressively pursuing energy efficiency. The Preferred Plan will achieve between 2-2.5 percent annual energy savings at an annual energy savings level of 582 GWh for all planning years through programs we administer. As discussed below, when combined with naturally occurring energy efficiency, the Preferred Plan includes total energy efficiency that exceeds 780 GWh on an average annual basis. Specific details regarding how the Company will achieve energy efficiency will continue to be addressed in our Triennial Planning process.

The Company has also identified energy efficiency impacts that are naturally occurring as part of our energy demand forecast. These can be described as routine adoption of efficient measures outside of programs or progression of codes and standards that specify minimum performance levels. Where a major step change in codes and standards occurs (e.g. implementation of a federal 45 Lumen per watt efficacy requirement for general service lamps or an acceleration of required performance in non-residential buildings as required in a state law adopted in 2023), the Company can calculate these effects to demonstrate the effect of energy conservation that is not

accounted for in the programs we administer through ECO. As part of the Preferred Plan, we estimate this to account for an additional 40 percent savings on top of those estimated as part of administered programs under ECO.

Demand Response

At the end of 2023, the Company exceeded the Commission's 2019 requirement to secure an incremental 400 MW of load. Many of these resources focus on the reduction of load during summer peak days or test customer interest and access to shifting opportunities. For our demand response portfolio to continue to be successful, we need the flexibility to procure resources and modify load for localized events and timing across all months of the year.

Our Preferred Plan includes 1,365 MW (of demand response resources as part of our five-year planning period. Our Preferred Plan aims to maintain load reduction through traditional resources with a moderate increase in load. This moderation is a result of the significant increase of available load as ordered from previous resource plans.

The Company has also begun to look at load flexibility as a resource. However, rather than model it as a resource like energy efficiency and demand response, we have identified the system needs that could be addressed by load flexibility. This will allow us to design load flexibility programs that can effectively produce system benefits by optimizing location and timing of the programs to minimize the net cost to all customers. This is discussed further as part of Section III below.

A. Energy Efficiency (EE)

On December 1, 2023, the Deputy Commissioner approved Xcel Energy's first Triennial Plan under the 2021 Energy Conservation and Optimization (ECO) Act. This landmark filing continues the Company's commitment to energy efficiency and demand response, setting targets at over the statutory minimum requirements, increasing budgetary spending for income qualified customers and laying out specific programs and requirements for efficient fuel switching – now allowed by ECO. With over 40 energy efficiency programs, ranging from Home Energy Squad visits providing energy efficient equipment installed directly in customers' homes to Process Efficiency programs providing comprehensive whole-building energy efficiency analysis, the Company continues to provide emerging technologies and program models to our customers.

Below, we discuss the requirements related to energy efficiency, the historical performance of the Company's ECO program, how the planning outlook was determined in the Preferred Plan, and the results of our modeling. The Company does not provide a specific action plan for energy efficiency in this filing, as this was approved in Docket No. G,E002/CIP-23-92 on December 1, 2023.

1. Naturally Occurring Energy Efficiency

The energy savings resulting from naturally occurring energy efficiency includes: customers who take action without participating in energy efficiency programs and instances of equipment that currently may be influenced by EE programs, but in the future would not be part of an energy efficiency program because an efficient technology is required to meet code or has become common practice. The level of energy efficiency occurring as part of the utility's ECO programs depends on what is allowed to be counted towards state savings targets. As a result, the achievements claimed by the utilities represent only a portion of the savings realized. For example, the Department of Energy and the Environmental Protection Agency have had success in recent years through their ENERGY STAR efforts working with electronics manufacturers and retailers to produce and stock more efficient models. Energy efficiency is increasingly being driven by multiple influencers in the market, some of them benefiting from utility programs and others driven by the market.

The Company has taken this into consideration as we developed our modeling techniques for energy efficiency. The Company has analyzed historical load compared to future customer demand forecasting to determine that customers are becoming more efficient than can be explained by our DSM portfolio alone. Comparing our future ECO program portfolios and applying an estimated 40 percent increase (estimated based on historical trends) shows the Company meeting and, in the short-term, exceeding 780 GWh of energy efficiency as modeled in previous resource plans. The Company has bifurcated naturally occurring energy efficiency to show the true nature of "conservation" where not all energy savings can be claimed through demand-side management (or in this case our ECO programs).

2. Integrated Resource Planning Requirements for Energy Efficiency

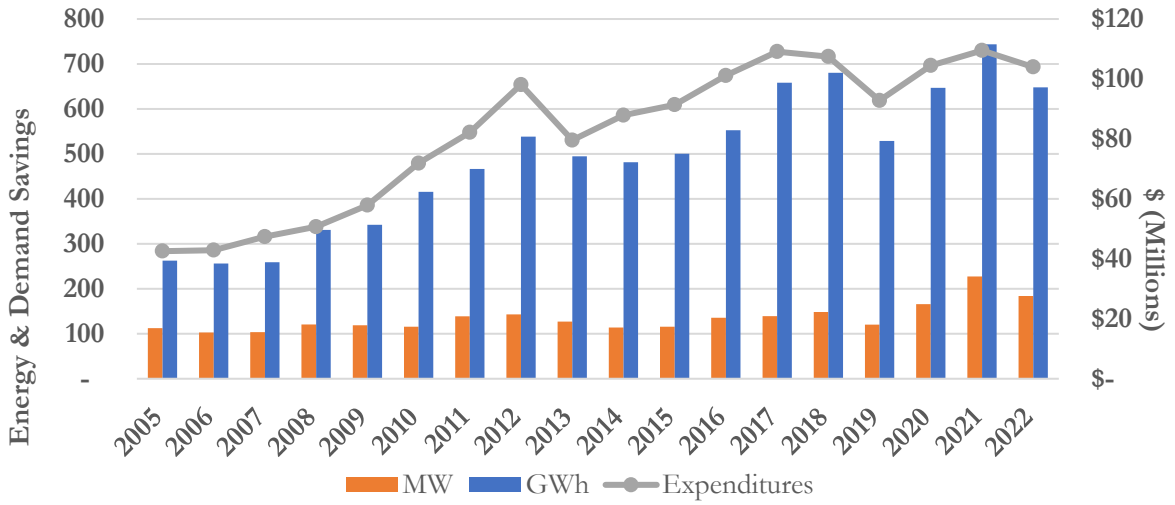
In connection with the Company's last IRP, the Commission's Order in Docket No. 19-368, issued on June 14, 2022, requires the Company, in Order Point 2.A.1, to "save, on average, at least 780 gigawatt-hours via energy efficiency." The Company's EE initiatives, reflected in the Preferred Plan meets this requirement. As discussed below, our Preferred Plan increases our projected EE savings in this planning period beyond

the requirements of Minn. Stat. § 216B.241, which requires the Company to save 1.75 percent of retail sales yearly. Rather, the Preferred Plan extends these savings between 2-2.5 percent at an annual energy savings level of 582 GWh for all planning years. Combined with naturally occurring energy savings, which is estimated to increase these savings by up to 40 percent, the Preferred Plan meets Commission's order.

3. Historical Performance of Programmatic Energy Efficiency

Xcel Energy has one of the longest-running and most successful DSM programs in the country. Between 1994-2022, the Company invested nearly $2.2 billion (nominal) resulting in 11,813 GWh of electric savings, 3,733 MW of electric demand savings. Our efforts continuously grow and modifications to our customer offerings prove worthwhile as we continue to meet and exceed statutory energy savings targets for electricity every year since 2011. Figure J-1 below highlights our historic electric achievement.

Figure J-1: Historical Electric ECO Achievements 2005-2022[9]



Our EE portfolio has had a significant impact on carbon reduction. Technologies and improvements implemented as part of EE programs, generally last for several years. Reductions in energy usage based on these programs have resulted in commensurate reductions in carbon emissions for the same period.

[9] Historical Achievement for ECO includes those demand response savings claimed as part of the portfolio.

4. Energy Efficiency Planning Outlook

The Company's projections for EE savings of over two percent of retail sales are critical to these goals and are based on a combination of two major types of energy efficiency: energy savings from ECO programs and naturally occurring energy savings as customer behavior impacts future load growth. In this section, we discuss the Company's current projections for efficiency savings from ECO programs, how we developed those projections, and the important contribution they make to the targets outlined in the Company's IRP. The Company created three bundles for EE of incremental increasing achievement at incremental increasing cost based on these projections so that EE could be modeled in Encompass in the same manner as a supply-side resource.

a. Energy Efficiency Scenarios

The Company began the development of energy efficiency bundles based on the filed 2024-2026 ECO Triennial.[10] Three bundles of EE were developed, based on (1) minimum statutory requirements, (2) estimated savings derived from our 2024-2026 ECO Triennial, and (3) high achievement.

First, a "Minimum Scenario" was set at the minimum statutory savings requirements set by Minnesota Statute § 216B.241; we reference this as Bundle 1. The resulting savings are set at 1.75 percent of weather normalized sales for the three prior years before a triennial is filed. The savings for 2024-2026 was set based on sales in 2020-2022, and the savings for 2027-2029 was set based on the sales forecast for 2023-2025. This trend continues every three years through the end of the modeling period.

Second, a "Programmatic Scenario" was created for Bundle 2 based on the Company's filed 2024-2026 ECO Triennial. The years 2024, 2025, and 2026 match the energy efficiency savings filed in our plan excluding the demand response segment (these are modeled separately as part of the IRP). The savings in 2027-2029 are included as the average of 2024-2026 since market conditions and codes and standards should remain consistent enough through this time. Starting in 2030 the programmatic savings drop to reflect the latest federal lighting efficiency standards.[11] This standard will essentially remove all savings from screw in bulbs, so these savings were removed from the 2024-2026 portfolio to calculate a percent reduction in programmatic savings.

[10] 2024-2026 ECO Triennial Plan, as filed, Docket No. G,E002/CIP-23-92, June 29, 2023.
[11] Federal legislation includes the 2007 Energy and Independence and Security Act (IESA) that adjusts baselines for lighting technologies.

Finally, a third bundle was provided as a selectable resource by the EnCompass model. This final bundle was created as a high-level scenario with a significant cost increase for program administration. This scenario was based on the high scenario of our 2020-2034 IRP which took into account the most recent state potential analysis for energy efficiency.[12]

Table J-1: Energy Efficiency Scenarios

	2024		2028	
	GWh	**Costs ($M)**	**GWh**	**Costs ($M)**
Bundle 1	477	$86	468	$82
Bundle 2	615	$134	623	$140
Bundle 3	774	$214	870	$264

Costs for these bundles were developed based upon the filed 2024-2026 ECO plan. For all bundles, the total cost is made up of two parts: an administrative cost and a cost of rebates to achieve these savings.

- Administrative Cost: Administrative cost is the total cost of the portfolio minus rebates. For the Programmatic bundles year 2024-2026 the filed costs were used. The Company assumed that administering energy savings programs varies directly with the size of said programs because of this the Company used a constant dollar-per-kWh metric from the filed programs to determine costs of all other years.
- Rebate Costs: The Company used the costs from the 2019 Potential Study to develop a cost curve to determine the costs of our high bundle and minimum bundle in relation to our Programmatic bundle which utilized specific rebate costs as filed in the 2024-2026 ECO Triennial.

All of the bundles use the same load shape, which is based on the filed 2024-2026 ECO Triennial plan. The shape was developed by combining the filed load shapes for each measure. To do this the total lifetime energy savings for each shape were used to determine weighting factors on which to combine the shapes. This results in alignment between the EE summer peaking shape and the Company's overall peak shape.

b. Modeling Results

The Company continues its commitment to Energy Efficiency as part of the 2024-2040 IRP. As part of the modeling process, both Bundle 1 and Bundle 2 were used as the

[12] Upper Midwest Integrated Resource Plan 2020-2034, Xcel Energy, Docket No. E002/RP-19-368, 2019.

baseline for the Encompass model. The first because of compliance requirements and the second as a result of the Company's commitment to energy efficiency through the 2024-2026 ECO Triennial and anticipated growth over time. Bundle 3 was not chosen as part of the modeling analysis due to the cost of additional energy efficiency.

The Preferred Plan includes lower energy efficiency levels as compared to our previous IRP planning process. However, this Plan has also captured natural occurring energy efficiency savings with a reduction of the energy forecast. This is an important aspect of our Preferred Plan, as the Company sees the reduction of lighting technologies available through ECO as LEDs become mainstream in the market and many newer technologies focus on the reduction of natural gas or shifting of load rather than permanent reductions.

B. Demand Response (DR)

Demand Response continues to be a critical part of our overall portfolio. Today, this DR portfolio comprises 14 percent of our total peak load. The growth of these resources has been maintained over several years by adjusting our programs, modifying control equipment and operational controls, and adding new innovative programs for customer participation.

Our Preferred Plan continues the growth of demand shedding resources, but that begins to level out, driven by our anticipation that customers will modify their level of commitment to these programs as they shift demand differently in a future where additional electrification technologies become more mainstream. The Company continues to explore opportunities to shift demand. We believe that, as newer technologies become active (e.g., residential batteries) in the market, systems and tools are put in place to better manage load control (e.g., DRMS), and the Company is able to complete several of their pilots (gaining important customer insights and usage data) we will be able to model these activities more accurately. Right now, this is not feasible because such technologies involve active shifting of resources that may reduce peak demand differently then we have historically seen. This likely will adjust the load that may be available for those programs that traditionally shed load at a specific time in the summer. The Company has included Appendix J1: Demand Management Portfolio Design Whitepaper as written by Opinion Dynamics, as an attachment to this appendix with further explanation of the history of demand response and where load flexibility will take us over time.

Below, we discuss the requirements related to DR, the historical performance of the Company's portfolio, the results of our modeling and DR as part of the Preferred Plan.

1. Integrated Resource Planning Requirements for Demand Response

In connection with the Company's last IRP, the Commission's Order in Docket No. 19-368, issued on June 14, 2022, Order Point 2.A.2 requires the Company to "acquire 400 megawatts of incremental demand response by 2023[.]" As provided in more detail in Docket No. E002/M-20-421 on February 1, 2024, the Company has grown its DR resources by 482 MWs over the last several years for a total of 1,333 MWs as required by Order Point 2.A.2. As described in more detail in our compliance filing, this requirement was met despite the loss of load resulting from the COVID pandemic and general load loss as a result of more efficient cooling systems. Several levers were applied to reach this level of savings including the addition of pilot programs, significant sign-on bonuses to customers, and one-to-one discussions with our largest customers. This unprecedented amount of savings exceeds the level of cost-effective demand response availability as found within past potential study analysis.[13]

In addition, Order Point 15 of the most recent IRP Order states in part:

> *Xcel shall include improved load flexibility and demand response modeling methodologies prospectively, including in its next resource plan.*

The Company has altered its modeling of DR resources by expanding our analysis to include additional load characteristics as described further in the modeling analysis of this chapter. Load Flexibility is addressed in Section III of this chapter.

2. Historical Performance of Demand Response

The Company has a large percent of peak load reduction from demand response, now approximately 14 percent of our system peak in the Midwest and remaining an outlier among utilities. In comparison, Otter Tail Power has a little over 10 percent, Baltimore Gas & Electric (BGE) has approximately 5 percent and Consolidated Edison, Nevada Energy and Arizona Public Service (APS) have less than four percent according to U.S. Energy Information Administration (EIA) data.[14] Below, the Company provides the historical details for the growth of demand response through 2023.

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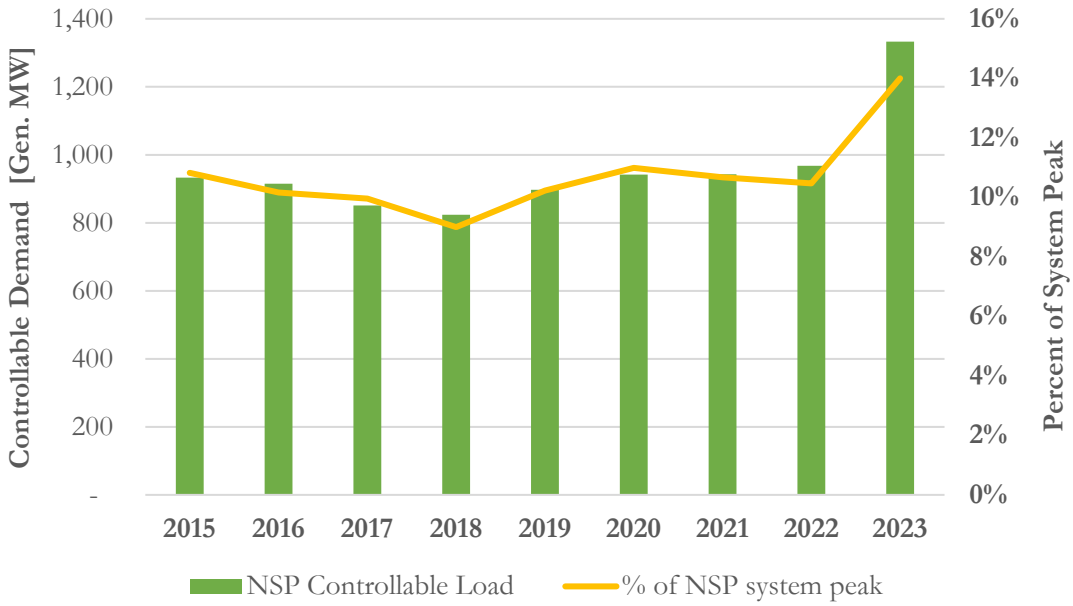
[13] Upper Midwest Integrated Resource Plan 2020-2034, Xcel Energy, Docket No. E002/RP-19-368, 2019, Appendix G.

[14] 2020 data set was used for analysis, available at: https://www.eia.gov/electricity/data/eia861/

Figure J-2: Historical Demand Response Achievements 2015-2023



3. Demand Response Planning Outlook

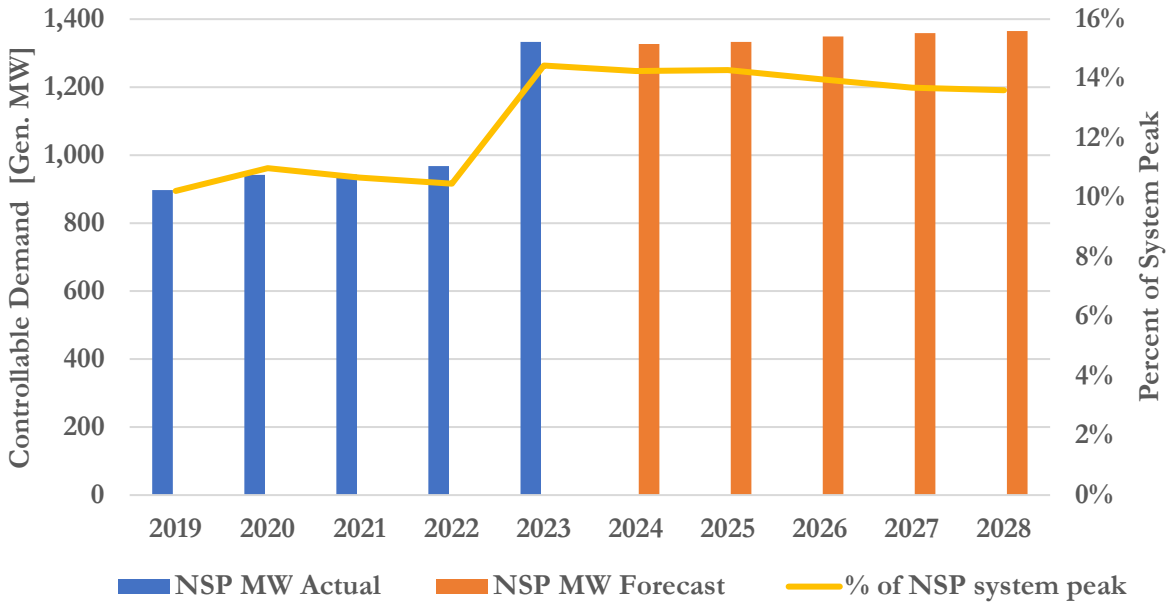
Our Preferred Plan includes 1,365 MW of DR resources as part of our five-year planning period. This is consistent with the achievement of an additional 400 MWs as required by previous Commission orders and our current resource availability.[15]

Our current available load for 2023 for demand response is 1,333 MWs or 14 percent of our peak load for NSP.[16] Our Preferred Plan estimates continued growth of demand response at a moderate pace, increasing load to 1,365 MW in the next five years. This moderate growth shows a slow increase as shedding DR resources have begun to saturate given recent growth efforts. In addition, we anticipate that some of our pilots currently unregistered with MISO may not continue and general load loss will continue as it has for the past five years due to customer attrition. We anticipate that these additional MWs in the five-year planning period will be a result of time-varying rates and load shifting opportunities of new technologies dependent on customer interest, customer behavior and the use of advanced metering technologies.

[15] Our Preferred Plan includes those resources available as a capacity resource, as part of MISO, therefore there may be a slight difference between total available capacity and total contracted load by our customers.
[16] Compliance Filing, Xcel Energy Demand Response, Docket No. E002/M-20-421, February 1, 2024

Figure J-3 below shows the demand response resources included in Encompass as part of our Preferred Plan.

Figure J-3: Controllable Demand (Gen. MW)



In this section, we discuss the Company's current projections for demand response, how we developed those projections, and the important contribution they make to the targets outlined in the Company's IRP.

a. Demand Response Scenarios

The Company created six bundles for demand response based on level of achievement and technology so that DR could be modeled in Encompass in the same manner as a supply-side resource. These bundles included: (1) Base DR, Saver's Switch, (2) Base DR, Other DR, (3) Incremental DR, Saver's Switch, (4) Incremental DR, Other DR, (5) High Potential, Saver's Switch, and (6) High Potential, Other DR.

Consistent with past practice, the Company developed a Base DR Forecast from existing programs, which was included in all baseline resource modeling as the first level of DR achievement. The Company then developed two levels of DR achievement incremental to the Base DR Forecast. The second level of DR achievement represents

achievement of the required 400 MW of incremental DR by the end of 2023,[17] and a continuation of that level of achievement beyond 2023. This level of achievement, represented by bundles 1 through 4, is included in the Encompass model as required resources as ordered by the Commission. The third level of DR achievement, represented by bundles 5 and 6, is based on the Brattle DR Potential Study included in the 2019 IRP. This level of achievement exceeds the achievement of the ordered 400 MW by 2023 at a higher cost. These bundles are included in the Encompass model as selectable resources to determine the cost-effective level of future DR achievement.

With each level of achievement, the costs and impacts were modeled separately to account for differing characteristics. These characteristics were defined through technology and control – including load shape and control hours – to create two categories of technologies: (1) Saver's Switch, and (2) Other DR programs.

Within each level of achievement, the costs and impacts of the Saver's Switch program and all other DR programs were modeled separately. This was done as the Saver's Switch program controls air-conditioning,[18] resulting in load reductions that differ significantly from the load reductions from all other DR programs which control a wide variety of loads. This results in a total of six modeled bundles as described above (each level broken into specific technology and control characteristics). Similar to EE, each level of achievement represents an incremental amount of DR and is dependent on the preceding level of achievement being selected (i.e., third level of achievement for the Saver's Switch program cannot be selected unless the second level of achievement is selected). Table J-2 provides the details of these scenarios.

Table J-2: Demand Response Scenarios

	2024		2028	
	MW	**Costs ($M)**	**MW**	**Costs ($M)**
Bundle 1	686	$29.5	692	$29.8
Bundle 2	339	$20.2	375	$22.4
Bundle 3	176	$13.8	178	$13.9
Bundle 4	56	$4.4	61	$4.8
Bundle 5[19]	24	$3.5	31	$4.5
Bundle 6	70	$10.1	59	$8.5

[17] *See Order Approving Plan with Modifications And Establishing Requirements For Future Filings*, Docket No. E002/RP-19-368, April 15, 2022 at Order Point 2.A.2.
[18] Saver's Switch was used as a proxy for characterization of the resource, other programs such as AC Rewards also hold these characteristics.
[19] Bundles 5 and 6 were not selected as cost-effective resources.

For each bundle, an estimate of the MW that varies by month was used and a maximum hour of annual control was also used. For the Bundles that include Saver's Switch (Bundles 1, 3 and 5) the monthly pattern of load relief potential was used to determine the MWs of load relief between May through September (all other months assumed 0 load relief), based on the historically observed air-conditioning load at system peaking conditions within those months. For the Bundles that include all other DR programs, the MWs of load relief across the entire year was based on the historically observed load relief potential each month at system peaking conditions.

Additionally, for all bundles, a maximum number of annual control hours was set, limiting the model to dispatch each bundle across each year in the future. For the Bundles that include Saver's Switch (Bundles 1, 3 and 5), this limit is 300 hours. For the Bundles that include all other DR programs, this limit is 80 hours.

b. Modeling Results

These bundles were optimized and tested as though they were competitive supply-side resources. Bundles 1-4 were set as non-selectable resources because they were already being procured through various demand response programs and therefore are already in existence (or assumed to be in the future). Bundles 5 and 6 were set as selectable resources, meaning they were compared to other supply side resources.

As noted, Bundles 1-4 were non-selectable and included in the Preferred Plan. In addition, Encompass ultimately chose Bundle 6 based on the load profile characteristics of programs that allows for control over several months rather than just peak summer days. This matches the future load profile of the Company and the MISO shift to a seasonal construct.

While the model shows a limited number of additional savings in outer years, the Company believes that as new technologies are developed, load profiles began to alter, and the utility is able to begin to initiate future demand resource management systems (DRMS) we will see additional efforts and opportunities for DR. In the short term, we estimate that these incremental steps will be smaller as programs are piloted and customer interest grows.

III. ADVANCED RATE DESIGN, DEMAND RESPONSE, AND ANY OTHER EFFORTS TO SHIFT CUSTOMER DEMAND

Order Point 13 of the Commission's April 15, 2022 Order in Docket No. E002/RP-19-368 requires the Company to account for anticipated effects of advanced rate design, demand response, and any other efforts to shift customer demand. We discuss demand response in Section II and the remaining efforts below.

A. Advanced Rate Design

On August 7, 2018, the Commission approved the Company's time-of-use (TOU) rate pilot, known as Flex Pricing Pilot.[20] The Pilot operated for two years, from November 2020 to October 2022, and included participants in two geographic areas: Minneapolis (Midtown substation) and Eden Prairie area (Westgate substation). Participants were selected from the eligible population to capture a diverse population base and provide insights into key customer types (income qualified, EV drivers, etc.).

The Pilot aimed to send adequate signals to reduce peak demand; evaluate effective customer engagement strategies; understand customer impacts by segment; support attainment of demand response goals; and understand integration of Pilot elements in our service territory. The findings indicated a modest reduction in demand during summer peak hours. Although usage patterns and their impact on customer bills were relatively minor, the average participant reduced their summer on-peak demand by 1.6 percent, with variations by location and year. The first year showed a consistent response in both regions. However, in the second year, the Eden Prairie area maintained its reduced usage patterns while the Minneapolis area did not result in a statistically valid difference between the treatment and control populations. In contrast, winter on-peak demand reductions in the second year indicated increased engagement from Minneapolis consumers, mirroring the efforts in Eden Prairie.

While the pilot data indicates a directional reduction, the task of deriving a quantitative adjustment to consider when modeling resource needs is complicated by the inconsistent results observed in the pilot. Further, the specific design of a TOU rate can significantly influence its effects. On December 22, 2023, the Company proposed a permanent residential TOU rate that closely mirrors the Flex Pricing Pilot rate.[21] However, as this proposed TOU rate framework includes customers that were excluded

[20] Docket No. E002/M-17-775.
[21] Docket No. E002/M-23-524.

customer classes from the pilot[22] and may evolve during the regulatory process, there remains uncertainty in forecasting its ultimate design and impact. Therefore, until we collect more data and receive Commission approval on a final TOU rate, the Company believes that the potential effects of a TOU rate can be best evaluated as one consideration that could result in the low load modeling sensitivity.

B. Shifting Resources

The Company did not specifically model the shifting of resources as part of this Resource Plan. While we have not modeled what can be considered "load flexibility" as a specific resource such as we would for energy efficiency or demand response, we have proposed a method to determine the generation system assets that can be avoided by these nascent technologies.

There are two reasons for moving forward such as we have. First, many of these resources are currently undefined. For example, an energy management system can be used to shift resources (or load) from one time to another based on a specific signal and/or programmatic scenario developed for the customer. Second, the Company does not have the capabilities to manage customer load at this level – however, we are testing holistic options for these types of custom approaches with customers as part of our 2024-2026 ECO Triennial. These current situations prevent the Company from making reasonable estimates of the potential impact of load flexibility, or when load flexibility can effectively be dispatched. Development of specifically defined bundles of load flexibility to model load flexibility resources in the same manner as EE, DR and supply-side resources is not possible at this time. Opinion Dynamics in their "Demand Management Portfolio Design Whitepaper" states that "many load flexibility value streams have not yet been established or quantified yet, though efforts are well underway, and opportunities abound. Most of the efforts across the country are nascent, with pilots showing promising results."

For this planning period, the Company has instead identified system needs that could be addressed by load flexibility. Batteries have similar characteristics to load flexibility in that they can both provide load relief that can be dispatched a high number of hours throughout the year but also produce an increase in load for other hours. By using the Encompass model to identify potential supply-side batteries as cost-effective resources,

[22] To achieve the goal of drawing conclusions about the entire population from the relatively small sample included in the pilot, certain customers were excluded. These exclusions were necessary either due to their small numbers or the difficulty in matching them with valid treatment-control pairings. Examples of such customers include those with electric space heating, those participating in net metering, and those with medically necessary equipment.

the Company can begin to design load flexibility programs. The charge and discharge hours, magnitude of load relief and the cost of those cost-effective batteries provide information to design load flexibility programs to provide similar load relief characteristics at costs below the supply-side options. Additionally, the design of the load flexibility programs will also consider impacts on the distribution system. This analysis occurring outside of the Encompass model is necessary to design load flexibility programs that can effectively produce system benefits by optimizing location and timing of the programs to minimize net cost to all customers.

Appendix J1: Demand Management Portfolio Design Whitepaper, provides further detail regarding how the Company can prepare for this adjustment from traditional DR resources to "load flexibility." As described in the appendix, several ongoing factors will help unlock the opportunities presented by load flexibility, including AMI deployment and further Grid Modernization.[23] In addition, the Company is currently piloting customer programs and will be focusing on a Virtual Power Plant (VPP) as described in Appendix X: Advanced Technologies and continuing several recently launched programs. As the Company continues to explore these options and learns further from our active pilots, we will incorporate these learnings into alternative forecasting and modeling options in future integrated resource plans.

IV. DISTRIBUTED GENERATION (DG) SOLAR BUNDLES

Order Point 15 of the Commission's April 15, 2022 Order in Docket No. E002/RP-19-368 requires the Company in its next Resource Plan to work with stakeholders to develop a modeling construct that enables the Company to model solar-powered generators connected to the Company's distribution system as a resource. Further, Order Point 15 directed the Company and stakeholders to address the following factors in developing the modeling construct:

A. Using a "bundled" approach as is used to model energy efficiency and demand response.
B. The costs borne by the utility and the costs borne by the customer.
C. Cost effectiveness tests.
D. Other topics as identified by stakeholders.

While we discuss this Order Point below, it is important to note that, since this Order was issued, the regulatory landscape for distributed solar has substantially changed. In 2023, the Minnesota Legislature amended the distributed solar energy standard (DSES)

[23] See Xcel Energy's Integrated Distribution Plan for further details regarding Grid Modernization, Docket No. E002/M-23-452.

set forth in Minn. Stat. § 216B.1691, subd. 2h, to mandate that at least three percent of the Company's retail electric sales in Minnesota must be generated from solar energy generating systems. To be counted towards this standard, the solar generating system must have a capacity of ten megawatts or less, be connected to the distribution system, be located in our Minnesota service territory, and be constructed or procured after August 1, 2023. As a result, our Preferred Plan includes nearly 2,000 MW of Community Solar Gardens and over 1,600 MW of distributed solar resources in compliance with state law.

As detailed in Appendix S: Stakeholder Engagement Summary, we discussed with the Clean Energy Organizations (CEOs) the potential effects of the DSES on the Order Point 15 distributed solar model construct. The CEOs' perspective in those meetings was that the DSES requirement will likely pertain to front-of-the-meter solar, while solar bundling is more likely to occur behind the meter. We agree with this interpretation; however, we anticipate that the DSES will have an impact on the capacity expansion model, and consequently, on the model selection of the solar bundle resource option. Further, we note that since the IRP Order, there are currently multiple dockets with pending decisions that will impact DG Solar development, inclusive of both behind the meter solar generation and distributed solar procured to comply with the DSES.[24]

A. DG Solar Bundle Approach

Below, we discuss the history of the solar bundle model construct within our resource planning process, as well as the development of the solar bundles included in this IRP model.

1. Background

As indicated in Appendix E: Load and Distributed Energy Resource Forecasting and Appendix F: EnCompass Modeling Assumptions and Inputs, the projected growth of behind-the-meter distributed solar on the NSP System by 2050 is expected to be substantial.[25] This surge in adoption can be attributed to a multitude of factors, including the declining cost of photovoltaics, the maturity of the solar installation industry in Minnesota, and tax credits. Given that these factors are not under the

[24] *In the Matter of Updating the Generic Standards for the Interconnection and Operation of Distributed Generation Facilities Established Under Minn. Stat. § 216B.1611,* Docket No. E999/CI-16-521.
[25] Residential solar growth is further discussed in the *In the Matter of Updating the Generic Standards for the Interconnection and Operation of Distributed Generation Facilities Established under Minn. Stat. § 216B.1611*, Docket No. E-999/CI-16-521.

Company's control and that the decision to install behind the meter distributed solar systems lies with the customers rather than the utility, the Company has traditionally included this resource in the NSP system model as a fixed forecasted amount, rather than treating it as a generic, selectable resource. As a result, during capacity expansion planning, EnCompass will optimize the combination of various generic renewable and other resource options, but maintain a constant level of DG solar.

In the last IRP, the Distributed Solar Parties (DSP) presented an alternative modeling construct for behind-the-meter distributed generation. Instead of relying on the Company's fixed forecasted amount of DG solar in the capacity expansion optimization, the DSP proposed creating selectable "bundles" of distributed solar resources with varying cost points and MW capacity levels. EnCompass could then choose from these bundles, similar to the modeling constructs for DR and EE discussed in this appendix.

While most selectable options in EnCompass are modeled based on their levelized cost of energy (LCOE), the DSP argued that this was inadequate for residential and commercial solar behind-the-meter DG solar resources. This was because the LCOE represents the costs incurred by the customers, not the Company, for purchasing and installing a DG solar system. Instead, they contended that the Company could directly influence the adoption of DG solar by:

1. providing an additional incentive to make these systems economically attractive to more customers, thereby fostering predictably increased adoption, and
2. including only the incentive payment to participating customers as the cost represented in EnCompass for rooftop DG solar resources instead of the LCOE.

The DSP used an adoption model to estimate the expected MW capacity that customers would adopt under different incentive scenarios. This adoption model was based on the economics of DG solar from the perspective of the participating customer.[26]

The Company raised a few concerns in response to these options. The primary concern was the predictability of the actual amount of distributed solar capacity that the Company could bring online at a specific incentive payment level. While the DSP

[26] DSP adopted a model proposed by Eric Williams, Rexon Carvalho, Eric Hittinger, and Matthew Ronnenberg in the journal Renewable Energy in December 2019. *See* Eric Williams et al., Empirical development of parsimonious model for international diffusion of residential solar, 150 Renewable Energy 570, 570- 577 (2020).

compared this construct to bundled approaches used for modeling EE and DR, it lacked any achievable potential analysis – an analysis of how much of an economically cost-effective demand-side resource can realistically be achieved given market and other barriers for customers and any utility resource limits. Achievable potential is an important and conventional component in implementing demand-side resources; indeed, the EE and DR resources modeled in this resource plan incorporate this aspect within their modeled resources.

We also raised concerns about whether this approach adequately accounts for potential rate and bill impacts, whether a significant portion of the payments might go to customers who would have installed such systems without a payment from the utility, and whether cost-effectiveness has been thoroughly evaluated from perspectives other than that of the participating customer when designing bundle levels.[27]

2. Current Iteration of Proposed Modeling Construct

For this IRP, we applied a "bundled approach" to demonstrate the modeling construct proposed by DSP. We discussed the proposed construct on three occasions with various interested parties. For additional information and recommendations, please see Appendix S: Stakeholder Engagement Summary, which contains more details on our correspondence and discussions on this matter.

3. Adoption Model and Inputs

Since this analysis involves working with multiple parties and examination of several assumptions, we used the same economic adoption model proposed by the DSP. This allows full transparency of the adoption model inputs used to create the bundles offered into EnCompass as well as transparency into key drivers, such as projected capital costs and the tax credits assumptions that impact the projected capacity of adopted solar.

The core principle of the adoption model brought forth by the DSP is that adoption can be modeled as a function of its economic viability for a participant. The model defined economic viability as the net present value (NPV) of the solar investment from the participant's perspective and forecasts the level. Essentially, a higher NPV makes the investment more attractive to customers. Fundamentally, the adoption model is designed to determine the appropriate "size" of the DG solar bundles that will be

[27] For example, a bundle with a very high incentive level, such as $90/MWH, would appear highly economic from the perspective of a participating customer but may not be cost-effective for the utility to implement.

offered in EnCompass as a selectable generation resource. As discussed below, the bundle sizes represent the amount of DG solar adoption that is economically viable at a given incentive level, pending a further assessment of achievable potential. Without a potential study to account for possible customer and implementation constraints, we do not have enough information to equate the amount of adoption projected by this model with the actual amount of solar that could be procured.

We used this same adoption model, with updated inputs as shown in Table J-3, to develop DG solar bundles for both commercial and residential customer classes.

Table J-3: Initial Year Input Assumptions for Economic Adoption Models[28]

Assumption	DSP's Residential Bundle in 2019 IRP	Residential Bundle	C & I Customer Bundle
Baseline Population	667,980 single family detached homes (7 county metropolitan area)	MSA is 15 counties MN and WI. 937,338 single-family detached homes	MSA is 15 counties MN and WI. 937,338 single-family detached homes
Size of typical installation	4 kWdc	7.2 kWdc	200 kWdc
Self-Consumption	100% (all consumed onsite)	100% (all consumed onsite)	100% on-site consumption
Gross Cost Per Watt	$3.50	$2.736	$2.049
Retail Price of Electricity	$0.12/kWh	$0.15/kWh	$0.13/kWh
Inflation Rate	2.00%	2.00%	2.00%
Lending Rate	5%	8%	8%
Capital Cost Subsidy (Federal)	Investment Tax Credit (ITC) expires in 2020	Inflation Reduction Act tax credits	Inflation Reduction Act tax credits
First Year Energy	5,000 kWh	8,311 kWh	236,528 kWh
Solar System Lifetime	25 years	30 years	30 years
Fixed Operations & Maintenance Costs	$0	$29.01/kW-yr	$18.08/kW-yr

[28] Many of the assumptions in Table J-3 change over the years. The assumptions for the initial year are provided in the table.

Assumption	DSP's Residential Bundle in 2019 IRP	Residential Bundle	C & I Customer Bundle
Additional Capital Cost Subsidy (Proposed Incentive Level Paid by Company)	$10/MWH, $20/MWH, $30/MWH, $35/MWH, $40/MWH	$10/MWH, $20/MWH, $30/MWH	$10/MWH, $20/MWH, $30/MWH

4. What the Adoption Model Outputs Represent, and How They Are Used to Create Bundle Sizes

Table J-3 above shows slight variations between input assumptions for the three different analyses conducted using the adoption model. In addition to differences in assumptions, there is a key difference in how the analysis in the last IRP and the analysis in this IRP would be implemented. Specifically, there is a difference in the assumptions about how the incentive levels analyzed in the adoption model would be used to acquire any DG solar bundles selected by EnCompass. In the 2019 IRP proceedings, the DSP proposed all incremental DG solar capacity receive the same incentive level as the highest bundle selected. In this Resource Plan, the amount of incremental solar receiving the incentive is capped at the amount of capacity projected in the solar adoption model. The capacity is targeted at DG solar that would not otherwise be installed without the incentive. This difference between the two IRPs, in which incentives are now assumed to be targeted at DG solar projects not already naturally occurring, was included in presentations to stakeholders on this construct and mitigates the Company's concern from the last IRP about the potential for substantial free ridership with this proposed modeling construct.

Once the adoption model provided by stakeholders produced the estimated MW levels for each of the proposed incentive levels, the residential and commercial adoption levels at a given incentive amount were bundled together. For example, for the year 2027, 3.8 MW of residential solar adoption and 4.4 MW commercial solar adoption were projected at an incentive of $10/MWH. Using the bundled approach, this means that EnCompass would be offered a single $10/MWH option for that year instead of separate residential and commercial DG solar bundles.

Finally, the bundles are composed of 5-6 year periods of acquisitions, instead of the 15 year periods that were proposed by the DSP in the last IRP. For example, Bundle 1 offers $10/MWH of incentive payments to customers installing new DG solar systems between 2024 and 2029, instead of the entire time period from 2024-2040. This was

done to allow for contiguous years of consistent incentive level, which encourages customer participation without being locked into a long term bundle. This approach ensures that the cost of acquiring new solar in the 2030s does not exceed the price of new utility-scale solar during the same time horizon. Due to the declining price of utility scale solar, bundles with higher acquisition costs can be a cost-effective alternative to utility-scale solar in the 2020s but exceed the projected price of utility-scale solar in the 2030s. Providing bundles in 5-6 year segments instead of 15 year segments allows EnCompass to minimize the number of years in which this phenomenon occurs.

5. Bundle Costs as Represented in EnCompass

While each DG solar bundle directly adopts the MW size estimates generated by the adoption model, the cost assumption provided to EnCompass for each bundle is adapted to reflect administrative costs necessary for the utility to acquire DG solar from customers via incentive payments. This step is another key difference from the analysis put forth by the DSP in the last IRP, which did not assume any cost to the utility for acquiring solar resources directly from customers. Since EnCompass modeling involves generic acquisition assumptions, generic administration costs were generated for each bundle by using as a proxy at the same level of adminstrative budget relative to the entire estimated annual cost as is used for the residential and business segments in the ECO Triennial 2024 plan.[29] As further discussed below, if bundles are selected in EnCompass modeling, the actual costs would need to be determined through a subsequent analysis to assess whether the modeled amounts of DG solar are achievable. Such an analysis can also incorporate more granular procurement details, such as potential locations, project types, or customer segments to target.

6. Bundles Provided in EnCompass Modeling

The cost and size information from the adoption model analysis was used to develop the nine solar bundles shown below in Table J-4. The costs presented in this table include the proposed incentive payments modeled in the adoption model plus the previously discussed administrative costs.

[29] Decision, *In the Matter of Xcel Energy's 2024-2026 Energy Conservation and Optimization Triennial Plan*, Department of Commerce, December 1, 2023.

Table J-4: Solar Bundle Selectable Bundles Offered in EnCompass

Year	Bundles 1, 4, and 7		Bundles 2, 5, and 8		Bundles 3, 6, and 9	
	Incremental MW*	Acquisition Cost ($/MWH)	Incremental MW*	Acquisition Cost ($/MWH)	Incremental MW*	Acquisition Cost ($/MWH)
2024	9.86	$12.69	11.38	$25.37	13.09	$38.06
2025	9.17	$12.69	10.60	$25.37	12.22	$38.06
2026	8.58	$12.69	9.94	$25.37	11.49	$38.06
2027	8.08	$12.69	9.38	$25.37	10.86	$38.06
2028	7.66	$12.69	8.91	$25.37	10.33	$38.06
2029	7.30	$12.69	8.51	$25.37	9.89	$38.06
2030	7.01	$12.69	8.18	$25.37	9.53	$38.06
2031	6.77	$12.69	7.92	$25.37	9.23	$38.06
2032	6.59	$12.69	7.71	$25.37	9.00	$38.06
2033	5.98	$12.69	7.02	$25.37	8.22	$38.06
2034	5.48	$12.69	6.46	$25.37	7.58	$38.06
2035	3.43	$12.69	4.09	$25.37	4.85	$38.06
2036	3.21	$12.69	3.83	$25.37	4.55	$38.06
2037	3.00	$12.69	3.59	$25.37	4.28	$38.06
2038	2.83	$12.69	3.38	$25.37	4.04	$38.06
2039	2.67	$12.69	3.20	$25.37	3.83	$38.06
2040	3.43	$12.69	4.09	$25.37	4.85	$38.06
Cumulative Total By 2040[30]	96.4		112.8		63.4	

B. DG Solar Bundle Cost Categories

Costs associated with DG solar bundles impact various parties differently (i.e., participating customers who install solar systems realize costs and benefits that differ from those realized by the utility and non-participating customers). To address Order Point 15, in part, Table J-5 identifies the cost categories borne from each party's perspective. Costs stated here were not necessarily used in cost-effectiveness tests discussed below. Instead, they are presented to enable a more comprehensive evaluation when analyzing the achievable potential of DG solar bundles accepted in EnCompass modeling, as impacts will vary with program design, regulatory framework,

[30] Amount shown is incremental (new) DG solar installed each year. As with other solar resources in the EnCompass model, in each subsequent model year for the solar installed, a 0.5 percent annual degradation is assumed. The cumulative totals at the bottom of the table represent the total amount of solar offered into EnCompass by all bundles using the same level of customer incentive - $10/MWH, $20/MWH, or $30/MWH – inclusive of 0.5 percent annual degradation.

and local market conditions. The costs listed below were compared with cost categories used by other recent cost-effectiveness analyses of distributed solar.[31]

Table J-5: DG Solar Cost Categories

Cost Component	Description
Participating Customers	
Upfront Costs: Initial Solar Plant	Costs associated with purchasing and installation of solar system
Upfront Costs: Additional Distribution Upgrades	Any necessary upgrades to the distribution system for integration.
Ongoing Costs	Ongoing operation and maintenance costs during life of solar asset, including inverter replacement
Utility Or Non-Participating Customers	
Administration Costs (Labor Costs)	Costs related to administrative tasks such as program management and customer support.
Incremental Payments to Participating Customers	Payments made to participating customers as incentives or direct compensation for installing DG solar
Participating Customer Bill Reductions	Reduced revenues from reduced utility bills of participating customers. As noted further in the narrative this is not a net new cost to the system but cost shifts from these reductions can impact rates and/or bills for other customers.
Grid Technology Additions[32]	Investments in distribution grid infrastructure or technology to accommodate procured DG solar bundles.

[31] References include Benefits and Costs of Net Energy Metering in Washington. *Energy + Environmental Economics (E3)*. December 2023. Available at: https://www.ethree.com/wp-content/uploads/2023/12/E3_Benefits-and-Costs-of-Net-Energy-Metering-in-Washington_2023-12-21.pdfand National Standard Practice Manual for Benefit Cost-Analysis of Distributed Energy Resources. August 2020. Available at: https://www.nationalenergyscreeningproject.org/national-standard-practice-manual/

[32] As noted in the Benefits and Costs of Net Energy Metering (December 2023), grid modernization investments, such as distributed energy resource management system (DERMS), are not generally associated with a specific increment of DERs such as DG solar and are instead made strategically to enable the utility to better manage both existing and anticipated DERs. As such, these costs may be incurred largely on behalf of resources such as DG solar but are typically recovered from all customers, thus resulting in a net cost to ratepayers.

Regarding the participating customer bill reductions listed in the table above, it is important to note that due to the structure of net metering, while not directly impacting the revenue requirement on the resource side of the ledger,[33] effectively reduces sales. This reduction in sales does not correspond with a proportional decrease in the costs that the Company continues to incur in serving the customer. Consequently, net metering leads to a disparity between sales revenue and ongoing service costs which can result in bill and/or rate impacts for other customers. While we have noted this cost in Table J-5, in accordance with the National Standard Practice Manual, we have not included it in the standard cost-effectiveness testing discussed below.[34] This is because it is more appropriately studied in more in-depth rate, bill, or participation analyses outside the scope of this generic IRP modeling.

C. DG Solar Bundle Cost Effectiveness Tests

The Company employed several cost-effectiveness tests to evaluate the DG solar bundles instead of relying upon the results of a single cost-effectiveness test. Tests included an analog to the Minnesota Cost Test, and as agreed upon by stakeholders, use of the standard cost-effectiveness tests used in many demand-side management cost-effectiveness analyses – the Participant Test, Ratepayer Impact Measure Test, Utility Cost Test, and the Societal Cost Test. All bundles passed the Minnesota Cost Test analog and were passed forward to EnCompass modeling.[35]

D. Other topics as identified by stakeholders to develop DG solar bundles modeling construct.

A comprehensive summary of stakeholder engagement is included in Appendix S. While no other topics were identified by stakeholders to develop the DG solar bundle modeling construct, stakeholder input informed the development of the solar bundles in this Resource Plan.

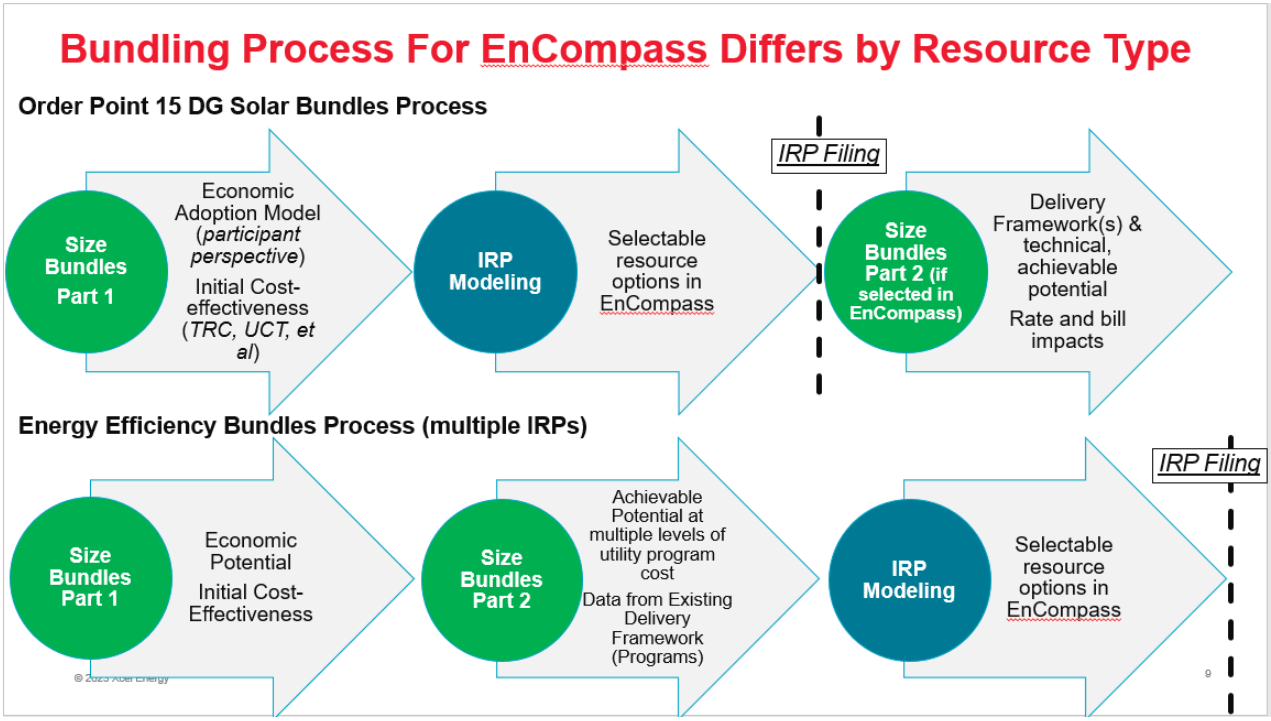
E. DG Solar Bundle Modeling Results and Next Steps

The results of this DG Solar Bundle modeling construct exercise are discussed in

[33] In the parlance of terminology regarding cost-effectiveness testing, this means that retail bill savings from customers installing DG solar systems are not a net new cost to the system (i.e., there is no revenue requirement or new financial transaction that is included in the rate base).
[34] The only exception is the Ratepayer Impact (RIM) Test.
[35] For more information regarding the Minnesota Cost Test, see Decision, *In the Matter of 2024-2026 Cost-Effectiveness Methodologies for Electric and Gas Investor-Owned Utilities*, Docket No. E,G999/CIP-23-46, March 31, 2023. (Further referred to as 2023 Cost-Effectiveness Decision).

Chapter 5: Economic Modeling Framework. As noted earlier, specific details on how these resources would be acquired, such as location, specific customers targeted, achievable potential, etc., fall outside the scope of this generic IRP modeling. These details would need to be identified, along with further cost-effectiveness testing updated with more granular inputs. Unlike EE and DR, the Company currently does not offer incentives for DG solar installations, outside of the Solar*Rewards program. Because of this different construct from EE and DR, additional analysis after bundle creation and EnCompass selection are necessary, as shown in the process comparison in Figure J-4 below.

Figure J-4: Summary of DG Solar and EE Bundle Processes



V. CONCLUSION

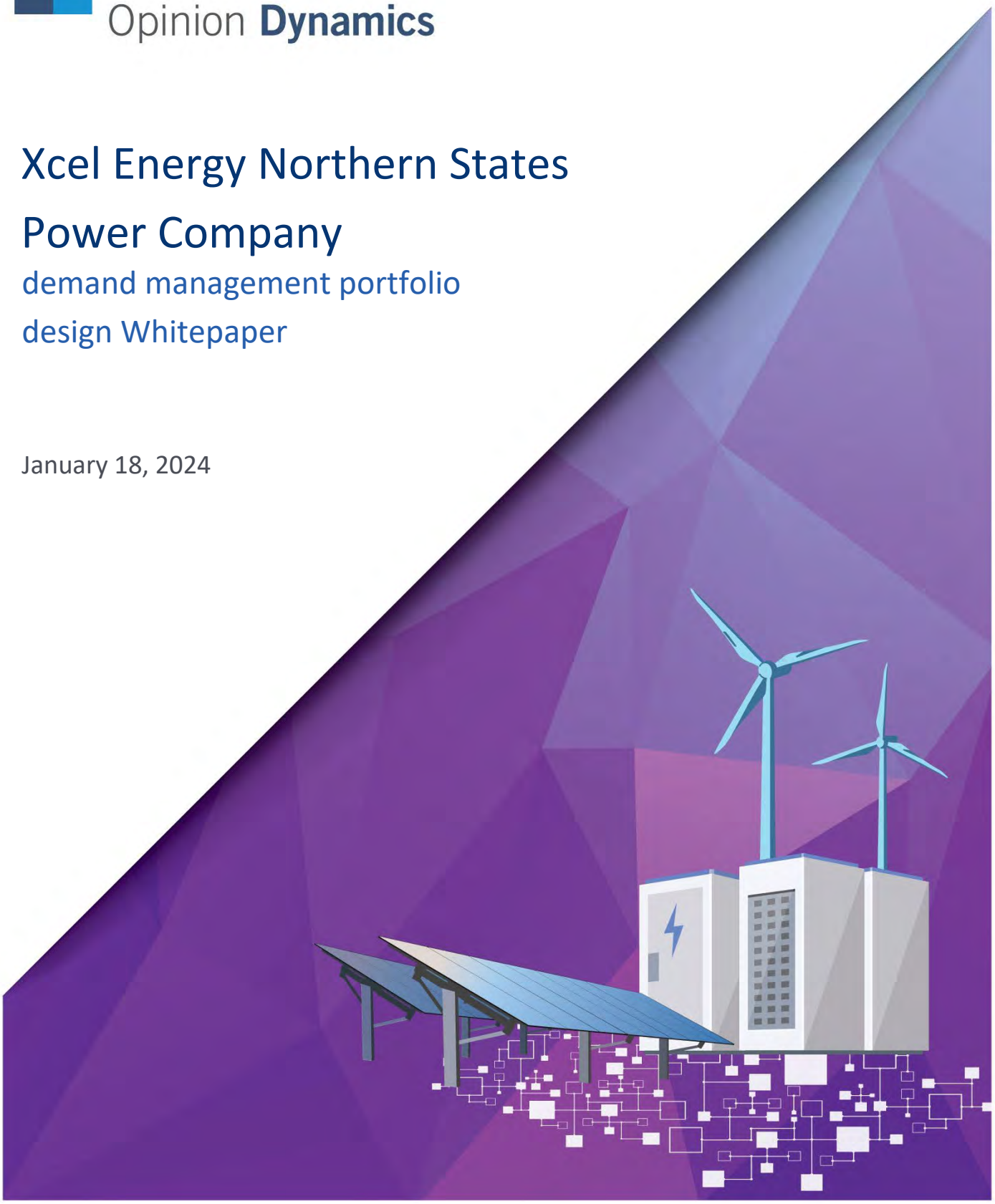
As noted above, DERs play an important role in our Resource Plan and are an essential part of our path towards carbon reduction. While the Company has a long history of integrating DERs into our system, advancements in technology will allow us to shift our efforts towards optimization of energy use, adding more value to the system.

Opinion Dynamics

Xcel Energy Northern States Power Company

demand management portfolio design Whitepaper

January 18, 2024



Introduction

Demand Response (DR) programs have been a part of energy planning for over 40 years. Over time, traditional DR has evolved in concert with the increasing availability of technologies unlocking breadth and depth of customer engagement, coupled with changing regulatory policies to address grid, customer, and climate needs. The last decade has marked an even more rapid evolution given the adoption of renewables, penetration of distributed energy resources (DERs), electrification policy objectives, and extreme weather events—creating a perfect environment to re-envision DR. As a result, new value streams have been unlocked, supplanting traditional DR with a more comprehensive approach: Load Flexibility.

This whitepaper explores the future opportunities and pathways to unlock the most value out of Load Flexibility in Xcel Energy's Northern States Power Company (NSP) service territory. To that end, the whitepaper addresses:

- The history of DR in the United States
- The state of DR programs and offerings in the Upper Midwest
- The evolution of Demand Response to Load Flexibility, including considerations to support NSP's future grid needs

Evolution of Demand Response in the United States

History of Demand Response in the United States

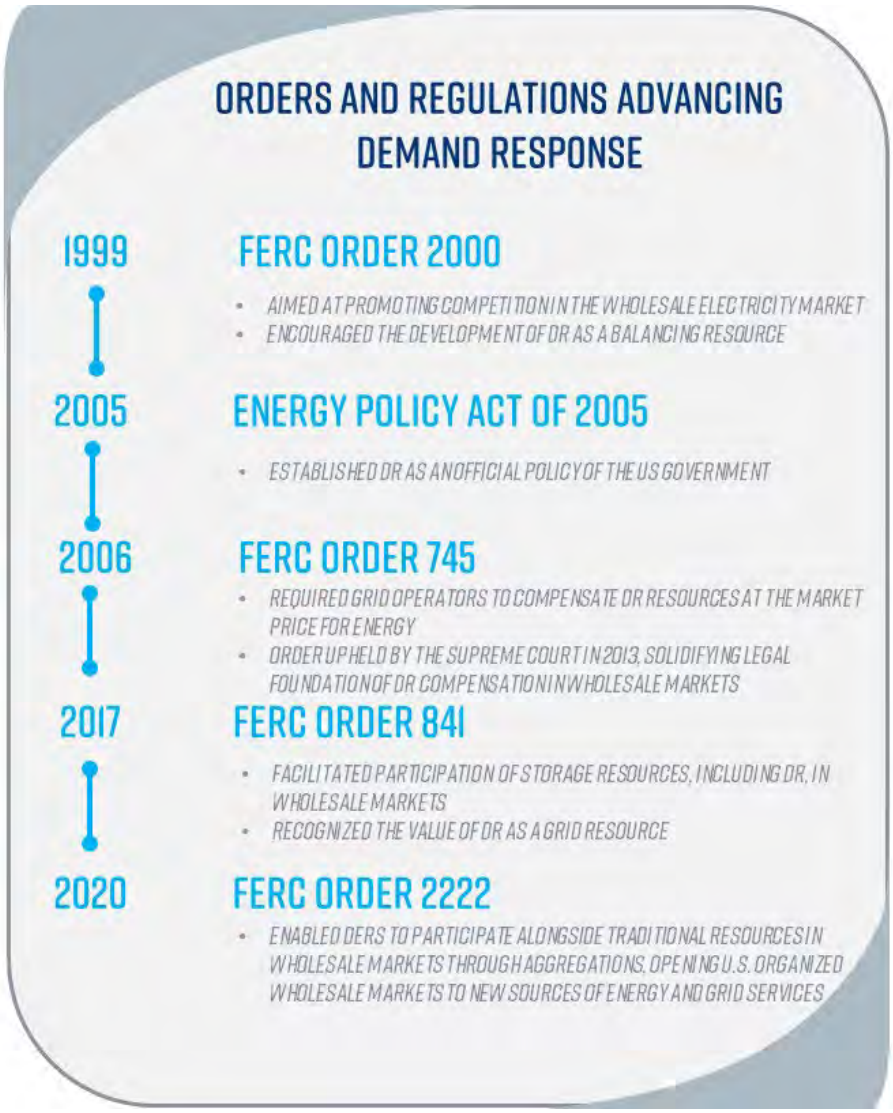
Demand Response is defined as "changes in electric usage by demand-side resources from their normal consumption patterns in response to changes in the price of electricity over time, or to incentive payments designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized." – Federal Energy Regulatory Commission (FERC)

Demand response (DR) programs originated in the 1970s and 1980s as utilities began to experiment with demand-side management (DSM) initiatives to tackle concerns about energy efficiency and peak demand.

The Energy Policy Act of 1992 was a significant milestone in the development of DR in the United States. It encouraged utilities to invest in energy efficiency and DR programs by allowing them to recover costs associated with these initiatives.

Beginning in 1999, a series of federal rules and orders established DR as a recognized resource in the wholesale markets (see sidebar). In response to regulatory signals and grid needs, DR programs have evolved significantly over time.

The advent and development of smart grid technologies facilitated better communication between utilities and consumers, which paved the way for more sophisticated DR programs.



DR Value Streams

This whitepaper focuses on value streams that are cost-effective for utilities to implement within the Upper Midwest, drawing from NSP's 2019 Potential Study associated with system peak demand. We acknowledge that additional value streams, such as affordability and carbon reduction, are not included in this framework (Hledik et al. 2019).

Table 1. DR Value Streams by Typology

DR Typology	Value Stream	Description
Traditional DR	Avoided generation capacity costs	Reduced need for new peaking capacity
	Reduced peak energy costs	Reduced load during high-priced peak periods
	System-wide deferral of transmission and distribution	Reduced need for peak-driven upgrades in transmission and distribution capacity
Non-Traditional DR	Geotargeted distribution capacity investment deferral	Targeted DR investments where load reductions would defer localized needs for capacity upgrades
	Ancillary services	Real-time adjustments to load from some end-use applications to mitigate system imbalances
	Load building/valley filling	Shifting on-peak load to off-peak hours
	Facilitating better integration of non-dispatchable, intermittent renewable generation resources	Adjusting load (up or down) as non-dispatchable renewables come online or go offline

Since 1970, DR programs have been evolving, albeit at varying timescales based on geographic, regulatory, and grid features. This evolution is classified broadly into three phases: DR 1.0 – The Past, DR 2.0 – The Present, and DR 3.0 – The Future, which align with an increasing array of value streams.[1]

DR 1.0 – The Past

- The earliest DR programs were interruptible tariffs (manual dispatches for large commercial and industrial [C&I] customers and one-way communication load control devices for residential customers).
- DR was primarily used to provide energy and/or capacity when wholesale prices were unusually high, there was a shortfall in generation or transmission capacity, or during unexpected emergency grid operating situations. Notifications were manual, and there was little to no customer feedback on performance.[2]
- Activities focused on demand reductions during a limited peak window for a small number of hours per year with the following associated value streams: generation capacity avoidance, reduced peak energy costs, and system peak-related transmission and distribution deferral (Faruqui and Hledik 2018).

DR 2.0 – The Present

- DR became integral to most wholesale markets and grid operation systems in the US. DR provided more precise energy and capacity to support wholesale marketplace activities, as well as sophisticated and near real-time measurements, which were often used as the system of record for customer feedback and confirmation of customer performance.
- Program variety increased, alongside increasing automation and program sophistication (e.g., transition of air conditioning switch programs to smart thermostats, C&I programs that extend beyond simple interruptible tariffs [e.g., demand bidding, performance-based payments], exploration of DR potential among small businesses, EV-managed charging programs, etc.).

[1] The descriptions of DR 1.0, 2.0, and 3.0 are informed by the authors' industry experience as well as their role facilitating Peak Load Management Alliance's "The Evolution of DR to DER" training class.
[2] NSP's traditional event-based DR (DR 1.0) is dispatched in response to emergency events called by MISO and does *not* refer to participation in MISO's day-ahead or real-time energy markets.

- Communication signals improved, which contributed to DR program variations.
- Adoption of advanced metering infrastructure (AMI) created additional DR program options, such as behavioral DR, critical peak pricing, and peak time rebates.
- DR timing moved beyond event-window peak shaving to the potential for 24/7 continuous management, and existing programs increasingly focused on targeted distribution capacity deferral.

DR 3.0 – The Future

- DR will be characterized by greater complexity.
- DR (or the DR 3.0 paradigm of "Load Flexibility") will evolve to be a component of broader distributed energy resources (DERs), including distributed photovoltaic (PV), EV charging, and various forms of energy/thermal storage, both on a grid operating system scale as well as behind-the-meter (i.e., on the customer side of the meter).

Load Flexibility is defined by the California Energy Commission as "the practice of adjusting load (or energy usage) to match the supply of electricity."

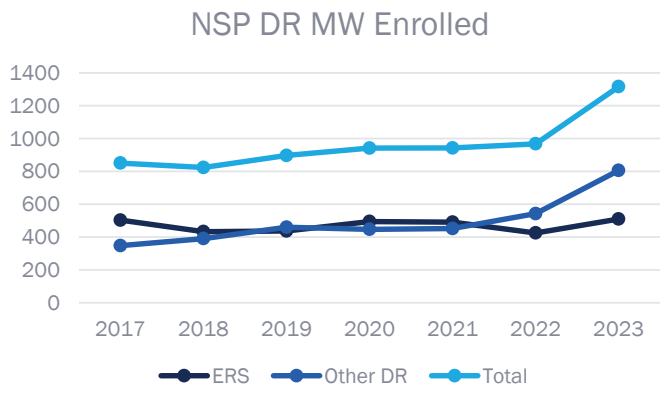
- Where wholesale markets exist, the major underlying economic principle of DR is a price signal, which moves the industry away from traditional "command-and-control" mechanisms to manage grid operations. In DR 3.0, Load Flexibility is not necessarily triggered directly by the utility or by the system operator; rather, dynamic loads can also be modified automatically via devices that react to pre-programmed price thresholds, although prices do not always trigger a DR signal. Utilities can also rely on a grid signal, such as voltage, rather than a price signal for emergencies and system peaks.
- DR can provide a variety of service benefits to customers and grid operators. Customers may even be "prosumers" who both provide and consume grid power, including volt/var control, renewable energy integration, and localized distribution system congestion management.
- Importantly, a broader definition of DR (including behavioral, EV, grid-interactive water heating, battery storage, etc.) across an 8760-time scale can unlock additional value streams (e.g., valley filling/load building and ancillary services). Lawrence Berkeley National Laboratory's landmark 2017 study put forth a novel framework for classifying Load Flexibility resources into four distinct "service types": Shape, Shed, Shift, and Shimmy. This work standardized nomenclature around these various Load Flexibility value streams, effectively replacing the historic monolithic concept of event-based DR with a more nuanced Load Flexibility framework.
- Many Load Flexibility value streams have not been established or quantified yet, though efforts are well underway, and opportunities abound. Most of the efforts across the country are nascent, with pilots showing promising results.

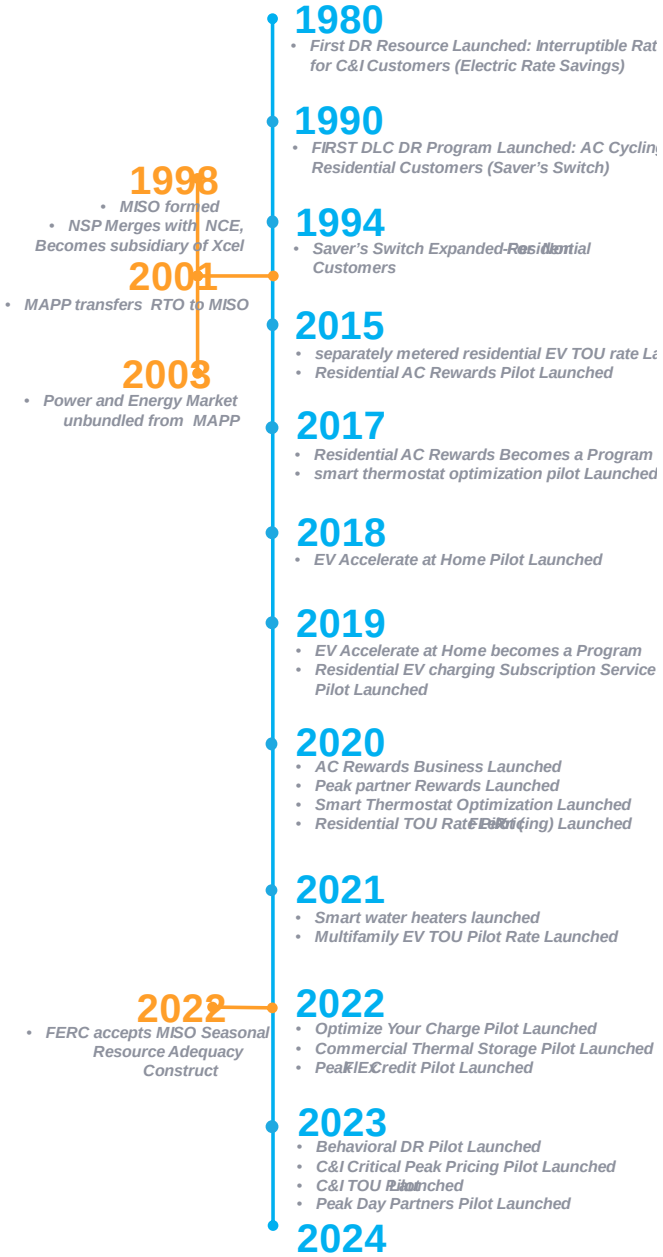
The State of DR Programs and Offerings in the Midwest

Xcel Energy: Northern States Power Company

NSP's history with DR began in 1980 with the launch of Electric Rate Savings (ERS). Over the next decade and a half, NSP launched two other flagship DR programs: Saver's Switch programs for both residential and non-residential customers. These legacy DR programs constitute over three-quarters of NSP's current DR potential. Notably, these DR 1.0 programs were developed under a different market construct (the Mid-Continent Area Power Pool, or "MAPP") than the current wholesale markets operated in the region through the Midcontinent Independent System Operator, Inc. (MISO).

Xcel Energy NSP has rapidly expanded its DR offerings in Minnesota in recent years, deploying at least one new pilot or program every year since 2017, including the launch of three new Load Flexibility pilots in 2022. Since 2017 alone, NSP acquired an additional 482 MW of capacity.[3]





NSP's current DR portfolio spans a variety of end uses and load modification strategies. Accordingly, Xcel Energy's efforts to expand its DR portfolio in Minnesota have contributed to steady inclines in flexible MW potential (see chart of MW Enrolled). These new offerings have resulted in net increases in DR potential despite declining MW enrollments in ERS (NSP's largest single source of DR potential). Per NSP's forthcoming DR Compliance Filing to the Minnesota PUC: "In total, the Company now has 14 percent of its peak demand available for demand response control across its Northern States Power Company jurisdictions. This includes active enrollment of approximately 460,000 residential and small business customers and 19,000 commercial and industrial customers in

[3] As of publication, this value has yet to be externally published. This value is forthcoming in the same docket referenced in the prior DR Compliance Filing (Northern States Power Company 2023a).

demand response programs" (see Table 2).[4] These enrollment numbers suggest that traditional DR enrollment rates may be approaching saturation. Based on findings from Brattle's 2019 Potential Study cited in NSP's last Integrative Resource Plan (IRP), opportunities to further grow NSP's traditional DR potential may be limited, as "the market for traditional cost-effective DR in MN may be approaching saturation" resulting in enrollment plateaus (Hledik et al. 2019). As of 2023, NSP achieved 1,316 MW of DR resources; exceeding the identified 2023 potential of 1,143 MW referenced in Hledik et al. 2019.[5] Thus, expanding non-traditional load flexibility is necessary to enable the subsequent growth of NSP's DR portfolio. Accordingly, NSP will need to pursue additional program offerings to exceed the MW and customer enrollment plateau that NSP may be very close to meeting. As a result, exceptional customer engagement and satisfaction will be essential to ensure existing legacy programs maintain customer enrollment.

[4] As of publication, these values have yet to be externally published. These values are forthcoming in the same docket referenced in the prior DR Compliance Filing (Northern States Power Company 2023a).

[5] Cost-effectiveness results for some newer DR resources are still pending, as many of NSP's new DR offerings are still in the pilot phase.

Table 2. Total MW Enrolled by Customer Class

Customer Class	Program	Description	Launch Year	Eligibility	Participants Enrollled (2023)	MW Enrolled (2023)	MW Enrolled: Fraction of Total (2023)
Residental	Residential DR: *Saver's Switch AC Rewards Smart Water Heaters*	Switch or smart thermostat AC direct load control program and water heater direct load control program	*Saver's Switch:* 1990 *AC Rewards:* 2015 *Smart Water Heaters*: 2021	Residential customers with central AC systems or heat pump water heaters	458,347	542	41%
	EV Optimization Pilot	Will study the management of the grid impacts of electric vehicles by working with customers to provide schedule options for their daily EV charging. The schedule options ensure charging occurs outside the Company's system peak and are designed to stagger charging times to avoid demand spikes during the off-peak period.	2022	Residential customers charging an electric vehicle at a residential address. Must use eligible equipment or drive an eligible vehicle.	1,337	2	0.2%
Commercial / Industrial	Electric Rate Savings	Demand charge discount for reducing load by at least 50 kW during control periods	1980	Business customers capable of reducing load by >50 kW	1,886	510	39%
	Peak Partner Rewards	Bill credit for reducing demand by at least 25 kW during control periods	2021	Business customers who contract to reduce demand by ≥25 kW	82	20	2%
	Commercial AC Control: *Saver's Switch AC Rewards*	Switch or smart thermostat direct load control program	*Saver's Switch:* 1994 *AC Rewards:* 2020	Commercial customers with central AC systems	16,807	138	10%
	EV Optimization Pilot	Will study the management of the grid impacts of electric vehicles by working with customers to provide schedule options for their daily EV charging. The schedule options ensure charging occurs outside the Company's system peak and are designed to stagger charging times to avoid demand spikes during the off-peak period.	2022	Busines customers charging an electric vehicle at a business address. Must use eligible equipment or drive an eligible vehicle.	8	0	0%
	Peak Flex Credit Pilot	Dispatchable, load-shedding program for commercial customers that provides additional flexibility and optionality to customers who want to design program parameters to work within their operational and business needs. This pilot provides pricing for both peak control events as well as buy-through options for economic control events and includes a tranche of load intended for third-party aggregation.	2022	Business customers capable of reducing load by 50 kW	4	4	0.3%
	Critical Peak Pricing Pilot	Pilot will study new time-varying rate design for a number of commercial and industrial customers. Features a three-part rate that incorporates energy and demand charges into a single volumetric rate. This rate also features a critical peak pricing component, where the Company calls events during times of extreme system peak. This pilot is paired with the General Time of Use Pilot above and is intended to inform the future design of commercial and industrial rates.	2023	Business customers with demand ≥50 kW over the preceding 12 months and with a load factor ≥30% over last 12 months	5	1	0.1%
	Peak Day Partners Pilot	The Peak Day Partners pilot program will offer commercial and industrial customers an incentive through an incentive bidding process, in exchange for reducing their peak load during periods when demand is high. The product purpose is to provide the Company with an additional power purchase resource to manage system requirements more efficiently during exceptional periods, and the Customer the option of receiving pricing associated with energy supply markets during such periods.	2023	Business customers capable of reducing load by 500 kW	37	99	8%
Totals	**All Programs**	**N/A**			**478,513**	**1,316**	**100%**

NSP's DR portfolio growth reflects the planning value that DR brings. Specifically, DR contributes to NSP's resource adequacy (RA) needs and helps ensure that NSP has a sufficient reserve margin (RM) for safe, reliable, and resilient operations. Grid and economic conditions over the last few years have not typically required frequent dispatch of DR resources to meet NSP's peak capacity needs. Nonetheless, NSP's current DR potential is essential to maintain the requisite RA and RM.

Additionally, NSP may be able to realize new value streams going forward, such as emergency and distributional value streams (the latter of which do not necessarily align with traditional MISO value streams). Additionally, MISO's new seasonal construct can potentially provide non-summer avoided generation capacity value for NSP. Accordingly, NSP has been expanding its winter DR capability, first by testing winter events in ERS in 2017 and later actively dispatching more frequently during the 2023/2024 winter season.

A comparison of independent system operators (ISOs)/regional transmission organizations (RTOs) reveals the regionally specific nature of DR value streams. Whereas neighboring PJM has a formal capacity market where load serving entities (LSE) can bid DR into the market, DR in MISO is used as a planning tool and for emergency response. Specifically, a LSE's DR resources can be used to meet MISO's annual capacity requirement and reserve margins (Sustainable FERC Project 2024a). These DR resources may then be dispatched in response to emergency events called by MISO. Conversely, DR is *not* dispatched or bid into MISO's day-ahead or real-time energy markets. Like MISO, CAISO also lacks a formal capacity market but has mandatory resource adequacy requirements (Sustainable FERC Project 2024b). Accordingly, other markets may offer more cost-effective DR 3.0 opportunities for their constituent LSEs than the value streams found in MISO.

An examination of capacity clearing prices and wholesale energy prices also exposes significant variation across ISOs/RTOs. For example, MISO's North/Central zones (which include NSP's operating territory) had capacity clearing prices at $15/MW-Day or lower in the 2021/2022 and 2023/2024 Planning Resource Auctions (PRA), whereas the 2022/2023 PRA clearing price was $236.66/MW-Day (15+ times higher) due to capacity shortfalls in four zones during that PRA cycle. PJM capacity prices have also experienced significant variation during that timeframe, ranging from $34.13/MW-Day in the recent 2023/2024 auction to $140/MW-Day in the 2021/2022 auction. Excluding the aberrant MISO clearing price spike in 2022/2023, PJM had higher capacity clearing prices than MISO in the past few auction cycles. CAISO, on the other hand, experienced less variation but had consistently high capacity prices over the last three years, with capacity prices ranging from $215.01/MW-Day to $227.84/MW-Day.[6] Locational Marginal Prices (LMP) for energy expose additional variation, with CAISO demonstrating notably different LMP trends than both MISO's North/Central hubs and PJM (which share more comparable LMP trends). When assessing example winter and summer days between the three ISOs/RTOs, CAISO consistently has the highest day-ahead prices, as well as the largest price swings within a given day.

Benchmarking against other utilities in the region

Based on a review of DR portfolios in the Upper Midwest, we found that NSP's DR program deployment is on par with investor-owned utilities the region. In general, we found that these portfolios reflect the value streams that are accessible given the market. Specifically, they are all summer peak-focused, and pilot activities are emergent (such as time-varying rate solutions). Across the Midwest, nascent efforts are underway to test DR applications beyond capacity in preparation for the transition to the Load Flexibility paradigm. The following two pages demonstrate how NSP's DR portfolio compares to other utilities in the Upper Midwest.

[6] CAISO reports capacity prices in $/kW-month. Values referenced in this paper have been scaled to reflect reporting units used in MISO and PJM ($/MW-day).

		RESIDENTIAL									COMMERCIAL AND INDUSTRIAL								
	UTILITY	AC CYCLING	SMART TSTAT DLC	WATER HEATER DLC	SPACE HEATING DLC	EV DR	OTHER DEVICE DLC	BEHAVIORAL DR	TIME-OF-USE RATE	CRITICAL PEAK PRICING RATE	AC CYCLING	WATER HEATER DLC	SPACE HEATING DLC	OTHER DEVICE DLC	CUSTOMER NOMINATED CURTAILMENT	INTERRUPTIBLE RATE	TIME-OF-USE RATE	CRITICAL PEAK PRICING RATE	REAL TIME PRICING RATE
	Xcel Energy Minnesota	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
MICHIGAN	Alpena Power Co.								✓							✓	✓		
MICHIGAN	Consumers Energy	✓	✓			✓		✓	✓						✓	✓	✓		
MICHIGAN	Detroit Edison Co.	✓	✓	✓		✓			✓	✓						✓	✓	✓	
MICHIGAN	Indiana Michigan Power	✓	✓	✓		✓		✓	✓	✓	✓				✓	✓	✓	✓	
MICHIGAN	Upper Peninsula Power Co.															✓		✓	✓
MICHIGAN	Wisconsin Electric Power Co.	✓		✓					✓		✓	✓			✓	✓	✓		✓
MICHIGAN	Wisconsin Public Service Corp.	✓		✓					✓		✓	✓				✓	✓		
MINNESOTA	Minnesota Power			✓	✓	✓	✓		✓			✓	✓	✓		✓			
MINNESOTA	Northwestern Wisconsin Electric Co.			✓	✓				✓								✓		
MINNESOTA	Otter Tail Power Co.	✓		✓	✓	✓	✓				✓	✓	✓	✓			✓		
NORTH DAKOTA	Montana-Dakota Utilities Co.				✓				✓						✓	✓	✓		
NORTH DAKOTA	Otter Tail Power Co.	✓		✓	✓		✓				✓	✓	✓				✓		

	UTILITY	RESIDENTIAL									COMMERCIAL AND INDUSTRIAL								
		AC CYCLING	SMART TSTAT DLC	WATER HEATER DLC	SPACE HEATING DLC	EV DR	OTHER DEVICE DLC	BEHAVIORAL DR	TIME-OF-USE RATE	CRITICAL PEAK PRICING RATE	AC CYCLING	WATER HEATER DLC	SPACE HEATING DLC	OTHER DEVICE DLC	CUSTOMER NOMINATED CURTAILMENT	INTERRUPTIBLE RATE	TIME-OF-USE RATE	CRITICAL PEAK PRICING RATE	REAL TIME PRICING RATE
	Xcel Energy Minnesota	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
MICHIGAN	Alpena Power Co.								✓							✓	✓		
MICHIGAN	Consumers Energy	✓	✓			✓		✓	✓						✓	✓	✓		
MICHIGAN	Detroit Edison Co.	✓	✓	✓		✓			✓	✓						✓	✓	✓	
MICHIGAN	Indiana Michigan Power	✓	✓	✓		✓		✓	✓	✓	✓				✓	✓	✓	✓	
MICHIGAN	Upper Peninsula Power Co.															✓		✓	✓
MICHIGAN	Wisconsin Electric Power Co.	✓		✓					✓		✓	✓			✓	✓	✓		✓
MICHIGAN	Wisconsin Public Service Corp.	✓		✓					✓		✓	✓				✓	✓		
MINNESOTA	Minnesota Power			✓	✓	✓	✓		✓			✓	✓	✓		✓			
MINNESOTA	Northwestern Wisconsin Electric Co.			✓	✓				✓								✓		
MINNESOTA	Otter Tail Power Co.	✓		✓	✓	✓	✓				✓	✓	✓	✓			✓		
NORTH DAKOTA	Montana-Dakota Utilities Co.				✓				✓						✓	✓	✓		
NORTH DAKOTA	Otter Tail Power Co.	✓		✓	✓		✓				✓	✓	✓				✓		

Load Flexibility Transition

DER National Trends

Deployment of DERs has increased nationwide in recent years and is anticipated to continue increasing in the future. The most common DERs include solar and wind, combined heat and power, energy storage solutions, load-modifiable end uses (such as smart thermostats or EVs), as well as microgrids and nanogrids. DERs are frequently grouped into three main categories: demand (e.g., EV chargers, smart thermostats paired with HVAC systems), storage (e.g., behind-the-meter storage and EV batteries), and generation (e.g., solar and wind). The various DERs have differing effects on the grid, and each presents unique DR and Load Flexibility opportunities.

Over the last three years, the US installed over 40 GW of solar PV, fueled largely by the steep and ongoing decrease in the prices of solar modules and inverters, as well as extended federal tax credits (Solar Energy Industries Association 2023).

According to Bloomberg NEF's annual battery price survey, battery prices (including both behind-the-meter and utility-grade) have also been declining for several years and experienced a 14% drop from 2022 to 2023, reaching a record low of $139/kWh due to falling raw material and component prices.

The US energy storage market installed a record 4.8 GW in 2022, with installations expected to reach almost 63 GW between 2023 and 2027 (Wood Mackenzie Power 2023). In Q3 2023, grid-scale storage deployment in the US grew by 52% over the previous year from 4.5 GW to over 6 GW. Distributed storage is expected to grow twice as fast as grid-scale (Wood Mackenzie Power and Renewables/American Clean Power 2023).

Over the last few years, EVs have emerged as a formidable DER. Due to the decreasing manufacturing costs of electric vehicle batteries, along with improvements in the driving range of electric vehicles and supportive policies from corporate, state, and federal governments (such as the Corporate Average Fuel Economy standards, Clean Vehicle Credits enacted by the Inflation Reduction Act [IRA], and the Clean Air Act), the market share of light duty EVs has increased exponentially. In 2023 alone, over 1.2 million EVs were sold in the US, representing over 8% of all light-duty vehicles. In comparison, over 4.5 million EVs have been sold in total since 2010. Myriad efforts are underway to understand EV Load Flexibility through rate-based solutions and managed charging programs (Argonne National Laboratory 2023). Efforts are springing up across the country to test the vehicle-to-grid (V2G) and vehicle-to-home (V2H) capabilities of EVs.

Building electrification goes hand-in-hand with transportation electrification. With significant potential to mitigate emissions and decarbonize energy supply chains, building electrification has been on the rise in the US. More specifically, the percentage of US homes heated with electricity has increased steadily from 1% in 1950 to 40% in 2020, and the electrification trend continued to intensify, fueled by favorable state and federal policies (Davis 2022). Between 2022 and 2023, multiple states have passed major new laws promoting clean heating through fuel switching (Minnesota Energy Conservation and Optimization Act, Illinois Climate and Equitable Jobs Act, and the Colorado SB21-246, among many others), and IRA legislation offers a suite of financial incentives to encourage individuals and businesses to invest

Each year from 2025 to 2030, the US grid is expected to add 20–90 GW of nameplate demand capacity from EV charging infrastructure and 300–540 GW of nameplate storage capacity from EV batteries, an additional 5–6 GW of flexible demand from smart thermostats, water heaters, and non-residential DERs, 20–35 GW of nameplate generation capacity from distributed solar and fuel-based generators, and 7–24 GW of nameplate storage capacity from stationary batteries.

in clean, efficient alternatives for their homes and businesses (Smedick, Golden, and Petersen 2022). For example, in 2022, heat pumps outsold fossil fuel-based heating systems in the US.

Forecasted estimates across the industry for DER penetration consistently predict the addition of more varied resources to the grid as well as the increasing complexity of resources interacting with one another. These interactions are made possible by the emergence and growth of smart grid and building technologies, ranging from smart thermostats to complex Virtual Power Plants (VPP) capable of aggregating and orchestrating multiple DERs in an automated environment.

FERC Order 2222 allowed the participation of VPPs in wholesale markets. While the implementation of the order is ongoing across the wholesale markets, as of August 2023, two out of six FERC-jurisdictional ISOs/RTOs allowed participation from VPPs that inject electricity for at least a subset of grid services. Texas also began opening the Electric Reliability Council of Texas (ERCOT) market to VPPs.

Xcel defines VPPs as: "an aggregation of controllable DERs managed at a scale that provides grid services or attributes, including energy and negative energy, ancillary services, and capacity. DERs aggregated to create a VPP could be utility or customer owned, in-front or behind the meter. DER assets in a VPP could include, but are not limited to, photovoltaic solar, energy storage, electric vehicles, and demand-responsive devices such as water heaters, air conditioning units, thermostats, and appliances. A VPP has benefits, such as the ability to deliver peak load electricity or load-following power generation on short notice. Such a VPP could replace a conventional power plant while providing higher efficiency and more flexibility, which allows the system to react better to load fluctuations. Resources that are part of a VPP may also be able to provide local grid benefits (to the extent that the resources are in close proximity to a local constraint) such as reducing loading on a distribution feeder" (Northern States Power Company 2023b).

Utilities across the country are pursuing price signals to better manage DERs—and demand in general—in the form of time-varying rates. Some states, like California, opted for a broad TOU defaulting approach, while others, like Oregon, are pursuing a targeted exploration of load-shifting capabilities of time-varying rates. Regardless of approach, across the country, time-varying rates are moving from the periphery to the mainstream of electricity pricing, fueled by the adoption of AMI technology. The arc of price responsiveness shows great promise in the ability of time-varying rates to support flexible load management (Faruqui and Tang, 2023).

The Department of Energy (DOE) Grid-Interactive Efficient Building Initiative fueled the development of roadmaps, frameworks, and pilots to test smart building technologies capable of grid integration (Office of Energy Efficiency & Renewable Energy 2023). While VPPs are not new and have been operating with commercially available technology for years, they have become an emerging solution in recent years, capable of aggregating DERs and contributing to resource adequacy at a low cost. VPPs deliver economic benefits, increase resiliency, offer carbon and other benefits, reduce T&D congestion, and empower communities. While integration of VPPs into electricity system planning, operations, and market participation has been limited to date, studies of VPPs across the

country point to their strong potential to deliver value to both the bulk power system as well as distribution system in vertically integrated and restructured energy market environments.

The growth of DERs is fundamentally reshaping the electric industry and making the operation of the grid considerably more challenging as more DERs are added. However, DERs can also offer a tremendous amount of additional flexibility for meeting load needs throughout the day, month, and year, thus opening new value streams for utilities to leverage. As such, Load Flexibility is increasingly important to ensure that the adoption of DERs and renewables is orchestrated effectively and efficiently.

From DR to Load Flexibility

In the context of growing DERs and grid-edge solutions, such as VPPs and grid-integrated buildings, the traditional event-based paradigm of DR is evolving into a Load Flexibility paradigm. Within this paradigm, electricity consumption is managed in increasingly granular units of time to address economic and system reliability conditions. California and New York were among the first states to pioneer Load Flexibility by instituting regulatory paradigms and roadmaps for integrating DERs. In California specifically, the Energy Division of the California Public Utilities Commission (CPUC) released a white paper and a proposal aiming at bringing together disparate baskets of flexible load solutions into a unified load management signal (Phillips 2022) (Madduri et al. 2022).

Other parts of the country are dipping their toes into the world of DER integration by piloting VPPs and innovative flexible load pilots. The efforts are still nascent and exploratory, seeking to properly assess the potential and ascertain value streams. We selected three distinct examples to demonstrate a cross-section of innovative flexible load initiatives across the country. For more information on these examples, see Appendix A.

Renewable Battery Connect Program
Public Service Company of Colorado

Sector
Residential/small business

Load Control Strategy
Solar Charged Battery Discharge

Dispatch Timing
Any time of year, Typically afternoons/evenings of the hottest days of the year

Participant Eligibility
Single-family homes/small businesses with solar and newly installed tesla powerwall or Solaredge home hub inverter with solaredge home battery

Enrollment
Opt-In

Participant Count
65 customers with 90 Batteries, 200 additional applications in the Queue

DR Potential
Current: 0.73 MW
Goal: 10 MW (by end of 2025)

Peak Power Rewards Program
Pacific Gas & Electric

Sector
Residential

Load Control Strategy
Battery Discharge

Dispatch Timing
Everyday 7 p.m. to 9 p.m. from August to October

Participant Eligibility
Single-family homes with Sunrun solar systems and LG Chem/SolarEdge/Tesla Powerwall battery

Enrollment
Opt-out

Participant Count
8,500 customers

DR Potential
34 MW

Multifamily Water Heater Pilot
Portland General Electric

Sector
Multifamily

Load Control Strategy
Water Heater curtailment

Dispatch Timing
Non-holiday weekdays, Timing dependent on grid needs, typically summer evenings and winter mornings/evenings

Participant Eligibility
Multifamily properties with at least 50 individually metered units and 80-gallon electric resistance water heaters

Enrollment
Opt-in

Participant Count
13,000+ switches

DR Potential
Summer: 2.4 MW Winter: 4.5 MW

Planning the Transition in Xcel Energy's service territory

Emerging Trends

According to the 2019 NSP Potential Study conducted by the Brattle Group, "NSP's cost effective opportunities to date have been constrained by limitations of the metering technologies, access to low-cost peaking capacity, a limited need for distribution capacity deferral and grid balancing services, and the relatively high cost of emerging DR technologies" (Northern States Power Company 2019, Appendix G2). However, this equation has begun to change since that study was published: AMI deployment is anticipated to be finished by the end of 2025 and a capacity shortfall is now anticipated as of 2027 (Northern States Power Company 2023c). In the short term, NSP does not foresee distribution system challenges that can be addressed by DR or Load Flexibility alone. The price signals associated with additional value streams for DR, such as ancillary services, have not historically fueled further growth of DR resources in NSP territory.

These legacy limitations and nuances historically shaped the value streams and available applications of NSP's existing DR programs. A substantial portion of the value of NSP's DR resources to date has been avoidance of load-supporting generation. As a result, the design of NSP's DR programs focused on supporting event-based peak shaving as opposed to continuous load management.

Nonetheless, the growth and proliferation of DERs, as well as the evolution of DR to Load Flexibility, is occurring in Xcel Energy's NSP service territory alongside the rest of the nation. The nuances of the service territory's forecasted generation mix, customer composition, and energy market shape a unique evolution trajectory with a distinct set of needs and potential solutions.

Minnesota's population is poised for significant growth, with the Minnesota State Demographic Center forecasting that the state will gain 850,000 new residents between 2020 and 2070, a 15% increase from 2020 levels. Steady predicted urbanization of the population will lead to a declining population in two-thirds of Minnesota's 87 counties (Minnesota State Demographic Center 2023).

Renewable resources, including wind, solar, hydropower, and biomass, generated the largest share of Minnesota's electricity in 2022. In 2022, wind provided 23% of Minnesota's total in-state electricity net generation, and solar provided 4%. Minnesota's mandatory renewable energy portfolio standard (RPS) requires that the state's electricity providers generate or procure at least 25% of their electricity retail sales from eligible renewable sources by 2025, apart from the state's largest utility, which must meet an even higher standard. Xcel Energy seeks to generate all power from carbon-free energy resources by 2050 (Xcel Energy 2023). In 2018, the state's utilities had already met the 25% requirement. There is an additional goal that 10% of statewide electricity sales come from solar power by 2030.

Minnesota, similar to the rest of the Midwest, has historically been a summer-peaking region. However, the growing adoption of renewable generation sources,[7] including solar and wind, is poised to change the value of DR. Increasing solar generation during the day is highly coincident with the summer peak and will likely reduce the value of DR during that period. At the same time, heavier reliance on renewable generation has the potential to shift net system peaks to different times of the day, thus creating potential curtailment needs at different times of the day, season, and year. DR program designs focused on existing summer peaking hours might not translate in a similar fashion to other days of the week or hours of the day in other seasons. For instance, NSP's largest residential program focuses on curtailing air conditioning load, which is not suitable for the shoulder or winter seasons and may not result in the same customer

[7] Growth in renewables is necessary to meet the Minnesota Legislature's mandate of a 100% carbon-free standard for electric utility generation and procurement by 2040.

engagement or curtailment potential during later hours in summer days. Renewable energy is intermittent, and heavier grid reliance on renewable energy sources can contribute to price volatility, which can create a need for high-value grid balancing services, such as frequency regulation, making DR a more viable solution.

While Minnesota is currently a summer peaking region, building and transportation electrification trends are projected to create peaking conditions during non-summer seasons in Minnesota and throughout the Midwest. NREL forecasts Minnesota to exceed half a million EVs by 2030. Growing transportation electrification load is poised to impact both bulk power and distribution systems, opening pathways for additional opportunities for Load Flexibility solutions. The Midwest wind resource peaks in spring and fall, while solar peaks in summer. Growth of electric heating load in the winter could create new peaks and open opportunities for winter DR.

On August 31, 2022, FERC accepted MISO's proposal to move to seasonal resource adequacy requirements rather than a single requirement based on the summer peak. MISO proposed this seasonal resource adequacy construct to address significant increases in emergency events that occur year-round, driven by factors including generation retirements, reliance on intermittent resources, outages resulting from extreme weather events, and declining excess reserve margin. MISO implemented the new seasonal resource adequacy construct in the Planning Resource Auction held in April 2023.

NSP started AMI deployment in 2022. As of September 2023, over 500,000 meters were installed, and the deployment is set to complete the rollout of the AMI infrastructure in 2025 (Northern States Power Company 2023b). AMI is a key element of the modern grid and can open the doors to the emergence of load management through time-varying rates. Like the rest of the country, Minnesota and the rest of the Midwest experienced rapid emergence of storage as well as enabling technologies, such as smart thermostats, smart appliances, and commercial load control automation tools. Notably, Xcel Energy's Grid Modernization plan includes leveraging distributed energy resource management system (DERMS) strategy and assessment in the short term and increasing focus on EV pilots, infrastructure, and energy storage in the short-to-longer term. These technologies expand the possibilities for DR to extend beyond the peak shaving service to achieve Load Flexibility. Projected future enabling technologies cost declines will likely enable increased adoption of the technologies. At the present time, however, these emerging technologies have yet to experience meaningful cost declines, integration, and communication protocols have yet to be tested and confirmed, and customer comfort has yet to be deepened. Furthermore, cost recovery avenues will need to evolve to support the integration of the enabling technologies. Cost recovery for demand management programs under the prior Conservation Improvement Program (CIP) rider was challenging.[8] However, recent revisions to Minnesota State Statutes enhance utility cost recovery for "load management activities," thereby opening the door for additional Load Flexibility opportunities. Customer adoption and engagement are important to consider as well. Integration of DERs and continuous management of demand will require a different customer engagement and incentive structure from the more traditional incentive structures aligned with the limited dispatch of DR resources.

NSP refers to traditional DR as load management and includes DR resources that achieve peak demand reductions during summer load in a similar fashion as a combustion turbine.

Non-traditional DR, which NSP refers to as demand management, includes options that allow customers to plan for and manage their demand differently by shifting load during different times of day impacted by new rate structures and new resources.

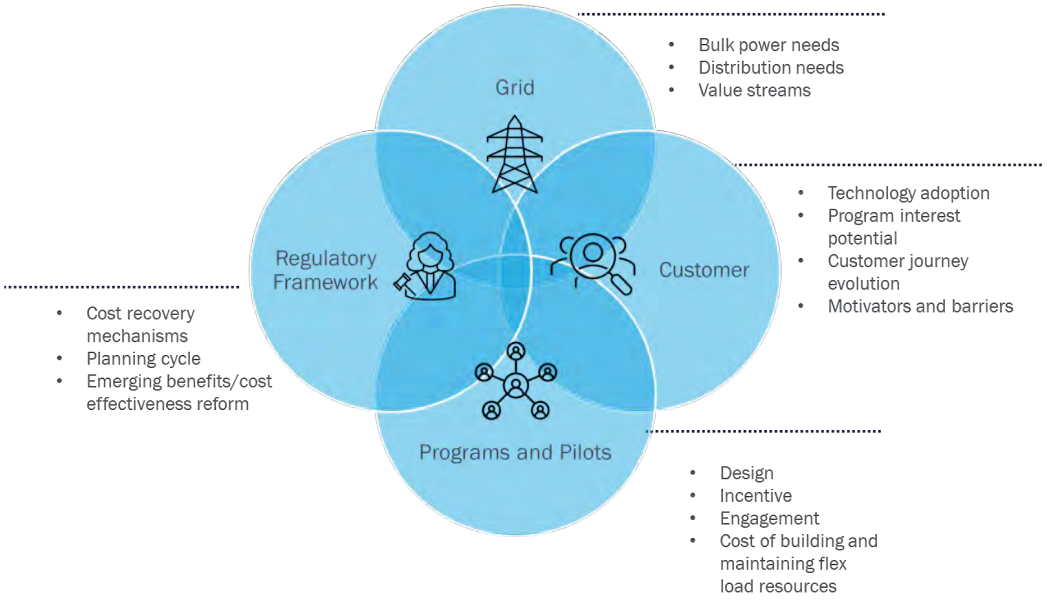
These anticipated changes in the market present an opportunity to revisit emerging challenges, opportunities, and value streams. NSP has made initial steps toward a meaningful transition to Load Flexibility by bifurcating traditional and non-

[8] Based on the 2019 IRP filings, while DSM programs were approved through CIP, prior decisions suggested that enabling technologies largely fell outside of the parameters for cost recovery through CIP (as did incentives for thermal storage capabilities associated with grid-enabled water heaters). Xcel Energy also experienced challenges with providing incentives for customers to purchase Level 2 smart chargers offering time-controlled charging.

traditional DR, as well as traditional and non-traditional value streams. NSP has also begun the process of assessing the potential, value stacking, and alignment of value streams with load and demand management needs. The market trends described above support the growing need for DR solutions that deliver benefits beyond curbing the need for capacity generation. NSP commissioned a 2019 potential study that identified a series of both common and emerging benefits from DR. These benefits included more traditional benefits, such as avoided generation capacity costs, reduced peak energy costs, and system-wide deferral of transmission and distribution upgrades, as well as additional benefits, such as geotargeted distribution capacity investment deferral, ancillary services, and load building/valley filling services. The potential study identified differential needs and opportunities for DR depending on the scenario and DR use cases—setting the foundation for pursuing further transformation of the DR paradigm. However, significant effort remains to identify, design, and implement DR solutions that prove the additional benefits under emerging generation, DER adoption, and technological advancement conditions. Furthermore, incorporating customer preferences and differential incentive mechanisms aligned with load management opportunities to ensure continuous customer engagement and participation will be important to explore and consider.

Preparing for Transformational Change

In these evolving conditions, the path forward requires a phased and thoughtful approach to assess, quantify, and deploy flexible load resources. Building out and maintaining these resources, whether managed charging, direct load control, or commercial DR offerings, can incur costs, both initially and in perpetuity, as long as the programs remain active. However, thoughtfully designed programs that carefully consider four intersecting spheres (depicted to the right) can bring immense value to both the utility and the customer. Importantly, these spheres overlap, providing points of integration as well as tension when formulating NSP's future engagement with load flexibility. For example, integrating a regulatory framework focused on cost causation with customer preferences associated with DER adoption may highlight rifts in traditional valuation molds. As a result, the intersections of these spheres are areas in which stakeholder engagement and discussion become increasingly germane to successful outcomes.



A thoughtful transition supported by careful planning to ensure sufficient capacity is available with the right characteristics—flexibility and fast response—to meet reliability needs at both bulk power and distribution levels is no small feat. Accordingly, such a transition cannot and should not happen overnight. The development of these flexible load resources should first rely upon well-established programs and offerings (and associated value streams) in support of the development of emergent pilots and initiatives to bridge the gap from short-term conditions to longer-term needs. A two-phased approach can help adequately prepare for the transition.

- Phase I: Next three to five years: *Plan and assess*. Reflects a period of initial transition, planning, assessment, and positioning DR toward a transformational shift to Load Flexibility, requiring iterative approaches rather

than deterministic outcomes. This phase will offer careful consideration of the customer journey, value streams, and relevant program designs.

- Phase II: Next five to ten years: *Transition*. Build out a flexible load resource portfolio to satisfy likely load management challenges at the distribution level, as well as at the bulk power level. Ensure that the portfolio is sufficiently adaptable to demand forecasts.

To that end, Phase I should focus on preparing to transition NSP's DR portfolio across these four spheres: grid, customer, programs and pilots, and regulatory framework.

The Grid

Anticipated Evolution

- Seasonally varying generation system needs, constraints, and value streams
- Emerging distribution system needs, constraints, and value streams
- Emerging need to balance intermittent renewable sources of generation with evolving demand for electricity

Evolving grid needs will likely:

- Shift emphasis away from DR as simply a resource needed to satisfy RA and RM planning requirements, and instead towards active, high frequency load management.
- Unlock new value streams for flexible load solutions, such as deferred/avoided distribution system upgrades and seasonally variable value, given MISO's transition to the seasonal construct.
- Open pathways for new programs and pilots to tap into the emerging value streams, both temporally and locationally. For example, the adoption of AMI infrastructure and the emergence of new enabling technologies, DERs, and aggregation mechanisms will likely create avenues for rate-based programs and EV managed charging programs that focus on load shifting and flattening. In other cases, DERs like renewables plus storage, as well as vehicle-to-grid programs, will be capable of absorbing excess energy during times of low demand and dispatching it during times of constraint.
- Increase complexity of program interactions, as well as uncertainty around the best ways to build portfolios and stack programs to achieve the greatest grid benefits. As a result, adaptability, optionality, and flexibility will be key.

Considerations

Identify how existing DR and novel Load Flexibility offerings can best fit into the seasonal MISO construct.

Identify the extent of distribution constraints and needed upgrades to assess the best pathway for Load Flexibility to deliver locational relief. Forecasting load at the distribution level will support thoughtful planning and deployment of Load Flexibility solutions. Exploring customer composition at the distribution level (e.g., mostly commercial, mostly industrial, multifamily, etc.) will support tailoring flexible load solutions to maximize impact.

Identify interventions that support balancing intermittent renewable resources and DER adoption. For example, time-varying rates and EV managed charging solutions can permanently flatten the ramp and improve load factor. Storage solutions can support grid services. Xcel Energy is already testing storage as a load management opportunity through the Thermal Energy Storage Pilot approved under the Load Flexibility Plan in Docket No. E002/M-21-101.

Quantify unlocked value streams given evolving grid needs to guide portfolio design and program prioritization.

Customer

Anticipated Evolution

- Growing penetration of enabling technologies and end-user automation solutions
- Growing presence of DERs, such as EVs and battery storage
- Customers as “prosumers” able to consume and provide grid power

Emerging grid needs described above combined with customer evolution will likely:

- Require greater customer education around continuous load management, which differs from existing participant experiences with event-based load curtailment. The educational efforts will potentially include the concept of “reverse DR” to support excess generation during certain times of the day—a counterintuitive concept to customers.
- Require differing levels of customer engagement, depending on the load flexibility approach, DER type, and/or presence of enabling technologies. Engagement can range from permanent habitual change to event-based temporary actions to changing energy-using patterns. The enabling technology will impact the level of effort and engagement for customers.
- Require re-consideration or redesign of customer incentives and rewards, given the shift to a more continuous load management framework (Faruqi et al. 2014).

- Increase the complexity of considerations and choices related to customer engagement with Load Flexibility solutions. A greater variety of Load Flexibility options—including locationally focused programs to support distribution grid needs—may require consideration of customer engagement in multiple programs (e.g., time-varying rates stacked with event-based load curtailment programs), as well as customer evolution across the portfolio given developing customer comfort with Load Flexibility concepts, adoption of DERs, and enabling technologies.

Considerations

Understand customer technology adoption trends, willingness to adopt, drivers, and preparedness to adopt load flexibility solutions. This research will allow NSP to select and phase program development and launch in alignment with market and customer adoption trends. NSP has already commissioned foundational research, including research conducted in 2014 to assess customer adoption rates and incentive levels (Faruqi et al. 2014).

Assess customer adoption potential to identify pathways for transitioning or integrating flexible load programs into the existing DR portfolio or transitioning customers from existing programs into new ones.

Review case studies across the country to assess customer preparedness to adopt Load Flexibility programs. Such a review will allow NSP to benchmark successes and identify barriers.

Understand customer knowledge, needs, and values to support incentive design allowing NSP to strategically build customer evolution pathways.

Programs and Pilots

Anticipated Evolution

- Growth of non-traditional pilots and programs to support evolving customer needs and grid services
- Shift to programs focused on continuous load management
- Increased opportunities for automation given growth of enabling technologies and DERs

Emerging grid and customer needs described above, combined with the anticipated evolution of programs and pilots, will likely:

- Require a shift in program design, customer enrollment and participation models (e.g., dual participation), and incentive levels to support continuous load management. For example, future portfolios must consider whether customers can participate in multiple programs or limit engagement to a single program and the implications for value streams.
- Require additional and refreshed program marketing and customer education.

- Require revisiting value streams and cost-effectiveness frameworks, as well as quantifying value streams associated with pilots, to better capture the full stack of program benefits, likely beyond grid services.
- Require assessing the ability of existing systems to support new program designs. Lessons learned from time-varying rate deployment stress the importance of integrating and building out required internal systems to deploy these programs for a seamless and efficient customer experience (e.g., billing, metering). This build-out is critical in advance of any opt-out (default enrollment) program design. In addition, these activities will also support continuous load management program designs at the grid edge, such as managed charging telematics metering, among others, to ensure that customer and technology communications and protocols are executed effectively as the number of events or interventions increase in frequency (e.g., summer and winter, seasonal, continuous).
- Require alignment of future processes to ensure reliability, efficient use of resources, maximization of customer benefits, and successful implementation of public policy.

Since 2019, NSP has augmented its DR portfolio to address future grid, customer, and regulatory needs. More specifically, because traditional DR programs may be approaching enrollment saturation (Hledik et al. 2019), NSP has developed non-traditional DR pilots to lay the groundwork for the load flexibility transition. These pilots include the EV Optimization pilot, Peak Flex pilot, Commercial Thermal Storage pilot, Residential Time of Use pilot, General Time of Use pilot, Critical Peak Pricing pilot, and Peak Day Partners. NSP's non-traditional DR pilots are currently offered to residential, commercial, and industrial customers to encourage load shift, shed, and shaping—which support designing programs with peak period flexibility that can respond to changing peaks due to renewables adoption, local peaks, distributional constraints, or other triggers. NSP has begun offering a range of time-varying rates (TOU, CPP), building upon the deployment of AMI infrastructure to develop a robust offering of interventions with lower customer enrollment.

Considerations

Design and develop pilots that offer customer and grid value for the future grid, including flexible peak periods to support continuous load management at a portfolio level, as well as targeted and locational programs to unlock avoided distribution cost benefits.

Implement evaluable pilots that support decisions for scale (e.g., develop program theory and logic models, demonstrate emergent technologies, determine customer journey and value, identify and document grid benefits).

Ensure that communication protocols and systems effectively build a foundation for large scale deployment of time varying rates.

Conduct customer research to determine whether customer incentives align with grid value; identify opportunities to integrate and aggregate DER values.

Identify and quantify new unlocked value streams.

Regulatory Framework

Anticipated Evolution

- Increasing regulatory pressure to expand DR MW potential
- Evolving cost-effectiveness paradigms
- Expansion of realizable DR value streams

Evolving regulatory frameworks will likely:

- Demand that NSP further expand DR MW potential in the face of climate goal mandates and evolving grid needs and capabilities.
- Allow for revised regulatory acceptance of non-traditional DR, including Load Flexibility offerings that were previously deemed not cost-effective under prior regulatory paradigms. These regulatory changes can open the floodgates for previously untapped Load Flexibility opportunities in NSP's service territory. Regulatory headwinds have already begun to shift, as marked by the recent change to Minnesota Statutes regarding rules concerning cost-effective load management programs. Going forward, NSP will be able to test and develop even more innovative non-traditional DR pilots and programs.
- Expand DR value streams, such as distributional value streams, and increase non-dispatchable renewable energy integration.

Considerations

Collaboratively work with stakeholders to revise, refine, modernize, and adapt regulatory frameworks as needed to ensure (1) the ability to flexibly adapt programs and pilots to rapidly changing technological landscape and continuously evolving needs of the customers and the grid; (2) collaborative assessment of emerging value streams from DERs and incorporating them into the cost recovery, cost-effectiveness, and other frameworks to reflect the full stack of benefits available from DERs.

Explore effective filing processes such as the load flexibility petition and/or R&D in ECO filings.

Identify and gain regulatory approval for other novel methods to incentivize customers to participate in Load Flexibility programs.

APPENDIX A. DETAILED CASE STUDIES

Public Service Company of Colorado Renewable Battery Connect Program

Load Control Strategy

Starting as a pilot offering in 2021, the Public Service Company of Colorado's (PSCo) Renewable Battery Connect Program charges and discharges residential solar-powered batteries during low and high-demand periods, respectively. Although events can be called at any time during the year, discharge events typically take place on the hottest days of the year, during the afternoon and evening. The remainder of the events target non-summer months to evaluate non-summer performance and solar time shifting. The program is limited to 60 events per year, with most of the charging events lasting around two hours and the majority of the discharge events lasting around three hours. Customers are divided into four groups to test a Randomized Control Trial to estimate baselines and load impacts associated with the program. There is a fifth group for customers located behind constrained feeders, which can allow for geotargeted load relief. This program uses both charge and discharge load control strategies, dispatching batteries to either charge (thereby utilizing excess solar capacity) or discharge to power participating homes and send excess power back to the grid (providing demand relief to the grid).

Program Implementation

The program is implemented by PSCo, which handles recruitment, event dispatch, and incentive distribution.

Program Design: Recruitment, Enrollment, and Opt-Outs

Eligible customers are recruited via solar and battery providers, as the battery equipment must be newly installed through an interconnection application with the Company. For their participation, participants receive $500 per kW of energy storage installed (up to 50% of the equipment-only cost)[9] and a $100 annual participation incentive (for five years) for participating in control events. There is no way to opt out of a given event other than unenrolling from the program altogether.

Program Design: Eligibility

Single-family residential homes and small business customers with solar systems and a newly installed Tesla Powerwall or SolarEdge Home Hub Inverter with a SolarEdge Home Battery are eligible to participate. Further, customers must have an interconnection agreement with PSCo and maintain the connection of their Tesla Battery and/or SolarEdge inverter through a cellular or high-speed internet connection.

Program Achievements: Enrollments and DR Potential

The pilot (which ended in September 2022) had 152 participants as of the pilot's end, yielding an estimated 1.7 MW of DR potential. The scaled program currently has 65 fully enrolled participants with 90 batteries, and another 200 applications are currently going through the interconnection process. Evaluated program impacts are still forthcoming. The program has a target of 1,850 participating customers and 10 MW of DR potential by the end of 2025.

[9] Income-qualified customers receive an increased incentive of $800 per kW of energy storage installed (up to 75% of the equipment-only cost).

Pacific Gas and Electric Peak Power Rewards Program

Load Control Strategy

Launched in 2023, Pacific Gas and Electric's (PG&E) Peak Power Rewards (PPR) Program discharges residential solar-paired batteries every day from 7:00 p.m. to 9:00 p.m. from August to October. This load control strategy dispatches batteries to power participating homes and to send excess power back to the grid.

Program Implementation

The program is implemented by Sunrun, which handles recruitment, remote battery programming and optimization, and incentive distribution.

Program Design: Recruitment, Enrollment, and Opt-Outs

All eligible customers are recruited via marketing materials sent from Sunrun notifying the customer that their home will be enrolled in PPR and they will receive incentives for their participation. Eligible customers are auto-enrolled in PPR and must manually opt out if they do not wish to participate in the program. PPR participants receive a $750 VISA gift card in exchange for their participation. PPR participants also receive a smart thermostat (unless they already received one through a different PG&E program). However, the smart thermostats are not dispatched during battery discharge events. Rather, the additional device serves as a participation incentive and offers another tool that customers can use to manage their load in the face of nightly events. The batteries are programmed to dispatch every day during the event season—there is no way to opt out of a given event other than unenrolling from the program altogether. Sunrun may clawback any unused funds on the VISA gift card if a participant subsequently unenrolls from the program.

Program Design: Eligibility

Single-family residential homes with Sunrun solar systems and LG Chem, SolarEdge, or Tesla Powerwall batteries are eligible to participate. Further, customers must have an interconnection agreement with PG&E and may not be enrolled in other demand response programs.

Program Achievements: Enrollments and DR Potential

Initially, the program was limited to 7,500 participants. Following low opt-out rates and rising interest in solar+storage, the program cap was met and subsequently expanded to 8,500 customers, yielding an estimated 34 MW of DR potential.[10] Evaluated program impacts are still forthcoming.

[10] https://www.pgecurrents.com/articles/3795-sunrun-pg-e-expand-collaboration-energy-efficiency-summer-reliability-program

Portland General Electric Multifamily Water Heater Pilot

Utility Background

Portland General Electric (PGE) is Oregon's largest electric utility, serving the state's two largest cities (Portland and Salem) and the surrounding communities. PGE has over 900,000 retail customers within a service area of 1.9 million residents, which encompasses approximately half of Oregon's population and about 75% of Oregon's commercial and industrial activity.[11] PGE is vertically integrated, providing generation, transmission, and distribution. Figure 1 illustrates PGE's Generation Portfolio. PGE owns and operates its own hydro generation facilities; however, it also purchases some of its hydropower from the Bonneville Power Administration (BPA).

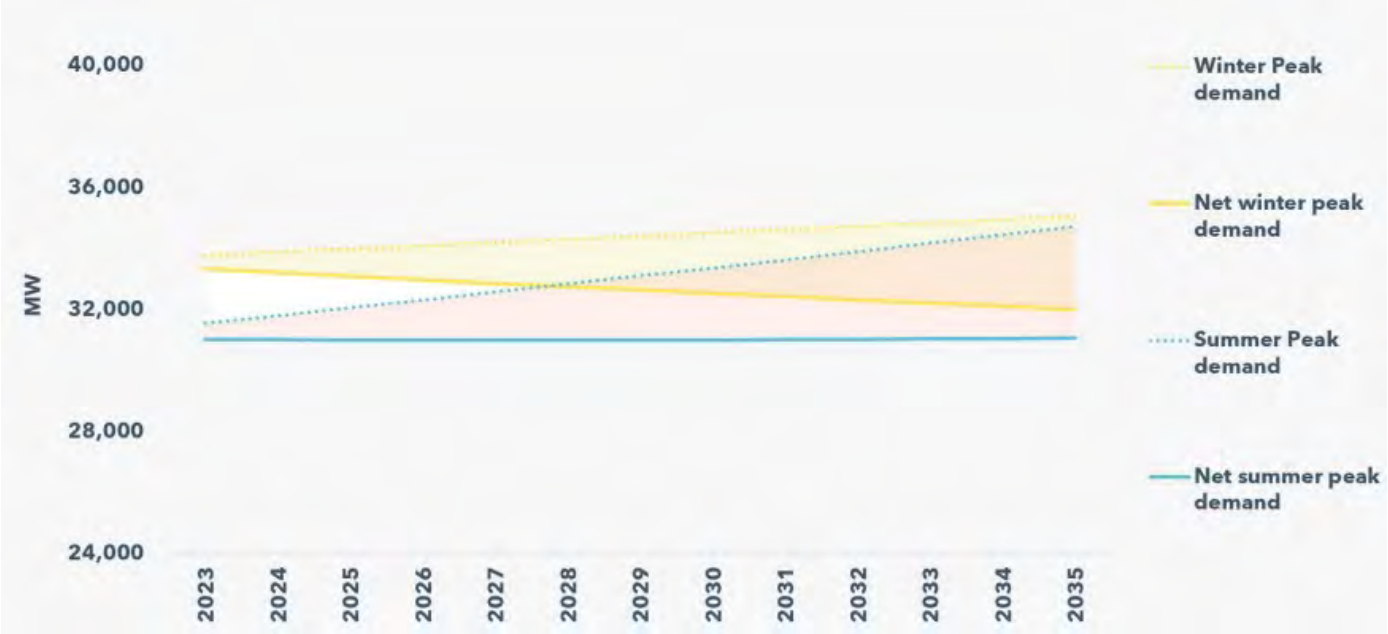
Figure 1. PGE Generation Portfolio

Source: PGE Clean Energy Plan and Integrated Resource Plan 2023

While PGE is an electric-only utility, natural gas is used abundantly in their territory and fuels much of the space and water heating in their service area. Despite the comparatively mild weather, air conditioning load has grown considerably over the last decade or so. This insurgence of mechanical air conditioning, combined with moderate levels of electric space and water heat in single-family homes[12] and high penetration of these electric end uses in multifamily buildings,[13] helps explain why PGE is a dual-peaking utility. As seen in Figure 2, PGE's winter peak is currently greater than its summer peak, but the two are expected to converge in the next decade or so (likely due to anticipated air conditioning load growth and potentially hotter summers). PGE's summer peak occurs in the late afternoon/early evening. Meanwhile, their winter season experiences two daily peaks: one in the morning and another in the late afternoon/early evening.

[11] https://downloads.ctfassets.net/416ywc1laqmd/6B6HLox3jBzYLXOBgskor5/63f5c6a615c6f2bc9e5df78ca27472bd/PGE_2023_CEP-IRP_REVISED_2023-06-30.pdf
[12] https://neea.org/img/uploads/Residential-Building-Stock-Assessment-II-Single-Family-Homes-Report-2016-2017.pdf
[13] https://neea.org/img/documents/Residential-Building-Stock-Assessment-II-Multifamily-Homes-Report-2016-2017.pdf

Figure 2. PGE Peak Load Forecasts



Source: PGE Clean Energy Plan and Integrated Resource Plan 2023

Program History

PGE participated in a BPA-managed NW Power Conservation Council water heater Load Flexibility study and has since grown its own multifamily program into over 10,000 units. The BPA pilot used the EcoPort predecessor (CTA-2045 + FM signals) to communicate with and dispatch single-family water heaters. Although successful, there were technological challenges with the communications technology. Specifically, they were clunkier and not standardized, and customers would often uninstall them. A subsequent PGE single-family pilot struggled to meet enrollment needs, as enrolling owner-occupants proved challenging. This single-family pilot tested various communications pathways: cellular LTE and utility mesh network. Meanwhile, PGE also set up a multifamily pilot, which has proved to be very successful, as working with multifamily property managers (who receive an annual cash incentive per enrolled water heater) has proved to be a successful enrollment strategy. The information in this section represents PGE's current Multifamily Water Heater Pilot.

Load Control Strategy

Launched in 2018, PGE's Multifamily Water Heater Pilot uses wi-fi and cellular switches to dispatch 38–50-gallon electric resistance water heaters in multifamily properties every non-holiday weekday.[14] Dispatch times depend on grid needs and are typically 5:00 p.m. to 8:00 p.m. in the summer, while winter months see both morning (typically 6:00 a.m. to 9:00 a.m.) and evening (typically 5:00 p.m. to 8:00 p.m.) dispatches. PGE will extend events by an hour or two when other [non-daily] DR programs are being called to minimize snapback [event end] peaks. Individual events are capped at eight hours, although PGE has yet to exceed five. This load control strategy effectively converts water heaters into thermal batteries, heating water when demand is low and providing load relief during daily peaks without sacrificing tenant comfort.

[14] PGE stopped installing wi-fi units in October 2019, as cellular switches are significantly more likely to maintain the connectivity needed for dispatch.

Program Implementation

The program is implemented by PGE, which handles recruitment, enrollment, and incentive distribution. PGE uses local trade allies to install the switches.

Program Design: Recruitment, Enrollment, and Opt-Outs

PGE recruits multifamily property management companies to opt their units into the pilot. In exchange, property management companies receive an annual cash incentive of $20 per connected water heater. The pilot also provides tenant incentives in the form of coupons to local businesses.[15] On installation day, a tenant may refuse entry to the contractor, or the contractor may not be able to enter the unit if there are unaccompanied minors or loose dogs, which in turn prevents the switch from being installed. These circumstances are fairly rare, as shown by the pilot installation rate of 89%. Upon installation, tenants receive educational materials that explain the pilot and voluntary opt-out instructions. The pilot has yielded a tenant opt-out rate of <1% and tenant surveys have demonstrated that most did not realize they were in a program in the first place nor that they had experienced any hot water shortages. Of the pilot's 1,000,000+ touches, <1% have resulted in cold water calls to PGE, and of those, <1% end up being at the fault of the program. If the tenant chooses to opt out, the installed device will stay in place but will no longer be in operation until a new tenant moves in.

Program Design: Eligibility

Multifamily properties with at least 50 individually metered units that have 38–50-gallon electric resistance water heaters are eligible to participate. PGE will not install retrofit control switches on units that are >20 years old. As new smart water heaters with CTA-2045 capabilities begin to penetrate the market, PGE will install EcoPort communications devices on these modern units.

Program Achievements: Enrollments and DR Potential

As of the end of 2022, PGE installed over 13,000 switches, averaging ~2,600 new installations per year. These switches are distributed across 111 properties and 32 property management companies (including 12 of the 25 largest in PGE territory). Evaluated impacts demonstrated 0.2kW per unit in summer and 0.35kW per unit in winter, resulting in an annual capacity of 2.4MW in the summer and 4.5MW in the winter.

[15] Tenant incentives are currently being reevaluated due to the closure of the local coupon company partner.

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APPENDIX K – ENVIRONMENTAL REGULATIONS REVIEW

I. INTRODUCTION

This appendix provides high level discussions on environmental regulations impacting planning and operation of the Company's assets.

II. GREENHOUSE GAS AND CLIMATE LEGISLATION AND REGULATION

A. New Source Performance Standards 111(b) and (d)

On May 11, 2023 the U.S. Environmental Protection Agency (EPA) released a four-part proposal under their Clean Air Act authorities to regulate CO2 emissions from the power sector. The proposal included:

1) Repeal of the Affordable Clean Energy rule;
2) Regulations for new natural gas generating units pursuant to Clean Air Act section 111(b), hereafter referred to as 111(b);
3) Regulations for existing natural gas generation pursuant to Clean Air Act section 111(d), hereafter referred to as 111(d); and
4) Regulations for existing coal generation pursuant to section 111(d).

Xcel Energy filed comments on the proposed rule on August 8, 2023. We anticipate a final rule will be released in spring of 2024. Potential impacts of these new regulations have been incorporated into modeling efforts as a sensitivity recognizing that impacts on our existing natural gas fired units, discussed below, located at our Black Dog, and High Bridge facilities could be significant if the regulation is finalized as proposed. We provided an initial assessment of the potential impacts to our system to the Department in information request number 128 filed in docket number E002/RP-19-368 on July 28, 2023 with a supplement filed August 16, 2023.

Since the rule is in a proposed state and not yet finalized, it is uncertain how the rule will ultimately impact operation of our facilities. If the rule is finalized as currently proposed, there will be no impact from the repeal of the Affordable Clean Energy rule for any utility, as the D.C. Circuit Court vacated the rule on January 19, 2021, and remanded the rule to the EPA for further proceedings. Nor will we be adversely impacted by the regulations setting standards for existing coal generation under section 111(d) if adopted as proposed,

as all NSP coal units are scheduled to cease operation by December 31, 2030. Sherburne County Generating Plant (Sherco) Unit 3 will be our only coal unit operating in the Upper Midwest in 2030, and will technically be impacted in 2030 with a unit-specific limit based on a five-year lookback period. As long as the unit does not increase emissions of carbon dioxide (CO2) in 2030, it should be able to comply with the limit.

The Company may be impacted by the proposed regulations for new natural gas generating units and the proposed regulations for existing natural gas generation units.

The proposed rule for new gas units requires implementation of the best system of emission reduction (BSER) and includes sub-categories for low, intermediate, and base-load units. For low load units (<20 percent capacity factor), the BSER is the use of fuels (natural gas, Nos. 1 & 2 fuel oil) for meeting emission standards. For intermediate load units (capacity factor that ranges between 20 percent and a source-specific upper bound), the standards of performance for Phase 1 require highly efficient operations and for Phase 2 require meeting an emission rate equivalent to blending 30 percent hydrogen beginning in 2032. For base load units (units operating above the upper-bound threshold for intermediate load units), the standards of performance are set based on whether a unit chooses the carbon capture and sequestration (CCS) pathway or the hydrogen pathway. For CCS, the unit must meet standards based on 90 percent capture of CO2 by 2035. For hydrogen, the unit must meet a Phase 2 standard based on co-firing 30 percent hydrogen by 2032 and a Phase 3 standard based on co-firing 96 percent hydrogen by 2038. EPA has designed these two pathways – hydrogen blending or CCS – so that they achieve the same level of CO2 emission reductions by 2038.

The standard for existing gas units impacts units with a nameplate capacity greater than 300 MW and capacity factors greater than 50 percent. The proposed emission guidelines also offer the two-pathway approach of hydrogen blending or CCS on the same timeline as the new baseload unit standard described above. States are given primary responsibility in establishing compliance pathways for existing units through state plans, which are required to be submitted to EPA for approval within two years after the final rule is issued. In developing state plans, the states can consider the remaining useful life and other factors of the existing source in setting standards of performance that reflect the EPA emission guidelines. Therefore, impacts to specific plants will depend on state plans and could diverge from the emission guidelines. Given this state plan process, it is difficult to predict outcomes at this time. Depending on capacity factors, Black Dog Unit 5/2, Riverside Units 9 and 10, and High Bridge Units 7 and 8 may be affected by this standard. For modeling purposes, as a sensitivity, we have presumed that Riverside Units 9 and 10 are not affected by the rule but that Black Dog Unit 5/2, and High Bridge Units 7

and 8 are affected. The affected units have been modeled in the sensitivity with a presumed 50 percent capacity factor limitation so that the units are not required to make any modifications based on the proposed rule.

For existing coal fired steam generating units, the rule provides three sub-categories based on the planned retirement date of the generating unit. Xcel Energy expects all of our coal units to fall into the "Imminent-term" retirement category which requires a unit to permanently cease operation before January 1, 2032. This timeline is consistent with the retirement dates in our filed resource plans.

B. MN Legislation 100 by 2040

In 2023, the Minnesota Legislature passed a new law requiring utilities, including Xcel Energy, to generate or procure carbon-free energy equivalent to 100 percent of its Minnesota retail sales by 2040. The law, Minn. Stat. § 216B.1691, also requires Xcel Energy to achieve interim carbon-free standards of 80 percent by 2030 and 90 percent by 2035, and a renewable energy standard of 55 percent by 2035. The Company is positioned to achieve compliance with the new legislation under our 2024 Preferred Plan as presented here. A table demonstrating compliance with the legislation is provided in Table K-1 based on the Preferred Plan modeling outcomes filed in this IRP.

A detailed discussion of this legislation can be found in Chapter 2: Planning Landscape and in Appendix N: Standard Obligations.

Table K-1: 2024 Preferred Plan Carbon-Free Energy

	2030	2035	2040
Carbon-Free Generation (GWh)	46,515	52,681	60,162
MN Allocated CF Generation (GWh)	35,644	40,668	46,666
MN Elec Retail Sales (GWh)	35,725	39,668	44,624
Percentage Carbon Free Generation	80+%	90+%	100%
Carbon Free Standard Requirement	80%	90%	100%

The Commission has opened an Investigation docket[1] into Minnesota's Carbon Free Standard as codified in Minn. Stat. § 216B.1691, Subd. 2g. Parties, and the Commission will weigh in on a number of topics in that docket over the next couple of years. Some nuances and open questions remain to be considered in that docket, which could influence future compliance depending on implementation requirements.

[1] Docket No. E999/CI-23-151.

III. COST OF CARBON AND EXTERNALITIES

A. Regulatory Cost of Carbon

The Regulatory Cost of Carbon values established by the Commission are applied in our modeling process as a cost adder and impact the selection of resources and how they are dispatched. The CO2 regulatory cost range is applied in resource planning models as a cost faced by any fossil generation resource, affecting both the dispatch of resources and expansion plan choices. The CO2 regulatory cost range is intended as a proxy for regulatory costs that utilities and their customers may face, beginning in the year they are expected to incur these costs, so that resource planning and acquisition decisions can consider the impacts of those costs on long-term capital investments. This cost range is meant to capture regulatory costs only. Societal damages from climate change are separately addressed using the CO2 environmental cost range established under Minn. Stat. § 216B.2422, Subd. 3 and per the December 19, 2023, Commission Order in Docket Nos. E999/CI-07-1199, E999/DI-22-236, and E-999/CI-14-643 Addressing Environmental and Regulatory Costs (Environmental and Regulatory Costs Order) discussed below under MN Externality Values. This is discussed further in Appendix F: EnCompass Modeling Assumptions and Inputs.

On August 1, 2007, the Next Generation Energy Act became effective, which provided direction to the Commission to estimate how the future regulation of CO2 emissions would affect the cost of generating electricity, and directed the Commission to establish a range of these cost estimates, revise them annually, and to use the estimates "in all electricity generation resource acquisition proceedings." Table K-2 below provides a summary of historical and current cost estimates listing only the years where the Commission changed the established cost range per ton of CO2. These Cost of Carbon estimates have not been included in the North Dakota scenarios.

Table K-2: Summary of Historical and Current CO2 Cost Estimates

Year Established Range was Adjusted	Cost Range (per ton of CO2)
2007	$4.00 to $30.00
2011	$4.00 to $34.00
2012	$9.00 to $34.00
2018	$5.00 to $25
2023 (to be applied beginning in 2028)	$5.00 to $75.00

In 2018, the Commission lowered both the lower and upper bound of the regulatory cost range because the Minnesota Pollution Control Agency (MPCA) and the Minnesota Department of Commerce noted in their comments that the price of a permit to emit a ton of CO2 had declined over time, at least as measured in trading exchanges, such as the Regional Greenhouse Gas Initiative (RGGI). In 2020, the Commission did not make any adjustments to the range. The regulatory cost range was modified in 2023 with the new values being applied beginning in 2028.

The purpose of establishing a regulatory cost of carbon from the generation of electricity was to be able to use those values in various modeling scenarios as an estimate of the per ton cost impacts of potential future regulations limiting CO2 emissions. In the 2023 Minnesota State Legislative session, a bill was passed mandating that all Minnesota utilities generate or procure set amounts of electricity from carbon-free energy technologies meeting a prescribed schedule, culminating with 100 percent carbon free generation and procurement in 2040. Additionally, as discussed in the last section, the EPA has proposed standards regulating CO2 emissions from the power sector. It is the position of the Company, and other Minnesota utilities and interest groups, that this legislation obviates the need for the regulatory cost of carbon to continue, as regulations now require the Company and other utilities to comply with CO2 emission constraints which eliminates the need to model potential CO2 emission reduction requirements as a theoretical future cost of regulatory compliance. Thus, the Company – and other parties – still believe $0 should be an acceptable lower bound of the range but have conducted modeling in compliance with Commission Orders.

B. MN Externality Values

The Minnesota Public Utilities Commission ordered the use of externality values for CO2 and criteria pollutants in its order Updating Environmental Cost Values in Docket No. E999/CI-14-643 issued January 3, 2018. For the North Dakota scenarios, these values have not been included.

Values were established by the Commission for emissions of CO2 and criteria pollutants: sulfur dioxide (SO2), nitrogen oxides (NOx), particulate matter less than 2.5 microns (PM2.5), carbon monoxide (CO), and lead (Pb). CO2 values were established considering Federal Interagency Working Group (IWG) Technical Support Document[2] guidance and included costs on a per short ton basis, with a low, mid and high range provided. Values

[2] Available at: https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf.

for the criteria pollutants were also provided on a per short ton basis for four locations: Urban, Metro Fringe, Rural and within 200 miles of the MN border. A range of low, midpoint and high values were established.

In the new 100 by 2040 legislation, Minn. Stat. § 216B.2422, Subd. 3, the Commission was directed to provisionally adopt and apply the cost of greenhouse gas emissions valuations presented in the United States Environmental Protection Agency's November 2023 Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advance[3] (EPA SC-GHG) including the time horizon, global estimates of damages, and the full range of discount rates from 2.5 to 1.5 percent, with two percent as the central estimate. The Commission provisionally adopted and applied the EPA SC-GHG, for purposes of measuring environmental and socioeconomic costs under Minnesota Statutes § 216B.2422, subdivision 3., as reflected in the Environmental and Regulatory Costs Order.[4] The PVSC Base Case Greenhouse Gas (GHG) values, inclusive of carbon dioxide, methane and nitrous oxide, are based on the mid EPA SC-GHG values, with the high and low EPA SC-GHG values as sensitivities per the Environmental and Regulatory Costs Order.

While the regulatory cost of carbon is taken into consideration in modeling in the PVSC scenarios, thus affecting dispatch order, the EPA SC-GHG costs are applied post processing and do not impact dispatch order. The PVRR sensitivity does not include environmental cost adders including regulatory and externality values. All prices are converted from metric ton to short ton and to nominal dollars using two percent escalation factor. The application of these values is further discussed in Appendix F: EnCompass Modeling Assumptions and Inputs.

IV. MN ENERGY OMNIBUS: CUMULATIVE IMPACTS

In 2023, the Minnesota Legislature passed a new law, Minn. Stat. § 116.065, requiring Cumulative Impacts Analysis for Permit Decisions in Environmental Justice Areas (EJ Areas). This law will require applicants seeking air permit actions with potential to substantially impact residents of an EJ Area to conduct cumulative impacts analysis for facilities located in Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, or Washington counties, Duluth and Rochester. The new state definition of Environmental Justice Area

[3] Available at: https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf
[4] ORDER ADDRESSING ENVIRONMENTAL AND REGULATORY COSTS. December 19, 2023. Docket No. E-999/CI-07-1199. Docket No. E-999/DI-22-236. Docket No. E-999/CI-14-643.

was adopted consistent with the 100 by 2040 law, in addition to a new definition of Cumulative Impacts, "the impacts of aggregated levels of past and current air, water, and land pollution in a defined geographic area to which current residents are exposed." If the Cumulative Impacts analysis finds significant adverse impacts would result from the permit action, then a community benefits agreement must be established, or permits may be denied. Additionally, community engagement in EJ Areas will be required during the process.

The full extent of these new requirements is not fully known at this time. The MPCA was given broad discretion and was directed to set new rules governing cumulative impacts analysis and community benefit agreements, which will provide a framework, guidance, and clarify the requirements of this new law. MPCA has opened a general request for comments, related information, and ideas from those affected by the rulemaking which ended October 6, 2023[5] and is early in a three-year process to gather information and draft proposed rules for public comment by May 24, 2026.[6] The Company submitted a supportive letter in response to the initial request for comments providing information on related experience in this area and will likely participate further in the rulemaking process. MPCA has updated its EJ Area Map[7] based on the new state definition, although we note a statistical adjustment is applied which is not consistent with the state definition. The Company operates several existing generation facilities in the greater metro area which will likely be subject to these new requirements when implemented. Dependent upon final MPCA interpretation and rulemaking, the impacts could be significant to permit issuance for existing and new generating facilities.

V. CONVENTIONAL POLLUTANTS & HAZARDOUS AIR POLLUTANTS

This section discusses requirements applicable to air emissions of pollutants regulated under the Clean Air Act (CAA). The four primary regulatory categories addressed are: 1) National Ambient Air Quality Standards (NAAQS), 2) Interstate transport of air pollution, 3) Visibility Impairment in National Parks and Wilderness Areas, and 4) Hazardous Air Pollutants. Each is addressed in the following sections.

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[5] MPCA Request for Comments on Cumulative Impacts Rule, available at: https://minnesotaoah.granicusideas.com/discussions/39398-minnesota-pollution-control-agency-request-for-comments-on-cumulative-impacts-rule.

[6] MPCA Cumulative impacts rulemaking, available at: https://www.pca.state.mn.us/get-engaged/cumulative-impacts.

[7] MPCA EJ Area Map, available at: https://mpca.maps.arcgis.com/apps/MapSeries/index.html?appid=f5bf57c8dac24404b7f8ef1717f57d00#map.

A. National Ambient Air Quality Standards

The CAA requires the United States Environmental Protection Agency (EPA) to set NAAQS for air pollutants that are common in outdoor air, considered harmful to public health and the environment, and are emitted from numerous and diverse sources. NAAQS include both (1) primary standards to protect public health, including the health of sensitive populations, such as asthmatics, children and the elderly and (2) secondary standards to protect public welfare, including protection against damages to animals, crops and buildings. The EPA has established NAAQS for six pollutants: particulate matter (PM), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), carbon monoxide (CO), and lead (Pb). The EPA is required to review the NAAQS every five years and revise them as appropriate to protect public health and welfare.

The CAA requires EPA to conduct periodic review of the science upon which the standards are based and revise the standards if necessary. The process begins with assessments of the updated relevant science, the latest risk/exposure information, and a policy assessment. EPA compiles this information and revises or develops new NAAQS through a public rulemaking process, if warranted.

Once EPA adopts or revises a NAAQS, states have two years to monitor the air, analyze the data and submit to EPA their recommended classification of the state into one of three categories: 1) Attainment areas (areas having monitored ambient air quality concentrations below the NAAQS), 2) Nonattainment areas (areas having monitored ambient air quality concentrations above the NAAQS), or 3) Unclassifiable areas. The EPA reviews the state's submittal and determines final area designations. When EPA designates an area in a state as Nonattainment, the state is given up to three years to develop a new State Implementation Plan (SIP) which identifies actions required to bring the area into Attainment. A SIP must include emission reduction requirements to demonstrate that air quality will attain the NAAQS within a given time period as required by the CAA.

Presently there is only one Nonattainment area in the state of Minnesota, a small nonattainment area for Lead emissions for an area surrounding Gopher Resource Corporation, a lead smelter and battery recycling company in Eagan in Dakota County. As a result, no emission reduction requirements are being imposed on Xcel Energy's Upper Midwest power plants through a state SIP due to NAAQS.

EPA has proposed changes to the PM NAAQS, lowering the level of the annual particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$). Sources

contributing to $PM_{2.5}$ emissions include dust (agricultural, construction and road) and fire (wildfires, prescribed fires and agricultural fires). Other lesser contributing anthropogenic sources of $PM_{2.5}$ emissions nationally include stationary fuel combustion and agricultural sources. In urban areas the largest $PM_{2.5}$-emitting sectors are mobile sources and fuel combustion. Once the proposed rule is finalized the MPCA will need to monitor the air, analyze the data and submit a proposed designation to EPA. EPA will have to review the proposal and issue a designation, then MPCA will develop a SIP to ensure compliance with the new NAAQS. This process will take many years and all Xcel Energy Upper Midwest coal units are committed to retire by 12/31/2030, making it unlikely that any additional controls will be required for NAAQS Compliance for any Xcel Energy units located in Minnesota.

The EPA recently announced (August 21, 2023) that the 2021 Ozone NAAQS reconsideration will be revisited during the 2024 Ozone NAAQS review process. We do not anticipate this process will be concluded prior to 2024.

B. Interstate Transport of Air Pollution

The CAA also requires that NAAQS SIPs include provisions that prevent sources within a state "from emitting any air pollutant in amounts which will … contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any" NAAQS.[8] The EPA has developed programs to reduce interstate transport of pollutants emitted by Electric Generating Units (EGUs) that are precursors to ozone and fine particles focusing on emissions of oxides of nitrogen (NO_x) as a surrogate for NO_2, and is a precursor to ozone and fine particle formation, and emissions of SO_2, which is a precursor to fine particle formation. EPA also has an obligation to ensure that air emissions from upwind states do not result in NAAQS non-attainment in downwind states. This obligation is addressed with the Cross State Air Pollution Rule and is bolstered by the Good Neighbor Plan that further reduces seasonal NO_x emissions by revising and strengthening the Group 3 CSAPR ozone seasonal NO_x allowance trading program. Each of these is described in more detail in the following sections.

1. Cross-State Air Pollution Rule

EPA designed the Cross-State Air Pollution Rule (CSAPR) as a "cap-and-trade" program that reduces overall emissions of SO_2 and NO_x from EGUs. This means that total

[8] CAA, 42 U.S.C. section 7410(a)(2)(D)(i)(I).

emissions from EGUs in a state or region are limited (the cap) and each ton of emissions allowed is represented by an emission allowance that can be transferred among EGUs (the trade). A cap-and-trade program thus reduces total emissions to the capped amount but provides flexibility for EGUs to meet their individual emission reduction requirements through installation of control equipment, purchase of emission allowances from other EGUs, or a combination of both.

CSAPR imposes emission limits on EGU's in upwind states on one or both of the following: (1) summer season NO_x emissions (to address ozone), and/or (2) annual NO_x and SO_2 emissions (to address fine particles), depending on the outcome of EPA's analysis of an upwind state's contribution to Nonattainment in downwind states. In Minnesota's case, the concern is the potential impact of fine particle emissions on Nonattainment areas in downwind states, rather than ozone. Since 2015, CSAPR has applied to Minnesota sources for fine particle precursors and to Wisconsin sources for fine particle precursors and ozone precursors. NSP-Minnesota holds sufficient emission allowances to meet CSAPR requirements, while NSP-Wisconsin has complied through operational changes and the purchase of some allowances.

EPA will continue to use CSAPR as one tool to achieve attainment of NAAQS throughout the country, even as the NAAQS are revised over time.

2. Good Neighbor Plan

On February 13, 2023, the EPA finalized a rule disapproving 19 State Implementation Plan (SIP) submissions (including Texas) and partially approving/partially disapproving two SIP submissions (Minnesota and Wisconsin) addressing the "interstate transport" or "Good Neighbor" provision of the CAA for the 2015 Ozone NAAQS. This action led to a final "Federal Implementation Plan (FIP) Addressing Regional Ozone Transport for the 2015 Ozone NAAQS" that was published in the Federal Register on June 5, 2023, referred to as the Good Neighbor Plan. The Good Neighbor Plan included Minnesota and Wisconsin in the Group 3 ozone NO_x allowance trading program, beginning with the 2023 Ozone NO_x season (May-September 2023).

On April 14, 2023, an industry coalition, including Northern States Power-MN, filed a petition for review in the 8th Circuit Court of Appeals (8th Circuit) regarding the SIP partial disapproval in Minnesota. On May 31, 2023, the coalition filed a motion to stay the SIP disapproval and on July 5, 2023, the 8th Circuit granted a Stay of the SIP Disapproval for Minnesota. This effectively means that the Good Neighbor Plan (CSAPR Group 3 ozone NO_x program) is not in effect for Minnesota during the litigation. Depending on

the litigation outcome, the Good Neighbor FIP may or may not apply in Minnesota after the resolution of the litigation.

The Good Neighbor Plan applied to Wisconsin sources from August 4-September 30, 2023 and will continue to apply in future ozone seasons. Subject sources are required to comply with the Group 3 ozone NO_x program for the entire Ozone NO_x season. NSP-Wisconsin will comply through operational changes and potentially allowance purchases. There is a possibility that the liquidity of the allowance market may tighten resulting in limited allowances being available for purchase potentially resulting in higher allowance costs in years 2030 and beyond due to dynamic budgeting and annual bank recalibrations. Regulated entities will need to monitor the markets and accommodate accordingly for compliance. Depending on the price of future allowances, dispatch order could be impacted and the need to purchase additional allowances could result in significant additional operational costs presuming that allowances are available to purchase on the open market.

These regulations have been incorporated into modeling efforts based upon estimated allowance allocations through 2029 based on information in the proposed rule. Modeling for affected units located in WI have been included in the base case scenario modeling. Modeling for units located in MN – both those owned by the Company or contracted by the Company - have been included as a sensitivity to determine the potential impacts of the rule in case it is ultimately adopted and applied in MN. Modeling efforts are further discussed in Chapter 5: Economic Modeling Framework and Appendix F.

C. Visibility Impairment in National Parks and Wilderness Areas

Visibility impairment is caused when sunlight encounters pollution particles in the air. Some light is absorbed, and other light is scattered before it reaches an observer, reducing the clarity and color of what the observer sees. The CAA established a national goal of remedying existing, and preventing future, visibility impairment from man-made air pollution in specified "Class I" areas: national parks and wilderness areas throughout the United States, including the Boundary Waters Canoe Area (BWCA) and Voyageurs National Park (VNP) in Minnesota. The visibility programs focus on reducing emissions of PM, SO_2 and NO_x as pollutants that can result in visibility impairment from EGUs.

The EPA has taken a two-step approach to implement the visibility program. The first step, "reasonably attributable visibility impairment" (RAVI), was implemented in the 1980s to address visibility impairment reasonably attributable to a specific source. In 1999, the EPA adopted the Regional Haze Rule (RHR) to address widespread, regionally

homogeneous haze that results from emissions from a multitude of sources. State environmental agencies are required to submit SIPs that develop and implement their strategy to reduce emissions that may contribute to regional haze. RHR SIPs must also include reasonable progress goals and periodic evaluation/revision cycles designed to ensure appropriate progress toward the national goal of no human-caused visibility impairment in Class I areas by 2064. These SIPs must be revised approximately every ten years to continue making reasonable progress toward reaching the 2064 national goal.

The MPCA developed, and EPA approved, Minnesota's regional haze plan for EGUs for the first ten-year planning period of the program. The MPCA's plan for Sherco Units 1 and 2 required combustion controls to reduce NO_x emissions (Over-Fire Air (OFA), combustion controls and Low- NO_x burners) and scrubber upgrades to reduce SO_2 emissions. These controls were installed and are in operation.

On December 20, 2022, the MPCA submitted a comprehensive SIP update for the second regional haze implementation period (2018-2028). The update for the second implementation period outlines significant improvements in visibility at BWCA and VNP, identifies additional emission reduction opportunities, examines the uniform rate of progress projected to 2064, and sets reasonable progress goals for 2028. The update utilizes federally enforceable conditions setting Xcel Energy unit retirement dates to satisfy emission reduction requirements:

- Sherburne County Unit 2 – by 12/31/2023 (air emission permit condition)
- Sherburne County Unit 1 – by 12/31/2026 (air emission permit condition)
- Allen S. King Unit 1 – by 12/31/2028 (Administrative Order)
- Sherburne County Unit 3 – by 12/31/2030 (Administrative Order)

The MPCA's plan update is under EPA review.

D. Hazardous Air Pollutant Emissions

1. Mercury and Air Toxics Regulation

Both state and federal regulations require reductions in Hazardous Air Pollutant (HAP) emissions, which includes emissions of mercury and air toxics, from power plants. In 2006, the Minnesota Legislature passed the Minnesota Mercury Emissions Reduction Act (MMERA) which required reductions of mercury emissions from coal fired power plants and in 2012, the EPA adopted its rule establishing National Emission Standards for Hazardous Air Pollutants (NESHAPs) from coal- and oil-fired power plants. This rule is

often referred to as the Mercury and Air Toxics Standard (MATS), and compliance was required in 2015. Mercury controls were installed and are operational on all three Sherco units and at King based on these regulations.[9]

MATS also set emission limits for acid gases and non-mercury metals. PM is a surrogate for non-mercury metal emissions and SO_2 is a surrogate for acid gas emissions. The Sherco and King plants meet these standards using control technologies and best operational practices.

In May 2020, EPA finalized the risk and technology review (RTR) for the MATS coal- and oil-fired EGU source category. *See* 85 Fed. Reg. 31,286 (May 22, 2020) (May 2020 Rule). According to the May 2020 Rule, the residual risk assessment indicated that air toxics emissions from the source category are acceptable and that the current standards provide an ample margin of safety to protect public health and prevent an adverse effect on the environment. Further, the May 2020 Rule did not identify any cost-effective controls that would achieve further emission reductions. Accordingly, the May 2020 Rule concluded that no revisions should be made to MATS. The May 2020 Rule also rescinded the Agency's 2016 finding that it was "appropriate and necessary" to regulate HAPs from coal- and oil-fired EGUs under Section 112 of the Clean Air Act via the MATS.

In January 2021, President Biden signed Executive Order 13990, titled *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis* (EO 13990). EO 13990 requires agency heads to review Trump Administration actions "that were harmful to public health, damaging to the environment, unsupported by the best available science, or otherwise not in the national interest." EO 13990 contained a non-exhaustive list of the actions to be reviewed, which included the May 2020 Rule. In March 2023, EPA published a final rule that reinstated and reaffirmed the 2016 "appropriate and necessary" finding and indicated that the Agency would address the MATS RTR in a separate rulemaking. *See* 88 Fed. Reg. 13,956 (Mar. 6, 2023).

On April 24, 2023, EPA published in the *Federal Register*, at 88 Fed. Reg. 24,854, the proposed MATS Residual Risk and Technology Review that would amend the NESHAP for coal- and oil-fired EGUs. In this action, the EPA is proposing to lower the emission limit for filterable particulate matter (fPM), eliminate the total and individual non-mercury metal HAP metals emission limits, require the use of continuous emissions monitoring

[9] The CAA requires that EPA review standards such as MATS each eight years to determine if control technology has improved and if the residual emissions left after compliance with the MATS pose additional residual risk to the public. EPA recently proposed to find that, based on its review, no revisions to the MATS are required. 84 Fed. Reg. 2670 (Feb. 7, 2019).

systems (CEMS) to demonstrate compliance with the fPM standard, lower the Hg emission limit for lignite fired EGUs, and eliminate one of the two definitions of "startup" in MATS. The proposed compliance deadline for the fPM emission limit reduction and fPM CEMS is three years after the effective date referenced in the final rule at promulgation. For units that use startup definition two, they must comply with startup definition one within 180 days after the effective date referenced in the final rule at promulgation. Due to the proposed compliance dates, impacts of this action may be limited. Sherco 1 and 2 will have been retired within that compliance timeline, and King may be retired depending on the final compliance deadline. As such, impacts will be limited to Sherco Unit 3, and would include the lower fPM emission limit, the requirement to install fPM CEMS, and the elimination of startup definition two which the unit currently relies on, if the rule is finalized as proposed. Xcel Energy has worked with industry partners to develop and submit comments to further minimize the impacts of this rule on our operations.

2. Industrial Boiler Maximum Achievable Control Technology (IB MACT) Rule

In 2011, the EPA adopted emission limits for HAPs from industrial boilers and process heaters fueled with coal, biomass and liquid fuels located at major and area sources. These standards apply to biomass combustion at Bay Front Units 1 and 2 as well as to several small heating boilers located at our facilities. Compliance was required by early 2016.

EPA published a final rule revising the IB MACT rules on October 6, 2022 (IB MACT Final Rule). The IB MACT Final Rule amends the NESHAP for major source boilers and process heaters in response to three decisions by the U.S. Court of Appeals for the District of Columbia Circuit (D.C. Circuit) remanding elements of the NESHAP. The IB MACT Final Rule became effective on December 5, 2022. The rules revised emission limits for new and existing sources as well as provided rationale for the use of carbon monoxide (CO) as a surrogate for organic HAPs. All industrial boilers in the Xcel Energy Upper Midwest region that are subject to this revised IB MACT rule are able to comply with the revised requirements.

3. Stationary Combustion Turbine NESHAP (YYYY) Rule

In March 2004, EPA promulgated its NESHAP for stationary combustion turbines located at major sources of HAP emissions. The NESHAP required new or reconstructed lean premix and diffusion flame gas-fired turbines to meet a formaldehyde limit of 91 parts per billion by volume, dry basis (ppbvd) at 15 percent O_2. During the rulemaking for

the NESHAP, EPA received a petition to delist lean premix and diffusion flame gas-fired turbines, and, in April 2004, EPA issued a proposal to grant the petition and delist those two subcategories of turbines. In August 2004, EPA took final action to stay the effectiveness of the standards for those two subcategories pending the outcome of the proposed delisting. EPA ultimately did not finalize the stay after the U.S. Court of Appeals for the D.C. Circuit held that EPA only has the authority to delist entire source categories under Section 112 of the Clean Air Act—not individual subcategories.

EPA did not take action to lift the stay until its proposed RTR for the stationary combustion turbine NESHAP. As part of the proposed RTR, EPA proposed to remove the stay of the standards for new and reconstructed lean premix and diffusion flame gas-fired turbines. However, when the RTR was finalized on March 9, 2020, EPA chose not to finalize the removal of the stay to give the Agency additional time to review public comments and assess new information from a 2019 petition to delist the entire stationary combustion turbine source category.

On February 28, 2022, EPA finalized the YYYY rule to amend the NESHAP for Stationary Combustion Turbines ("YYYY Final Rule") at 40 C.F.R. Subpart YYYY. The YYYY Final Rule removes the stay of the effectiveness of the standards for new or reconstructed lean premix and diffusion flame gas-fired turbines, which was issued in 2004, shortly after the original NESHAP for stationary combustion turbines was promulgated.

As a result of the YYYY Final Rule, lean premix and diffusion flame gas-fired turbines that were constructed or reconstructed at major sources of HAP emissions after January 14, 2003, must meet the formaldehyde standard once the YYYY Final Rule becomes effective with ongoing compliance demonstrated by monitoring certain operating limitations defined in the rule or by EPA approved alternate operating limitations. The YYYY Final Rule allowed the Company to propose an alternate monitoring system for the High Bridge and Riverside combined cycle units to demonstrate that formaldehyde emission standards are continuously met through continuously monitored operating parameters and required formaldehyde emission testing to validate this demonstration. After months of correspondence, EPA Region 5 approved Xcel Energy's alternative monitoring proposal on May 22, 2023, and May 23, 2023, for High Bridge and Riverside, respectively. These alternate monitoring proposals can be further amended through completion of additional source testing and approval by EPA.

VI. WATER QUALITY REGULATIONS

A. Waters of the United States

The Clean Water Act (CWA) uses the term "Waters of the United States" (WOTUS) as those waters that are subject to the provisions of the CWA. The recent Supreme Court decision in *Sackett v. EPA*[10] (Court's decision) limited the regulatory definition of those waters subject to CWA requirements. On August 29, 2023, the EPA and the U.S. Army Corps of Engineers (Army Corps), the two federal agencies empowered with implementing the CWA, announced a final rule amending the 2023 definition of WOTUS to conform with the Court's decision.

Prior to the Court's decision, EPA and Army Corps issued regulations defining categories of surface waters considered WOTUS. One category includes wetlands that have a surface and/or subsurface hydrologic connection to a surface water regulated by the CWA. The Court's decision clarified that only wetlands with an obvious surface-only hydrologic connection could be considered WOTUS and regulated by the CWA. At present, Xcel Energy does not view this change as having a significant impact on our resource plans and/or operations.

While there has been a federal change in what types of water bodies are regulated by EPA and Army Corps, state laws protecting wetlands are unchanged. These laws frequently involve a larger number of wetlands and isolated water bodies and influence our plans and operational activities.

B. Cooling Water Intake Structures

Section 316(b) of the federal CWA (316(b) rule) requires the EPA to develop regulations governing the design, maintenance, and operation of cooling water intake structures to assure that these structures reflect the best technology available for minimizing adverse impacts to aquatic species. The regulations must address both impingement (the trapping of aquatic biota against plant intake screens) and entrainment (the protection of small aquatic organisms that pass through the intake screens into the plant cooling systems) and are implemented through National Pollutant Discharge Elimination System (NPDES) permits.

[10] Sackett v. EPA, 598 U.S. __ (2023). Docket No. 21-454. Available at https://www.supremecourt.gov/opinions/22pdf/21-454_4g15.pdf.

The EPA's 316(b) rule was finalized on August 15, 2014, requiring affected facilities to:

- Adopt one of seven options addressing impingement of biota at the entrance to cooling water intake structures, with approval by state or federal NPDES permit writers.
- Minimize entrainment of biota into the structures, as directed by the permit writer taking several factors into account.
- Implement the impingement, entrainment, and other measures as soon as practicable after the entrainment measures have been identified, with interim milestones the permit writer may set, or for new units upon commencing operations.
- Provide extensive information in permit applications, including source water physical and biological data, intake structure and system data, proposed impingement compliance methods and supporting study plans, previously conducted entrainment studies, and the operational status of the plants; and
- Provide two-year comprehensive entrainment characterization studies, technical feasibility and cost evaluation studies, benefit valuation studies, and studies of non-water quality environmental and other impacts, with peer review of the last three, for plants that withdraw more than 125 million gallons per day.

The rule does not mandate the use of closed-cycle cooling for existing facilities. However, qualifying closed-cycle systems will satisfy the final rule's impingement and likely will satisfy its entrainment requirements. The definition of qualified closed-cycle cooling has been broadened to include existing impoundments of waters of the U.S., if sufficiently documented as having been designed to provide a recirculating cooling function or if built in uplands, and to delete references to specific cycles of concentration, percentage flow reduction, and continuous flow constraints.

The final rule requires NPDES permit writers to provide copies of applications to the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS), allowing these agencies to provide input within 60 days on endangered and threatened species and critical habitat potentially affected by intake structures and recommended permit conditions. If permit writers incorporate those conditions and permittees conduct all measures recommended by the Services, the permit will provide "incidental take" authorization. The FWS/NMFS biological opinion provided with the final rule states that the final rule is not likely to jeopardize listed species or destroy or adversely modify designated critical habitat.

The definition of "existing facilities" would include nuclear uprates and other repowered and significantly modified units, even if the turbine, condenser, or fuel are replaced. However, replacement units—essentially newly built, stand-alone units constructed at existing facilities regardless of change in generation capacity, cooling water flow, or use of an existing intake structure—would be considered a "new" unit and subject to closed-cycle cooling equivalent requirements.

The final rule provides a *de minimis* exception for impingement mortality requirements for very low impingement rates but cautions that Endangered Species Act (ESA)-listed species may not be taken. The rule also provides less stringent impingement standards for low-capacity utilization units.

The final rule does not dictate an ultimate compliance deadline for all facilities but requires agencies issuing NPDES permits to include terms and conditions in permits as they come up for renewal or amendment thus final compliance is tied to the timing of future permit renewals.

Xcel Energy's Upper Midwest power plants that use greater than 2 million gallons per day of surface water are required to comply with the rule. This includes Sherco, Monticello, Riverside, High Bridge, Black Dog, Allen S. King, Prairie Island, Red Wing, Wilmarth, Bay Front and French Island. Additionally, three plants may be required to reduce entrainment mortality: Monticello, Allen S. King, and Black Dog upon NPDES permit reissuance.

The Sherco plant is already a closed-cycle cooling facility and as such, will not likely be required to make significant cooling water intake structure upgrades to comply with the rule.

The Allen S. King plant will retire at the end of 2028 and is not required to make any additional system modifications under the rule's retirement exemption provision.

Monticello's newly reissued permit includes requirements for an engineering assessment of feasible 316(b) compliance alternatives for the plant's river water intake system. The studies were submitted in January 2023 and will result in an agency decision on upgrades necessary for ongoing compliance in the next permit renewal which begins in 2025.

Prairie Island's intake system was modified in the 1990's to include necessary protections for aquatic life and shellfish and continues to be compliant with the updated 316(b) requirements.

The compliance upgrades needed for Xcel Energy's RDF plants (Red Wing, Wilmarth, and French Island) are in varying stages of implementation. The Bay Front plant has submitted the required engineering studies to Wisconsin Department of Natural Resources (DNR) for review and are awaiting a final decision on any additional changes that may be required.

C. Thermal Discharge

The EPA regulates the impacts of heated cooling water discharge from power plants under CWA Section 316(a). States with authority to implement and enforce CWA programs (e.g., Minnesota, Wisconsin) have state-specific water quality criteria including thermal discharge temperature parameters to protect aquatic biota. Plants must operate in compliance with the thermal discharge temperature parameters. No changes have been made to the thermal discharge temperature parameters in Minnesota.

During permit renewals for the Monticello and Black Dog facilities, EPA Region V reviewed the previously submitted thermal studies. In light of operational changes that have occurred since the original thermal studies, the newly reissued permits for both sites require a new multi-year study of the thermal discharges from both sites. Depending on the results of each study, MPCA and EPA Region V could modify each site's thermal discharge limits in a subsequent permit action. All other plants in Minnesota are unaffected by the issues that were specific to Monticello and Black Dog.

In 2010, Wisconsin implemented new water quality standards regulating the thermal discharge temperature from facilities with state issued NPDES permits. The new requirements are being incorporated into facility permits as the permits come due for renewal.

In 2012, the Bay Front plant in northern Wisconsin was the Company's first Upper Midwest plant to receive new thermal discharge limits. Preliminary modeling of the plant discharge indicated that there could challenges to meeting the new requirements. Field monitoring of the discharge showed that the plant was complying with the new thermal discharge limits during normal operations.

Currently, French Island is not subject to compliance with the thermal discharge limits. Preliminary evaluation indicates that French Island will have challenges achieving compliance with potential future thermal discharge limits during the late summer and early fall periods of the year. The current permit issued in 2018 required a thermal monitoring plan (due in 2020) with monitoring (due in 2021). Monitoring data was submitted with the permit application in September 2022. Negotiations with the Wisconsin DNR during permit reissuance will determine what, if any, thermal limits will be required.

D. Effluent Limitation Guidelines

Over the last eight years, EPA's technology-based contaminant reduction requirements Effluent Limitation Guidelines (ELGs) have undergone two major revisions and a third revision was proposed in 2023. The ELGs apply to power plants using coal, natural gas, oil or nuclear materials as fuel and discharge treated effluent to surface waters, as well as to utility-owned landfills receiving coal combustion residuals. ELGs are implemented through permits issued to individual facilities and establish the maximum amount of a pollutant that may be discharged to a water body. The guidelines are periodically updated to reflect improvements in pollution control and reduction technologies.

For NSP, revisions issued in 2015 and 2020 largely targeted coal-fired electric generating units but also contained some provisions addressing wastewaters from combined and simple-cycle combustion turbines. These changes have been incorporated into individual NPDES permitted facilities compliance activities as appropriate.

On March 29, 2023, the EPA proposed additional changes to the ELGs (88 Fed. Register 18,824). The proposal suggested further restrictions on flue-gas desulfurization (FGD) wastewater and wet bottom-ash handling systems. The proposal offered options for ash landfill leachate and ash system process waters from systems no longer in use, referred to as "legacy wastewaters." The comment period on the proposed rulemaking ended on May 30, 2023, and the final rule is expected to be published mid-2024, at the earliest. The EPA also published a direct final rule, effective May 30, 2023, to extend the deadline for plants to opt-in to the 2028 early retirement provision promulgated in the 2020 regulation.

NSP's coal fired generating plants will not be required to make any upgrades to address compliance with the rule as proposed. Sherburne County Generating Plant is a closed-cycle facility that does not discharge any wastewaters associated with ash handling. Sherco Unit 3 landfill leachate may require pre-treatment or alternative management depending on what options are included in the final rule.

The method(s) used to dewater and dispose of wastewaters contained in the Sherco Unit 1 and Unit 2 scrubber solids ponds could change depending on EPA's final decision for managing legacy wastewaters. Under the 2020 ELG rule, the wastewater in the scrubber solids pond was prohibited from discharge to a surface water and prohibited from discharge to a local Publicly-Owned Treatment Works (POTW). Language in the preamble of the 2023 rule proposal suggests the EPA may be reconsidering the prohibitions for this category and has solicited public comments on options the EPA may consider in the final rule.

Retirement of the Allen S. King plant by the end of 2028 has been approved by the Commission.[11] As a result, the Company filed with the MPCA under the 2015 ELG rule for King Plant to be exempt from all ELG compliance obligations. This "Notice of Planned Participation" as it is referred to in the 2015 ELG Rule, exempted King Plant from making capital improvements needed to comply with the requirements of the 2015 and 2020 ELG rules. That same Notice will extend to the finalized version of the 2023 ELG rule proposal.

No other NSP electric generating facilities are affected by the changes proposed in the EPA's 2023 ELG proposal.

VII. COAL COMBUSTION RESIDUALS

Coal Combustion Residuals (CCRs), often referred to as coal ash, is residue from the combustion of coal in power plants. Two types of CCRs are fly ash and bottom ash. Fly ash is a light material with the consistency of talcum powder that is carried from the boiler with the flue gas. This material is captured by pollution control equipment and may be combined with solids generated from air quality control systems designed to reduce SO_x and NO_x emissions. Bottom ash consists of the heavier materials collected from the bottom of the boiler. CCRs are either recycled for beneficial reuse or disposed of appropriately as non-hazardous industrial waste.

Currently the CCRs resulting from the coal combustion at Sherco Units 1 and 2 are disposed of wet within a permitted, engineered, lined surface impoundment as a non-hazardous industrial waste. The fly ash generated from Sherco Unit 3 is disposed of within a permitted, engineered, lined ash landfill located on plant property. The bottom ash generated from all

[11] *In the Matter of the 2020-2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy*, Docket No. E002/RP-19-368, Order (April 15, 2022), at Order Point 4.

Sherco units is stored within a lined impoundment as a non-hazardous waste until it can be beneficially used as a construction material or properly disposed on site.

The fly ash from the A. S. King plant is transported for disposal at a permitted, engineered, lined commercial landfill as a non-hazardous industrial waste, while the bottom ash from this facility is beneficially utilized in the manufacture of products. Xcel Energy's operations are subject to federal and state laws that impose requirements for handling, storage, treatment, and disposal of wastes. These laws regulate CCRs as a non-hazardous waste under Subtitle D of the RCRA. While Xcel Energy's NSP-Minnesota disposal and storage facilities have been regulated by the MPCA for several decades, they became subject to regulation under EPA's CCR Rule in 2015.

EPA's CCR Rule became effective on October 19, 2015 and only applies to the Sherco and Black Dog facilities in the Company's Upper Midwest region. This rule was promulgated in response to environmental concerns regarding structural failures and releases of ash directly to the environment from large surface impoundments, allegations of inconsistent oversight by the states, and the potential for releases from unlined ash impoundments and landfills to impact drinking water sources.

The CCR rule established minimum design and operating requirements for CCR landfills and surface impoundments that are comparable to Minnesota's current requirements under State rules, site-specific permits and operating plans, with specific differences discussed in subsequent paragraphs. Under this rule, regulated landfills and surface impoundments are referred to as CCR Units.

The CCR Rule requires ongoing groundwater monitoring of each regulated CCR Unit. The rule also defines groundwater protection standards which, if exceeded, may lead to corrective action. Currently, the results from the CCR Rule groundwater monitoring program have shown no exceedances of CCR ground water protection standards (GWPS), meaning that no corrective action is required at this time.

The CCR Rule liner performance criteria are different than that established under the MPCA's state program. Consequently, the Sherco Bottom Ash clay lined impoundment, is deemed lined under the state rule but is deemed unlined under the CCR Rule. As a result, Xcel Energy replaced this impoundment with a new, permitted, engineered, lined impoundment that meets EPA and MPCA requirements. Xcel Energy had previously anticipated the need to replace this impoundment and had plans to replace it by 2023. To comply with EPA's CCR Rule requirements Xcel Energy accelerated this project to

have the new lined bottom ash impoundment in place by October 31, 2020. Closure of the existing bottom ash impoundment is scheduled to be completed as originally planned in 2025.

Coal operations ceased at the Black Dog site in April 2015. CCR discharges to the three small impoundments present at the site ceased prior to October 19, 2015. These impoundments were closed by removal on December 12, 2016. The CCR materials removed from the impoundments were disposed of in an off-site, lined landfill. The CCR rule requires the completion of groundwater monitoring at closed CCR sites. Groundwater sampling for this site has been completed and it was determined through closure verification sampling that groundwater monitoring concentrations do not exceed the groundwater protection standards; therefore, the site meets the requirements for closure of the CCR units as documented in 2019 in the CCR Monitoring Closure Verification Report.

The EPA continues to propose changes to the CCR regulations, none of which have been finalized. In one action, the EPA proposes to add a federal permit program to the CCR regulations and in a second, separate action, the EPA proposes to regulate legacy CCR surface impoundments. Both proposals are expected to create new compliance obligations for CCR units, differing from the current rules. While these changes are likely to increase the compliance cost, accurately estimating the potential costs is not feasible or useful until the final rules are issued.

VIII. MULTI-MEDIA EMERGING POLLUTANTS: PER AND POLYFLUOROALKYL SUBSTANCES (PFAS)

State and federal efforts have been accelerating in addressing per and polyfluoroalkyl substances (PFAS), an emerging chemical of concern in the last several years. Legislative and regulatory efforts are taking place to expand the current understanding of the human health and environmental risks of PFAS and to develop steps to reduce these risks. PFAS are a group of widely-used, long-lasting chemicals that breakdown very slowly over time. PFAS are found in air, water, and soil across the world. While PFAS are not directly related to the electric power industry, there may be indirect connections through the regulation of pollutants and hazardous substances. The electric power industry, like any other industry, may have processes or use materials that could potentially contain PFAS or release them into them into the environment.

It is important to emphasize PFAS regulations have the potential to significantly impact the electric power sector by increasing operating expenses, among other challenges. If

PFAS are detected in our facilities' air emissions, water supply, or soil, costly treatment or remediation measures may be required to ensure regulatory compliance. A summary is provided below describing some of the many current federal and state efforts to regulate PFAS.

A. EPA Proposal to List PFOA and PFOS as Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Hazardous Substances

On August 26, 2022, EPA issued a proposal to designate two of the most widely used PFAS- perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) including their salts and isomers, as hazardous substances under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or Superfund. The direct regulatory impact of this designation is reporting and clean-up requirements for current or historical PFOA and PFOS releases. EPA indicated in its Spring 2023 Regulatory Agenda that it intends to issue a final rule listing PFOA and PFOS as CERCLA hazardous substances in 2024.

B. EPA's Advanced Notice of Proposed Rulemaking (ANPRM) to Regulate Additional PFAS under CERCLA

On April 13, 2023, EPA issued an ANPRM requesting public input on regulating additional PFAS chemicals (except PFOA and PFOS) as CERCLA hazardous substances. The ANPRM seeks information on designating: (1) all or a subset of seven specific PFAS chemicals—perfluorobutanesulfonic acid (PFBS), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA), hexafluoropropylene oxide dimer acid (HFPO-DA or GenX chemicals), perfluorobutanoic acid (PFBA), perfluorohexanoic acid (PFHxA), and perfluorodecanoic acid (PFDA), and their respective salts and structural isomers; (2) precursors to PFOA, PFOS, and the previously listed seven PFAS chemicals; and (3) "categories of PFAS."

C. EPA's Toxic Substances Control Act (TSCA) PFAS Reporting Rule

On October 11, 2023, EPA published its final PFAS reporting rule under TSCA section 8(a)(7), This rule imposes a one-time reporting obligation on any entity that manufactured (and/or imported) PFAS or PFAS-containing articles at any time from January 1, 2011 through December 31, 2022. Manufacturers (and importers) are required to report information regarding the use, source, exposure, and health effects of the PFAS they manufactured and/or imported. The effective date of the Final PFAS Reporting Rule is

November 13, 2023. The window for reporting under the Final PFAS Reporting Rule will run from November 12, 2024 through May 8, 2025.

D. National Primary Drinking Water Standards (NPDWS) for PFOA and PFOS

On March 29, 2023, EPA issued a Notice of Proposed Rulemaking (NPRM) proposing NPDWS for PFOA and PFOS and issuing a preliminary regulatory determination to regulate PFBS, GenX chemicals, PFHxS, and PFNA. As proposed the NPDWS would establish a health-based, non-enforceable Maximum Contaminant Level Goal (MCLG) of zero and an enforceable Maximum Contaminant Level (MCL) of four parts per trillion (ppt) for PFOA and PFOS. For the other four PFAS chemicals, EPA proposes using a hazard index (HI) approach, which considers the four PFAS chemicals as a mixture, and setting an MCLG and MCL of 1.0 (unitless) for these compounds.

E. Minnesota PFAS Updates

The State of Minnesota issued a PFAS Blueprint to prevent PFAS pollution wherever possible, to manage PFAS pollution when prevention is not feasible or pollution has already occurred, and to clean up pollution at contaminated sites. To do this, the state has developed multiple efforts to measure and monitor PFAS in groundwater, water, and in air emissions throughout the state.

In 2023, the Minnesota Legislature took several actions to regulate or ban PFAS in firefighting foams and in certain products.

F. Wisconsin PFAS Updates

The Wisconsin Department of Natural Resources (WDNR) has been actively developing information and tools to address PFAS contamination since 2018. In 2023 the WDNR released a PFAS contamination "toolkit" to assist communities in addressing PFAS contamination in drinking water. The toolkit provides options for actions that can be taken to identify and treat PFAS-contaminated drinking water.

G. U.S. Geological Survey (USGS) Study

On June 23, 2023, the USGS released a study of PFAS concentrations in public and private drinking water supplies in the United States. Among the study's conclusions are that as much as 45 percent of drinking water samples nationwide could contain PFAS.

IX. WILDLIFE REGULATIONS ASSOCIATED WITH RENEWABLE DEVELOPMENT

A. Land-Based Wind Energy Siting Guidelines

As part of Xcel Energy's project planning process, all renewable energy projects are evaluated following the U.S. Fish and Wildlife Service (FWS) Land-based Wind Energy Guidelines (WEGs). The WEGs have a structured process that is scaled to the specific stage of a project's development. In the early stages (referred to as Tier 1 in the WEGs), screening using available data is used to identify possible impacts over a wide area and as a result is a broad, lower resolution, analysis. As a project becomes more developed with more specific information on location and possible layout, the evaluation begins to use more site-specific data from studies targeted to the specific area(s) of a project. This "Tier 2" review develops more refined information on the plants and animals that might be impacted by the project. Additional species or habitat-specific studies may be conducted based on the results of the Tier 2 studies so that specific impacts can be minimized or avoided in the final project design, construction and/or operations.

In the latter stages of development when land for a potential facility is more fully identified, the Company works with federal and state wildlife agencies to evaluate in more detail the area where the project is expected to be constructed. These meetings and correspondence ensure that important details regarding known existence of listed species, or species of state conservation concern, are considered and, if needed, protected as we begin to design the facility layout. Site-specific Tier 3 studies are designed and conducted at this stage to inform final siting impacts. These studies evaluate wildlife use of the site and delineate habitat such as native prairie, wetlands, and forest.

Once a project has been constructed and operational, Xcel Energy implements Tier 4 of the WEGs by conducting post-construction mortality monitoring to investigate the actual impacts of the facility on avian species. These one-to-two-year studies involve surveys of selected turbines to identify avian and bat mortality across all seasons. Results from these studies are used to inform if there are unusual numbers or species experiencing mortality as a result of the wind facility's operation. In some cases, additional research (Tier 5 study) is conducted to evaluate operational changes or technology that may minimize impacts. These Tier 5 studies, when needed, are typically conducted in coordination with state or federal wildlife agencies to evaluate a specific concern.

B. Endangered Species Act

FWS reviews scientific data on plants and animals across the United States to determine if listing under the Endangered Species Act (ESA) is warranted. If species are found to meet the criteria, FWS proposes and then finalizes regulations formally listing species as either "endangered" or "threatened." The "threatened" category is reserved for species that are likely to become endangered unless steps are taken to prevent the species from meeting the criteria to be endangered. The term "endangered" means any species which is in danger of extinction throughout all or a significant portion of its range.

If a facility expects to unintentionally cause harm or death to a federally listed species, an "incidental take permit" under the ESA can be sought to provide federal authorization for that potential harm to the species. The ESA process for obtaining the take authorization involves a multi-year planning process with the FWS to evaluate the potential presence of the listed species, the modes of potential harm, and the estimated number of individual deaths over the course of the facility's operating lifetime. The permit applicant also works with the FWS to develop a plan to minimize harm and a process to mitigate the estimated deaths so there is no net impact to the species population.

Within the NSP service territory there are multiple federally listed species, and the specific species that may be present varies across our region. Because there are multiple species in the NSP service territory that are listed or proposed for listing, NSP utilizes the FWS Information for Planning and Consultation (IPaC) tool to screen planned projects for potential impacts to federally listed species. Xcel Energy also works with state-level information sources to identify potential impacts to species of state conservation concern.

Xcel Energy monitors the federal and state listing processes and utilizes qualified biological consultants to ensure we identify all relevant plant, fish, mammal, and avian state and federally listed species during the development of proposed renewable projects.

C. Bald and Golden Eagle Protection Act

Eagles are protected in the United States under both the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). Both of these federal laws are implemented by the FWS.

Pursuant to BGEPA, FWS has regulations that formally permit the unintentional take of eagles in the United States. In 2009, following Bald and Golden Eagles being delisted from their previous endangered status under the ESA, FWS issued regulations to permit

the unintended take (or death) of eagles. The regulation has been revised twice and is currently involved in a new regulatory rulemaking. As part of FWS regulatory framework, FWS has guidance for industry on avoiding the potential for unintended take. Xcel Energy utilizes FWS guidance in project planning and when potential for eagle take is identified, we work with FWS and state wildlife agencies to address take and, if necessary, seek an Eagle Take Permit from FWS for specific projects and/or facilities.

Xcel Energy currently has two Eagle Take Permits for wind energy facilities. The Courtenay Wind facility in North Dakota has a 5-year take permit and the combined wind energy facilities of Pleasant Valley and Ben Fowke (previously Grand Meadow Wind Facility) in Minnesota are covered under a single, 5-year take permit.

With a growing Bald Eagle population in the upper Great Plains and upper Midwest, Xcel Energy continues to evaluate the risk to eagles at our existing sites as well as any newly proposed development. We work closely with the appropriate federal and state wildlife agency experts to understand the risks and potential permitting options that may be needed to address the risk of eagle take.

X. CONCLUSION

As noted in the above discussion, there are numerous proposed, pending, and existing environmental regulations which can, and do, affect the operation of our generation facilities. We are closely monitoring these regulations and compliance requirements, and we are considering the potential impacts in our planning process.

APPENDIX L – SYSTEM PLANNING INTEGRATION

I. INTRODUCTION

Achieving the goal of a sustainable, clean energy future depends upon having sufficient infrastructure to support delivery of clean electricity while maintaining customer reliability and affordability. Modernized transmission and distribution systems are critical to our ability to serve our customers in a reliable and safe manner, enable customer choice, increase renewable and carbon-free energy, effectively leverage emerging technologies, and take a holistic view of resource planning.

As we actively prepare our distribution and transmission systems for the needs of the future, we consider the need for thoughtful investments to meet our core obligation: safely and reliably delivering energy to our customers. We are also focused on adopting smarter technologies to further enable distributed energy resources (DER) on our system. Additionally, we face new challenges and opportunities for the transmission grid as traditional baseload units retire, large scale renewables significantly increase, and DERs are increasingly adopted. In some cases, such as increasing consideration of distribution-level DER impacts on the transmission grid, changes in the market and planning constructs are underway.

Recent policy changes are also driving the need to evolve resource planning. For instance, Minnesota's new carbon-free energy standard, which requires the Company to generate or procure carbon-free energy equal to 100 percent of its Minnesota retail sales by 2040, will impact resource, transmission, and distribution planning. With these recent policy changes, we are adapting our planning practices to ensure reliability and resilience, including development of substantial new transmission, which will be needed to support the transformation that is underway.

Overall, we envision building toward an integrated grid that supports the Company's clean energy transition, leveraging the strength of an interconnected system to make the best use of available resources while continuing to serve our customers with resilient and reliable power. We discuss our Integrated System Planning initiative, as well as our transmission and distribution systems, in greater detail below.

II. INTEGRATED SYSTEM PLANNING

As the Company works to achieve our carbon reduction goals, we must proactively design our energy delivery system to maintain reliability and affordability and increase sustainability as generation sources shift from legacy fossil fuel plants to renewable and

carbon-free sources. Investments the Company makes today will last for decades. It is therefore imperative that these investments are compatible with carbon-free legislation and regulation in addition to the Company's own goals. As both the transmission and distribution systems transform to deliver carbon-free electricity that meets the needs of an increasingly electrified grid, the Company must take a long-term approach to our planning and identify which projects will stack to reach our carbon-free goals while delivering reliable, affordable, and sustainable electricity to our customers.

This inherent need for long-term planning that considers the impacts of generation, transmission, and distribution on each other spurred the creation of Integrated System Planning (ISP). The purpose of ISP is to develop generation, transmission, distribution, and natural gas plans that deliver on the Company's clean energy goals while keeping bills low and enhancing the customer experience. ISP also bridges the gaps between modeling tools with human processes in addition to tackling the myriad challenges borne by the overall planning landscape, such as inflection points with technologies – like EVs and beneficial electrification – and pricing. The standing goal and charter of the ISP organization is to bring out the best in all of our infrastructure systems to meet the needs of our customers while preserving legislative requirements in concert with affordability.

A. Two Organizations, One System

By creating ISP, the Company has created two simplified, streamlined, and focused organizations: ISP and Operations. ISP focuses on planning the Company's electric and natural gas delivery systems. It takes an integrated approach to designing construction specs, conceptual design feasibility, regulatory and policy collaboration, and modeling and innovative technology integration to consider the entirety of the Company's energy delivery systems: generation, transmission, distribution, and gas. Each of these aspects of our system are linked, so consideration of how projects in one area impact another and function together must be taken into consideration when planning for our decarbonized future. Operations is focused on the execution and delivery. Once ISP has done its part, Operations takes care of crucial details such as safety; siting and land rights; project management, engineering, and construction; operations and maintenance; program implementation; and customer connections. The relationship between ISP and Operations is not linear, but cyclical, as handoff and communication processes are essential to its success.

B. ISP System Planning Cycle

The Company understands that to drive the transformation of strategic planning within the enterprise, ISP will need to institute a cross-functional planning cycle that will serve as a platform to achieve integration. To achieve this, a five-part System Planning Cycle has been developed.

- *Origination*

Origination focuses on customer needs evolution, emerging trends, technology integration, competitive advantage, and competition.

- *Integrated Planning*

Integrated Planning focuses on the alignment of origination trends into impact analysis, competitive advantages, and strategic system plans.

- *Modeling and Analytics*

Modeling and Analytics optimizes and refines strategic system plans based on enterprise outcomes centered on reliability, cost, sustainability, and customer experience.

- *Conceptual Design*

Conceptual Design develops and transforms integrated plans into conceptual designs, project value and costs, and enterprise capital plans.

- *Standards and Compliance*

Standards and Compliance develops, designs, and governs operational standards, project management, and compliance metrics and interfaces with regulators.

ISP Business Operations oversees this process and integrates ISP within the context of the enterprise, develops Management Operating Systems, and creates Success Paths for the ISP teams to achieve overall sustainability and customer goals. In addition, ISP Business Operations coordinates and supports the regulatory responsibility of ISP.

III. ALIGNING IRP AND INTEGRATED DISTRIBUTION PLAN

Order Point 9 of the Commission's latest IRP Order[1] states:

> *9. Xcel shall take steps to better align distribution and resource planning, including:*
> *A. Set the forecasts for distributed energy resources consistently in its resource plan and its Integrated Distribution Plan [IDP].*
> *B. Conduct advanced forecasting to better project the levels of distributed energy resource deployment at a feeder level, using Xcel's advanced planning tool.*
> *C. Proactively plan investments in hosting capacity and other necessary system capacity to allow distributed generation and electric vehicle additions consistent with the forecast for distributed energy resources.*
> *D. Improve non-wires alternatives analysis, including market solicitations for deferral opportunities to make sure Xcel can take advantage of distributed energy resources to address discrete distribution system costs.*
> *E. Plan for aggregated distributed energy resources to provide system value including energy/capacity during peak hours.*

In addition to the work that ISP is doing to develop infrastructure investment plans that consider generation, transmission, distribution, and gas and the impacts they have on each other, the Company is working persistently to align the IRP and the IDP. We address each part of Order Point 9 below.

A. Aligning Forecast Vintages

While forecasting plays a role in both the IRP and IDP, the processes are fundamentally different and serve disparate functions. The IRP process is a long-term (15+-year) resource planning process that has been in place for decades and is governed by established Minnesota Statutes and Rules (which result in Orders that constitute prima facie evidence in other proceedings). Similarly, transmission planning is largely governed by Federal Energy Regulatory Commission (FERC) and North American Electric Reliability Corporation (NERC) requirements and overseen by the Midcontinent Independent System Operator (MISO). In contrast, the IDP process is nascent in comparison – intended to be informational in nature – and is based on a set of planning objectives and reporting requirements that the Commission has established on a utility-by-utility basis. Additionally, the IRP forecasts include all the states in the

[1] ORDER APPROVING PLAN WITH MODIFICATIONS AND ESTABLISHING REQUIREMENTS FOR FUTURE FILINGS, Docket No. E002/RP-19-368, April 15, 2022 (IRP Order).

Company's Upper Midwest service territory, while the IDP is concerned solely with Minnesota. We discussed potential evolutions to the IDP process in our IDP filed on November 1, 2023.[2]

Another key difference between the IRP and the IDP is the time horizon and planning cycle duration and cadence. The IRP indicates size, type, and timing of resource needs over a 15-year time horizon, while the IDP shows a five-year budget of discrete projects and investments including their drivers and benefits. The five-year budget, which is used for the IDP, is built every year on the forecast from the previous fall – for example, the 2023 IDP budget was based on forecast data from Fall 2022. The reason for this is that additional steps are required to create the distribution forecast; the system-level forecasts used in the IRP cannot be directly applied to the distribution system as anticipated locations for the growth must be identified. After a location-specific distribution forecast is developed, distribution system risks, mitigations, and a 5-year budget must be developed prior to the IDP filing. This is significantly different in the IRP, where the modeling happens only three to six months in advance of the filing date every four years, meaning that the most recent and relevant forecast vintages are used. This information was presented at our IRP IDP Forecasting: Electrification and DER Workshop held with stakeholders on February 13, 2023.[3] Additional stakeholder outreach details are available in Appendix S: Stakeholder Engagement Summary.

Despite the fundamental differences between the purposes of the IRP and the IDP, there are opportunities to align some of the forecast vintages used in the creation of both. Additionally, because the distinct aspects of the Company's system – generation, transmission, and distribution – are interconnected and impact one another, we are taking distribution system additions that are selected in the IRP process into account when conducting the IDP budget forecast. We are using the same forecasts in similar ways in both the IRP and IDP to align the plans, but if a new version of a forecast comes out between the IDP forecast analysis and the IRP, it would make more sense for the IRP to use the most recent version. This issue cannot be addressed by aligning the filing date for the IRP and IDP, because, as previously mentioned, the forecast for the IDP happens at the beginning of the filing process – about one year in advance – whereas the IRP modeling happens much closer to the filing date. However, for this IRP, we were able to align several forecast vintages, as shown in Table L-1 below.

[2] Docket No. E002/M-23-452.
[3] Presentation materials were filed in Docket Nos. E002/M-21-694 and E002/RP-19-368.

Per the Commission's IRP Order we are making efforts to set the forecasts for DER consistently between our IDP and IRP.[4] Because of the modeling timeline for the IRP, finalization of the IRP models was not complete at the time of IDP submission on November 1, 2023. Table L-1 below expands on the outline of which forecast vintages were used for the various IDP and IRP forecasts that we provided in Appendix A1: System Planning of our November 1, 2023, IDP.

Table L-1: Forecast Vintage Comparison

Forecast	Vintage Reflected in IDP Corporate-Level DER Scenario Modeling	Vintage Used in IDP LoadSEER DER Scenario Modeling	Vintage Used in IRP Energy Forecast
Distributed Solar PV	June 2023[5]	June 2023	June 2023
Community Solar Gardens	August 2023[6]	August 2023[7]	August 2023
Distributed Energy Storage	September 2023	2021 IDP	Did not model in IRP
Energy Efficiency	September 2023	Embedded In 2022 Energy Sales & Demand Forecast	September 2023
Demand Response	2022	Embedded In 2022 Energy Sales & Demand Forecast	September 2023
Electric Vehicles	July 2023	2022	July 2023

B. Advanced Forecasting of DER

In our most recent IDP, the Company presented DER scenarios from our new LoadSEER tool for the first time. As we discussed in that same IDP, the Company recognized a need for and sought this new tool to aid in developing load forecast and distribution plans that would allow for enhanced analysis, as increasing penetrations of DER on the distribution system require better understanding of the conditions on that system at a more detailed level.

[4] The Commission's latest IDP Order includes a parallel Order Point; *see* July 26, 2022 Order in Docket No. E002/M-21-694, at Order Point 4.
[5] Since the IRP covers a multistate region and the IDP is focused on Minnesota, the June 2023 forecast had WI distributed solar PV added to it for the purposes of the IRP.
[6] As new information was available, it was combined with data from the August 2023 forecast.
[7] This scenario includes a forecast for solar that will meet Distributed Solar Energy Standard (DSES), Minn. Stat. § 216B.1691, subd. 2h, as added by 2023 Session Laws Chapter 60, Article 12, Section 16, and is discussed in section II.C.7.

Adoption of DER on the distribution system is location-specific, and adoption impacts are unique to each individual feeder. To better understand the potential location-specific impacts of the DER forecast scenarios on the distribution system, the forecasts we prepared for the IDP were then allocated to the distribution system using LoadSEER. The scenarios that were created and then analyzed in LoadSEER comprise various combinations of the corporate-level DER adoption forecasts in the IDP.

One output from the LoadSEER analyses was estimated distributed upgrade costs from each of the more granular adoption scenarios. For the IRP, we leveraged these estimated upgrade costs as an approximation for estimated costs to interconnect large DER resources specifically added by the Company in coming years to comply with the Distributed Solar Energy Standard (DSES)by 2030[8].

C. Investments in Hosting Capacity

Xcel Energy recognizes hosting capacity as a key element in the future of distribution system planning, and we anticipate that it has the potential to further enable DER integration by guiding future installations and identifying constrained areas. In compliance with Minn. Stat. § 216B.2425, and by order of the Commission, beginning in 2016, we have conducted and submitted an annual Hosting Capacity Program Report each year. We submitted our most recent Hosting Capacity Program Report on October 31, 2023 (2023 Hosting Capacity Program Report). These studies show hosting capacity results at the feeder and sub-feeder level, provide an indication of distribution feeder capacity for DER, and streamline interconnection studies by helping to guide projects to places on the distribution system where there may be available capacity.

There are several ongoing projects that will assist with advancing customer-sited DER, identify interconnection points on the distribution system and necessary distribution upgrades to support continued DER development, and improve our hosting capacity program for our customers. These projects include the implementation of Foundational Updates, and the subsequent implementation of the Monthly Updates use case. Increasing the HCA update cadence from quarterly to monthly will provide developers with fresher data and increase confidence in the ability of the HCA to inform the interconnection process of customer-sited DER by working to close the delay between the data cutoff date and the publication of results. More information about the timeline for implementation and prerequisite software upgrades can be found in our 2023

[8] While data was leveraged for approximating distribution upgrade costs, it is not inclusive of any costs to the transmission system for interconnecting large DERs.

Hosting Capacity Program Report filed October 31, 2023.[9] Furthermore, the implementation of the Advanced Distribution Management System (ADMS) and the ongoing implementation of AMI will provide enhanced system visibility to improve the data inputs and the analytical tools to further refine the HCA output.

In addition to these projects, as discussed in our 2023 Hosting Capacity Program Report, we have updated our methodology that improve the tool's usefulness for identifying interconnection points on the distribution system and places where upgrades to support DER development are needed. These improvements include adding the Technical Planning Study (TPS) Capacity Utilization and adding a feeder update criterion. The TPS Capacity Utilization accounts for the remaining capacity on a feeder based on the TPS and will reduce instances where the HCA map shows more capacity than is otherwise available. The updated feeder criterion will cause feeders to be updated when their normal rated capacity has been modified. Both changes, and the other changes discussed in our 2023 HCA filing, will increase the accuracy of the HCA, and help engineers more accurately identify where there is room on the system and where upgrades are needed.

HCA also serves as a valuable input prior to the interconnection process, helping customers or developers gather information about a location before an application is submitted. Interconnection studies are necessary to ensure the proposed generator can safely interconnect without adversely impacting electric delivery to surrounding customers and at what cost. With better data inputs and more analytical tools available to distribution engineers, we will be able to respond more efficiently to interconnection study requests and streamline the process for interconnecting customers. The interconnection process and associated studies will make use of the latest in technology and standards, such as IEEE-1547-2018 as amended in IEEE-1547a-2020, discussed in further detail in the section below and align with applicable regulatory guidance developed in the Interconnection and Operation of Distributed Generation Facilities proceeding (Docket No. E999/CI-16-521).

D. Improvements in Non-Wires Alternatives Analysis

We have been continually improving and expanding our NWA analysis. As discussed in Appendix F: Non-Wires Alternative Analysis of our 2023 IDP, the stacked values used in our NWA analysis are consistent with the IRP assumptions, where applicable. Given the inherent differences in timing of the two filings and the time at which we must begin our NWA analysis, however, some assumptions align with our last *approved* resource plan but do not align with the modeling assumptions that were used in

[9] Docket No. 23-466.

this plan. For example, the WACC discount rate varies slightly; this IRP uses the WACC from the latest Commission-approved capital structure in Docket No. E002/GR-21-630, but we did not have time to make that adjustment between the time of the rate case Order and when we needed to begin NWA analysis for the 2023 IDP. In addition, the National Renewable Energy Laboratory's (NREL's) 2023 Annual Technology Baseline, from which many of our technology cost assumptions are sourced, does not reflect potential tax credits for battery energy storage. Although we made an adjustment for our IRP modeling, we did not have time to incorporate that adjustment into the NWA analysis for the 2023 IDP. We will continue to evaluate our modeling assumptions and strive to match them between the IRP, the IDP, and NWA analysis whenever practicable and applicable.

We have not yet issued market solicitations for deferral opportunities, but as discussed in Appendix F of our 2023 IDP, our latest NWA analysis shows three potentially viable and cost-effective projects. All three of these potentially viable projects have in-service dates in 2028. Given that timeline, we will have another opportunity to run our NWA analysis in November 2024 as part of our annual NWA analysis update before additional steps are taken. If any of the projects remain potentially viable and cost-effective, we would then determine next steps in the next IDP Annual Update filing in November.

E. Plans for Aggregated DERs

From a resource planning perspective, we have many DR and energy efficiency programs that can be considered "aggregated" in the sense that they are designed to benefit the bulk system at times of peak system demand. It is important to note that, in this context, "aggregated" means behind the meter resources, such as customer owned DR, EE, rooftop DG solar, and customer owned batteries. This contrasts with larger DERs that are front of the meter, such as those outlined in Chapter 136, Article 4, Section 17 of Minnesota Law.[10]

As shown in Appendix F: EnCompass Modeling Assumptions and Inputs, these behind the meter resources and corresponding assumptions about their capabilities are entered in aggregate into EnCompass for consideration. For the IRP, this includes DER in all states in our Upper Midwest region, whereas the IDP only considered Minnesota. Additional information about DER can be found in Appendix E: Load and Distributed Energy Resource Forecasting and Appendix J: Distributed Energy Resources.

[10] Chapter 136 - MN Laws.

Additional discussion about Virtual Power Plants and the potential for them to deliver benefits to the bulk system, including delivering peak-load electricity can be found in Section V of Appendix X: Advanced Technologies.

IV. TRANSMISSION PLANNING

As we discuss in Appendix T: MISO Grid Congestion, while transmission planning is considered separately from resource planning, these two functions are interrelated. Transmission limitations in turn inform our resource strategy, and transmission needs are driven by multiple factors including increased customer electric demand, new or retiring generator interconnections, generation resource choices and the availability of transmission to meet the demand for these resources. Further, the interconnected nature of the transmission system means that neighboring utilities' decisions (either transmission or generation) impact the NSP System.

A. MISO and Transmission Planning

The Transmission Business Unit centrally manages Xcel Energy's transmission systems (i.e., NSPM, NSPW, Public Service Company of Colorado, and Southwestern Public Service Company) so that energy is safely and reliably transmitted from generating resources (both Company-owned and third-party-owned) to the distribution systems serving our customers. To effectively leverage the interrelation between the transmission and resource planning functions, Transmission Planning has transitioned into the ISP organization along with Resource Planning, as discussed above.

As demonstrated in the Biennial Transmission Plan[11] we – as part of the Minnesota Transmission Owners (MTO) group – submit to the Commission in odd-numbered years, we are constantly reviewing and studying our system to optimize operations and prepare for the future. We independently – and in conjunction with MISO and our neighboring utilities – analyze different futures to assess the system and determine any necessary improvements, in both short- and long-term planning horizons. Based on these analyses and subsequent implementation, between 2010 and 2018 we invested more than $3 billion in our transmission system. Much of our transmission investment over the recent past has been in implementing the CapX2020 initiative and participating in MISO 2011 Multi-Value Projects (MVP), which increased transmission capabilities in the Upper Midwest. Expanding upon these efforts, the MISO Long-Range Transmission Planning effort has developed the first of four transmission expansion portfolios with an estimated benefit to cost ratio of 2.6-3.8 for the northern portion of the MISO

[11] Docket No. E999/M-23-91.

footprint, increasing to 2.8-4.0 when considering only the zone in which NSP is located.[12] The second of these portfolios is currently under development, being analyzed against scenarios that achieve 96 percent carbon reductions across the MISO footprint, and meeting Minnesota requirements for 100 percent clean energy by 2040.[13]

MISO and the Company perform ongoing and specialized studies to evaluate necessary projects to address issues in the overall MISO system, including the NSP System.

From these studies, and our own technical study efforts in support of the Baseload Study we undertook with this Resource Plan, as discussed in Appendix T: MISO Grid Congestion, we believe significant additional transmission development will be necessary as we and other utilities retire fossil-fuel baseload generating units and add significant renewable resources to the grid to achieve our commitment to a clean energy future. We also believe changes to the current planning constructs are necessary to accurately reflect the trends underway and to ensure system stability and resilience, customer affordability, and reliability. For instance, the Company is adding additional system reliability aspects to our RFPs to ensure grid reliability and not just capacity totals are accounted for as we transition our system to carbon-free resources.

B. Ongoing MISO Studies

MISO Transmission Expansion Plan (MTEP). MISO has an annual transmission planning process which results in identification of needed transmission facilities.

MISO Generation Interconnection Studies. MISO performs generation interconnection studies to identify facilities necessary to connect new generation resources.

MISO Economic Planning Studies. As part of its planning process, MISO conducts a Market Congestion Planning Study (MCPS). The purpose of this study is to determine whether there are transmission projects that could remove transmission constraints and thus more efficiently use available generation resources. When undertaken, the MCPS results are reported as part of the annual MTEP report. During the MCPS process, projected economic and power flow models are developed which, when analyzed, determine the total production costs that are incurred to provide energy to the MISO

[12] MISO, *MTEP21 Report Addendum: Long Range Transmission Planning Trance 1 Executive Summary*. https://cdn.misoenergy.org/MTEP21%20Addendum-LRTP%20Tranche%201%20Report%20with%20Executive%20Summary625790.pdf.

[13] https://cdn.misoenergy.org/20230428%20LRTP%20Workshop%20Item%2003b%20Future%202A%20Siting%20Presentation628726.pdf.

load. Transmission constraints – the transmission elements that limit the amount of power that can be transferred between the unused, lower-cost generation and customers – are identified. Through stakeholder discussions, transmission projects are proposed that could mitigate the constraints. The costs for these proposed transmission projects are determined and compared to the amount of production cost savings that could be realized if those projects were in service. The resultant benefit to cost ratio of the projects indicates whether the proposed solutions should be considered for further evaluation for constructability and reliability analysis. Stakeholder review and comments are compiled, and a decision on whether to recommend a MCPS project be included in the upcoming MTEP report is made.

MISO Long-Range Transmission Plan (LRTP): To meet the collective goals and requirements of the MISO footprint efficiently and cost-effectively, the LRTP was initiated in 2020. This effort is expected to analyze if there are cost effective portfolios of transmission projects in the northern portion of the MISO footprint (analyzed in Tranches 1 and 2), the southern portion of the MISO footprint (analyzed in Tranche 3), and between the two areas (analyzed in Tranche 4). The first projects included in the Tranche 1 portfolio, approved in July 2022, are expected to be placed in service starting in 2028. Like the Economic Planning process, the LRTP is subject to a rigorous stakeholder process to determine the system improvements included in a portfolio while meeting minimum benefit to cost thresholds.

C. Technical Considerations

1. Seams

Seams are interconnections between different regional transmission organizations/independent system operators (RTOs/ISOs), generally within the same interconnect (i.e., PJM to MISO, both of which are in the Eastern Interconnect), and they play a role in interregional planning. To address reliability issues and inefficiencies between RTOs, MISO and neighboring regions implemented interregional planning processes beyond FERC required coordination. While this process has yet to identify areas in which interregional transmission expansion would be cost effective for both regions, this foundation of interregional cooperation spurred the creation of the MISO-SPP Joint Targeted Interconnection Queue (JTIQ) study effort, described in greater detail below.

2. *Congestion*

A thorough discussion of transmission congestion, its causes, impacts, and efforts to address it can be found in Appendix T: MISO Grid Congestion.

3. Reliability

In addition to ensuring reliability by meeting MISO resource adequacy requirements, the Company also conducts studies related to transmission grid reliability and essential reliability services, including grid strength and stability studies, and maintaining a transmission planning criterion. The primary goal of this reliability analysis is to ensure NERC compliance on the transmission system. These studies incorporate load growth, shifting generation, and any topology changes to ensure all planning criteria are met in the 10-year planning horizon.

While transmission reliability is focused on the larger MISO bulk transmission system, it is also being integrated into processes for acquiring future generation for the NSP system. Since many aspects of transmission reliability are locational in nature, it is particularly well suited for incorporation into the evaluation process for many of the Company's generation acquisition processes. These generation RFP processes allow for evaluation of locational factors, unlike the resource planning process generally unconstrained by interconnection location used in the IRP. The main way that transmission reliability is being incorporated into resource acquisition processes is by evaluating the attributes from different generation resource bids that are related to transmission reliability in addition to the conventional RFP evaluation process.

4. Interconnection Queue

The MISO Generator Interconnection Process is designed to allow generators reliable, non-discriminatory access to the electric transmission system, in a timely manner, while maintaining transmission system reliability. Recently, as the number of proposed projects in MISO has expanded significantly, this process has been mired in delays. Delay impacts are particularly evident in the Definitive Planning Process (DPP) phases, where MISO undertakes generation interconnection studies. Current studies are several months behind due to the considerable number of projects in the queue, and a generator interconnection process that allows late withdrawals from the queue. With the intention of addressing some limitations in processing generation interconnection queues, FERC issued Order 2023 in July of 2023, directing all ISOs/RTOs to file their plans to address these issues. These compliance filings are not due until after the filing

of this IRP, meaning we do not have any official updated information about MISO's plans at this time. Order 2023 includes the following provisions:[14]

- **Implement a first-ready, first-served cluster study process.** Transmission providers will conduct larger interconnection studies encompassing numerous proposed generating facilities, rather than separate studies for individual generating facilities. This approach will increase the efficiency of the interconnection process, help minimize delays, and improve cost allocation by analyzing the transmission system impacts of multiple projects at once. To ensure that ready projects can proceed through the queue in a timely manner, interconnection customers will be subject to specific requirements, including financial deposits and site control conditions, to enter and remain in the interconnection queue.
- **Speed up interconnection queue processing.** The final rule imposes firm deadlines and establishes penalties if transmission providers fail to complete interconnection studies on time, but transmission providers may appeal their penalties at the Commission. Additionally, the rule establishes a detailed affected systems study process, including uniform modeling standards and pro forma affected system agreements.
- **Incorporate technological advancements into the interconnection process.** The final rule requires transmission providers to:
    - Allow more than one generating facility to co-locate on a shared site behind a single point of interconnection and share a single interconnection request. This reform creates a more efficient standardized procedure for these types of generating facility configurations.
    - Use operating assumptions in interconnection studies that reflect the proposed charging behavior of electric storage resources.
    - Evaluate alternative transmission technologies in their cluster studies.

  Additionally, the final rule allows interconnection customers to add a generating facility to an existing interconnection request under certain circumstances without such a request being automatically deemed a material modification and establishes modeling performance standards or inverter-based resources.
- **Establish an effective date and a transition process.** Compliance filings are due 90 days after publication of the final rule in the *Federal Register*. To smooth

[14] https://www.ferc.gov/news-events/news/fact-sheet-improvements-generator-interconnection-procedures-and-agreements.

the transition to the new rule, the Commission has adopted two options that can be exercised depending on the progress of the interconnection request:

- Those interconnection customers that have been tendered facilities study agreements by the transmission provider may proceed to a transitional serial study (a facilities study) or may opt to move to the transitional cluster study.
- Those interconnection customers in the interconnection queue that have not been tendered a facilities study agreement (have not completed the system impact study) will be eligible for the transitional cluster study.

While the MISO Generation Interconnection Process already includes many of these provisions to ensure timely processes of requests, the requirement to ensure projects entering the queue are "ready projects" will reduce the stress introduced by the inclusion of less certain or speculative queue requests.

Even if the aforementioned time constraints improve with queue reforms, as generation projects progress through the DPP phases, they are sometimes assigned high transmission system upgrade costs that challenge their economic viability. These interconnection costs, which are partially due to assigned transmission system upgrades, are additional to a resource's capital cost, both of which are passed on to customers.

In the MISO footprint, costs for upgrades are directly assigned to interconnecting generators, with the exception of network upgrades at 345 kV and above, for which 10 percent of the upgrade cost are regionally cost shared. To represent these upgrade costs in our last IRP, we used $500/kW for generic wind projects and $250/kW for generic solar projects, which were based on MISO Definitive Planning Process data. In this IRP, we have not yet noted significant improvements in these costs, and have decided, for modeling parity, to use a consistent $250/kW as the estimated system upgrade cost for all generic resource options, including storage. Additionally, these allocations are currently being discussed at the Federal and Regional levels in FERC Docket No. RM21-17-000, and may change based on those discussions.

The Company is looking for more efficient and innovative ways to meet our sustainability and reliability goals, including working with MISO to amend the Generator Interconnection Process, engaging with projects that will increase transmission capacity, and making decisions that will allow us to keep and reutilize existing interconnection rights. In the Company's work with MISO, two key issues with the queue were identified: (1) constraints are being identified, but not mitigated, and (2) not all constraints are being identified.

The issue of constraints being identified but not mitigated has been attributed to the threshold at which generators are made responsible for upgrade costs. The existing MISO threshold is that a five percent or greater contribution would require a generator seeking Network Resource Interconnection Service (NRIS) to pay for an identified upgrade. For a generator seeking Energy Resource Interconnection Service (ERIS), a contribution level of 20 percent or greater is required to be assigned costs of an upgrade. This gap in cost responsibility resulted in needed upgrades being identified during System Impact Study efforts, but since contribution levels of the projects were below the thresholds, the constraints were not mitigated. This was aggravated by generators being allowed to switch the level of service requested between System Impact Study phases – if a generator seeking NRIS could not cover the costs of upgrades to maintain that level of service, they were allowed to switch to being an ERIS service request between phases to reduce their cost burden, but still impact the same constraints.

In early 2022, the Company raised this concern with MISO and initiated a stakeholder process to implement our proposed solution – lowering the ERIS contribution threshold to 10 percent. MISO facilitated the stakeholder process, but implemented a change that only partially addressed the issue. MISO's solution applies a 10 percent contribution threshold for generators requesting ERIS, but only to facilities that are 230 kV and lower. Given that lower voltage facilities are higher impedance, and therefore contribute less generation, the Company feels that this is a step in the right direction, but still does not fully address the concern. We will be monitoring the contribution of ERIS requests on 345 kV facilities to determine the impact of this partial solution.

The issue of constraints not being identified was related to how MISO was implementing the fuel type dispatch that is included in their Interconnection Process procedures. This fuel type dispatch outlined how new generation should be dispatched in the System Impact Study models based on the type of generation they represent. While implementing this dispatch, the Company identified a consistent pattern in which the dispatch of existing generation of a similar type and in a similar location to a new interconnection request is lowered to accommodate the new request. This application of generation dispatch in this model effectively resulted in a net neutral change in overall generation output from an area, and fails to identify constraints that would limit outlet capability when generators of similar type and location are generating at similar levels. The reduction of available, low-cost generation out of economic order due to transmission system limitations is the definition of congestion and economic curtailment. This has several impacts:

1) Increased congestion costs,
2) Reduction in tax incentives,
3) Reduction in revenues due to reduced production because of transmission constraints,
4) Reduction in capacity value.

The Company raised this issue with MISO staff in March 2023, recommending changes to the MISO interconnection process, either through a stakeholder process or through including specific requirements in the NSP Local Planning Criteria. These recommendations include requirements for new and existing generation of similar types, located in similar locations, to be dispatched at similar levels. This would ensure existing resources maintain their deliverability and avoid future congestion. The response received at the meeting was that MISO would take the proposal back and consider it internally, but it was not likely that resources would be committed to the proposed changes.

There are, naturally, other issues that are not related to generation interconnection that contribute to constraints going unmitigated or simply unidentified. One great concern is the priority of dispatch in the MISO market. In the MISO market, there is no consideration to interconnection service when differentiating between resources in a similar location – the decision is based purely on offer price. This means that a newer wind resource that chose ERIS due to the higher cost of NRIS can offer a lower cost into the market than an older wind resource that may have less valuable tax credits or may have exhausted their tax credits, but obtained NRIS when it interconnected. This, in effect, reduces the deliverability of the NRIS resource in favor of an ERIS resource that is only supposed to be able to utilize the transmission system on an 'as available' basis. When this treatment of resources in the MISO market is paired with the generator interconnection procedures that fail to identify and mitigate constraints, the transmission system can only be assumed to have insufficient capacity, and deliverability of resources can only be expected to decrease. In terms of resource adequacy, the situation described here also reduces the overall accredited capacity in the MISO region. NRIS resources facing congestion are being curtailed so that ERIS resources can produce. As described earlier, reduction in production leads to lower capacity accreditation for the NRIS resource, but ERIS resources are not allowed to be granted capacity credit of any kind unless they obtain NRIS or transmission service. If the current MISO processes are not corrected, these issues will only lead to higher costs to customers and unrealized value of investments.

Given the state of the MISO queue, the Company is constantly reevaluating interconnection costs and looking for creative solutions to help keep costs low for our customers. In addition to advocating for procedural changes directly with MISO, as we previously discussed, the Company is also engaged in LRTP projects and looking for ways to preserve and reutilize interconnection rights we already have.

In addition to taking the necessary steps to realize the most value from existing transmission and generation facilities, the MISO LRTP project is developing plans to ensure the backbone infrastructure is in place to enable the transition to clean energy resources in a way that is efficient and cost effective. The initial portfolio, Tranche 1, was developed to address inefficiencies of the system and to meet near term goals and mitigate existing issues. The next portfolio, Tranche 2, is under development to design a backbone transmission grid capable of achieving carbon reductions estimated at 96 percent when compared to 2005 levels by 2041 across the MISO footprint. When considering the NSP area, these projects are intended to meet the requirements set in recent legislation by 2040. While this process is not intended to resolve all issues related to integration of new generation resources, it will ensure those resources can interconnect in a more efficient manner while meeting federal, state, and local requirements and goals.

Another effort underway to ensure a more cost effective and efficient approach to generation interconnection, the JTIQ study, has developed a process and transmission portfolio to address interregional constraints limiting the ability of new generation resources to interconnect in the MISO and SPP regions. The current JTIQ portfolio includes five projects, all primarily 345 kV located along the northern portion of the MISO-SPP Seam, stretching from North Dakota to Kansas and Missouri. Due to the innovative nature of this JTIQ process, applications have been submitted to the U.S. Department of Energy requesting federal funding for portions of this transmission development.

Given the increasing limitations of the MISO queue, the Company has also been looking for opportunities outside the MISO process to meet our renewable sourcing needs. One way to do this is to preserve and utilize interconnection rights we already have, thus avoiding delays and costs associated with the interconnection process. A recent success of this endeavor is the currently under construction Sherco Solar project at the site of our Sherco Coal plant in Becker, Minnesota. Because the coal plant was connected to MISO, the Company already had interconnection rights, which would have been lost, if they were not reused by 2026. By building Sherco Solar at this site, the Company secured our interconnection rights, which benefits our customers, as there will be no interconnection costs added to the capital costs of Sherco Solar.

V. DISTRIBUTION PLANNING

The Distribution system is the final link of the electric system that delivers electricity to every home and business the Company's service area. The work performed by Distribution is essential to ensuring that the electric service our customers receive is safe, reliable, and affordable. We extend service to new customers or increase the capacity of the system to accommodate new or increased load, repair facilities damaged during severe weather to quickly restore service to customers, and perform regular maintenance and repairs on poles, wires, underground cables, metering, and transformers. Distribution is also at the forefront of working to transform the distribution grid to enhance its security, efficiency, and reliability, to safely integrate more distributed resources and support electrification, and to enable improved customer products and services.

The Distribution organization is one of the Company's business units whose investments and work directly impact the daily lives of our customers. As a result, it is important that our investments are focused on achieving the Company-wide priorities of leading the clean energy transition, keeping customer bills low, and enhancing the customer experience.

A. Overall Approach to Distribution System Planning

An important aspect of distribution planning is the process of analyzing the electric distribution system's ability to serve existing and future electricity loads by evaluating the historical and forecasted load levels and utilization rates of major system components such as substations and feeders. We see this changing as our planning processes evolve to analyzing future electricity *connections*, rather than just loads. The purpose of these assessments is to proactively plan for the future, maintain and improve resiliency, and identify existing and anticipated capacity deficiencies or constraints that will potentially result in overloads during *normal* (also called "system intact" or N-0) and *single contingency* (N-1) operating conditions. Normal operation is the condition under which all electric infrastructure equipment is fully functional. Single contingency operation is the condition under which a single element (feeder circuit or distribution substation transformer) is out of service.

B. Integrated System Planning and Distribution Planning

Achieving the goal of a sustainable, clean energy future depends upon having sufficient infrastructure to support delivery of renewable and distributed generation resources and customer reliability. Modernized transmission and distribution systems are critical to our ability to serve our customers in a reliable and safe manner, deliver growing levels

of choice, increase renewable energy, meet the challenges of emerging technologies, and take a holistic view of resource planning.

As we actively prepare our distribution system for the needs of the future, we consider the need for thoughtful investments to meet our core obligation: safely and reliably delivering energy to our customers. We are also focused on adopting smarter technologies to further enable DER on our system. Additionally, we face new challenges and opportunities for the transmission grid as traditional baseload units retire, large scale renewables significantly increase, and DERs are increasingly adopted. In some cases, such as increasing consideration of distribution-level DER impacts on the transmission grid, changes in the market and planning constructs are underway. Recent policy changes are also driving the need to evolve planning. The federal Inflation Reduction Act (IRA) and the Infrastructure Investment and Jobs Act (IIJA) have myriad avenues for acquiring funding and tax incentives, which will impact how the Company and the energy industry at large will proceed with planning, while the "100 x 40" law passed by the Minnesota Legislature contains a roadmap to 100 percent carbon-free electricity, which will also impact resource, transmission, and distribution planning. We are adapting our planning practices in the interim to ensure reliability and resilience, including development of substantial new transmission, which will be needed to support the transformation that is underway.

Overall, we envision continuing to build on our planning capabilities for an integrated grid that supports the Company's clean energy transition, leveraging the strength of an interconnected system to make the best use of available resources while continuing to serve our customers with resilient and reliable power. We also envision a highly integrated operating technology environment.

This need for long-term planning that considers the impacts of generation, transmission, and distribution on each other spurred the creation of the Integrated System Planning (ISP) business unit within the Company, which we discussed above. The purpose of ISP is to develop generation, transmission, distribution, and natural gas infrastructure investment plans that deliver on the Company's sustainability goals while keeping bills low and enhancing the customer experience. ISP also bridges the gaps between modeling tools with human processes in addition to tackling challenges of the overall planning landscape, such as inflection points with technologies – such as EVs and beneficial electrification – and pricing. The Company's, and indeed the industry's, exploration of integrated planning frameworks is nascent and will continue to evolve and improve as we make progress toward a clean energy future and our vision to be the preferred and trusted provider of the energy our customers need.

VI. CONCLUSION

Although increasing DER penetration levels will drive integrated resource planning and distribution planning closer together, there are fundamental differences in how these two planning activities assess and develop plans to meet customers' needs. Distribution planning, like Integrated Resource Planning (IRP), charts a path to meet customers' energy and capacity needs, but is more immediate and subject to emergent circumstances because distribution is the connection with customers. Unlike IRPs, five-year plans are considered long-term in a distribution context; and, IRPs are concerned with size, type, and timing, whereas the primary focus of distribution planning is location. Thus, distribution loads and resources are evaluated for each major segment of the system – on a feeder and substation-transformer basis – rather than in aggregate, like occurs with an IRP. Before a greater integration of distribution planning, transmission planning, and IRP can occur, distribution planning will need to become even more granular than it is today to address the challenges – and harness the benefits – of DER.

Our transmission and distribution systems are critical to our ability to serve our customers in a reliable and safe manner, and to deliver growing choice and increasing renewable energy. As we actively prepare our distribution system for the needs of the future, we consider the need for thoughtful investments to meet our core obligation, safely and reliably deliver energy to our customers, and adopt smarter technologies to further enable DER on our system. We recognize and will continue to respond to customer interest in increased DER.

The transmission grid is also facing new challenges and opportunities as traditional baseload units retire, large scale renewables significantly increase, and DER are increasingly adopted. In some cases, such as increasing consideration of distribution-level DER on the transmission grid, changes in the market and planning constructs are underway. Other changes are just coming into view and the planning constructs have not yet caught-up. Overall, we envision building toward an integrated grid in the future that supports the Company's clean energy transition – leveraging the strength of an interconnected system to make the best use of available resources and continue to serve our customers with resilient and reliable power.

We support the evolution of the grid, and are taking actions to evolve our planning tools and improve our foundational capabilities to support our customers' expanding energy needs and expectations. We support a shift toward more integrated system planning, where utilities assess opportunities to reduce peak demand using DER and to supply customers' energy needs from a mix of centralized and distributed generation resources.

APPENDIX M – NUCLEAR

I. INTRODUCTION

Our Preferred Plan proposes to extend the operations of our nuclear plants. The continued operation of our two nuclear plants, which have been providing carbon-free power for 50 years, is crucial to achieving our Company's and Minnesota's carbon-free goals. We are proposing to extend operations of the two units at Prairie Island Generating Plant (PINGP) for an additional 20 years, until 2053 and 2054. We are also proposing to operate the Monticello Nuclear Generating Plant (MNGP) until 2050, in line with our pending application at the Nuclear Regulatory Commission (NRC). By doing so, we can continue to provide our customers with carbon-free power while keeping costs low by making use of our existing carbon-free resources.

In this appendix, we discuss the importance of using our nuclear generation fleet to meet our environmental and resource planning objectives and Minnesota's policy goals. Further, we provide information in compliance with Order Point 23 of the Minnesota Public Utilities Commission's (MPUC) last IRP Order,[1] requiring that we file a report explaining:

A. Planned investments at the Prairie Island and Monticello, and future plans for Prairie Island.[2]

B. Any aging management issues that may arise from continued operation.

C. Expectations regarding future nuclear workforce.

D. Cyber-security issues or concerns as plants move from analog to digital systems.

E. True comprehensive cost-benefit analysis, which includes potential environmental and economic impacts to the neighboring communities—in particular, the Prairie Island Indian Community and its Treasure Island Resort & Casino.

F. Additional spent nuclear fuel generated over a 10- or 20-year period.

[1] *In Re Xcel Energy's Upper Midwest Resource Plan*, Order, Docket No. E002/RP-19-368, April 15, 2022 (IRP Order).
[2] We note that where we reference plans for PINGP or MNGP beyond 2033/2034 or 2040, respectively, such plans are preliminary and contingent upon Commission approval of the life extensions and future Certificates of Need, and NRC renewal of the plants' operating licenses. We discuss required state permits, Certificates of Need, and federal licenses further in Section IX below.

G. How fuel stored on-site will be removed during the next integrated resource plan period.

H. Which additional state permits, Certificates of Need, or federal licenses will be required.

I. The full supply chain and life-cycle carbon impacts of the ongoing nuclear generation and storage at each of the facilities.[3]

We begin with a discussion of nuclear generation's role in a carbon-free future.

A. Nuclear's Role in a Carbon-Free Future

Our nuclear generation plays a key role in our carbon free future. We could not cost-effectively achieve such significant levels of carbon reduction without nuclear generation on our system. Our nuclear plants—which total approximately 1,650 MW in baseload net capacity—comprise approximately 40 percent of our existing carbon-free generation and 30 percent of our total generation in the Upper Midwest. These plants avoid the emission of 12.5 million metric tons of carbon dioxide due to reduced consumption of fossil fuels each year, which is equivalent to removing approximately 2.8 million gas-powered cars from the roads.[4] Nuclear is particularly important as we come to rely more and more on intermittent renewable resources like wind and solar. As we add significant amounts of intermittent renewable resources, the Company's nuclear plants help ensure that our system is resilient and reliable 24 hours a day, 365 days a year.

Our Preferred Plan includes a 20-year license extension of PINGP Units 1 and 2 (expiring in 2053 and 2054) and an additional 10-year extension on the operation of MNGP (through 2050). The EnCompass modeling of our plan demonstrates both that the continued operation of PINGP and the extension of MNGP are cost effective and expected to result in customer benefits. Our Economic Modeling Framework is discussed in Chapter 5: Economic Modeling Framework, but we briefly summarize the nuclear-specific results below.

As part of our economic analysis, our three baseload scenarios are based on three nuclear retirement scenarios, shown in Table M-1 below.

[3] Addressed in Appendix Y: Life Cycle Emissions Impacts.
[4] 2022 Nuclear Energy Institute data is used for MNGP and PINGP metric tons of carbon dioxide emissions avoided. Equivalent vehicle approximation calculated from August 2023 Environmental Protection Agency vehicle emissions data (www.epa.gov).

Table M-1: Baseload Scenarios

Scenario Name and Description	Plant Retirement Dates	
	PINGP Unit 1/Unit 2	MNGP
Scenario 1 – Reference Case Maintain current planned retirement dates	2033/2034	2040
Scenario 2 – Prairie Island plant Extension Extend PINGP 20 years; maintain MNGP retirement date	2053/2054	2040
Scenario 3 – Preferred Plan – Extend All Nuclear Extend PINGP 20 years; extend MNGP 10 additional years	2053/2054	2050[5]

The baseline modeling for the three scenarios described in Table M-1 is allowed to select the most cost-effective resources to replace the nuclear plants at the time of their retirements; therefore, all three scenarios assume some amount of firm dispatchable replacement generation such as gas-fired combustion turbines (CTs) to meet capacity needs. Our analysis shows that extending operation of our nuclear plants is beneficial and the least-cost alternative when compared to other scenarios. Table M-2 summarizes the EnCompass results for each modeled scenario.

Table M-2: Scenario PVSC/PVRR Deltas from Reference Case ($2024 millions)

PVSC Production Cost	Delta in NPV ($m) 2024-2040	NPV ($m) 2024-2040	Delta in NPV ($m) 2024-2047	NPV ($m) 2024-2047	Delta in NPV ($m) 2024-2050	NPV ($m) 2024-2050
Scenario 1 PVSC	**$0**	$51,037	**$0**	$63,635	**$0**	$68,788
Scenario 2 PVSC	**($413)**	$50,624	**($437)**	$63,198	**($513)**	$68,275
Scenario 3 PVSC	**($785)**	$50,252	**($941)**	$62,695	**($1,025)**	$67,762
PVRR Production Cost	**Delta in NPV ($m) 2024-2040**	**NPV ($m) 2024-2040**	**Delta in NPV($m) 2024-2047**	**NPV ($m) 2024-2047**	**Delta in NPV ($m) 2024-2050**	**NPV ($m) 2024-2050**
Scenario 1 PVRR	**$0**	$34,678	**$0**	$44,948	**$0**	$48,927
Scenario 2 PVRR	**($97)**	$34,581	**$291**	$45,239	**$391**	$49,317
Scenario 3 PVRR	**($464)**	$34,215	**$46**	$44,994	**$239**	$49,166

[5] As part of our last approved IRP, we received approval to extend operations at MNGP for 10 years. An additional 10-year extension, as modeled in the Preferred Plan, aligns with the NRC license extension we are currently seeking for MNGP. We anticipate applying for a SLR with the NRC for an additional 20-year extension for PINGP at the end of 2026.

The Preferred Plan—which includes the extension of both our nuclear plants—is the least-cost baseload scenario. The extensions result in approximately $1 billion in PVSC savings for our customers when compared to the Reference Case. We also conducted a sensitivity analysis that reoptimizes our Preferred Plan expansion plan to achieve a 100 percent carbon-free generation fleet by 2050. The results of the analysis are summarized in Chapter 5, Economic Modeling Framework. The Preferred Plan sensitivity case results in savings of nearly $2 billion for our customers on both a PVSC and PVRR basis. Compared to existing technologies, the extension of our nuclear fleet provides an overwhelmingly cost-effective source of carbon-free energy.

We believe these results provide strong support for our Preferred Plan, Scenario 3, and demonstrate the importance of our nuclear fleet from an overall resource planning perspective.

In addition, our nuclear plants provide three crucial elements of system value, all with zero carbon emissions: accredited capacity; system stability; and portfolio diversity and reliability. We address each of these elements below.

First, MISO's new seasonal resource adequacy construct has, in essence, increased the value of our nuclear plants since our last resource plan filing, most particularly in the winter season. Under MISO's new planning reserve margin (PRM) requirements, there is currently a 27 percent reserve margin during the winter months—higher than the summer season—while the winter seasonal capacity accreditation assumptions are projected to be less than five percent for new solar resources and less than 40 percent for new wind resources. To keep our system stable and meet the PRM during all seasons, we would need incremental natural gas generation if we were to replace our nuclear generation. This would slow down our efforts to cut carbon emission and reach Minnesota's goal of carbon-free energy. Given renewables' lower seasonal accreditation values, the large amount of renewables (shown below) that would be required to added to offset the loss of our nuclear plants would likely require even more transmission than the already sizeable transmission expansion plans of MISO current build out. EnCompass modeling results show that Scenario 1—replacing the carbon-free energy from the nuclear plants (based on their current retirement dates) with other resources—would require nearly 4,700 MW of incremental generating capacity over the modeling period, in addition to the resource additions identified in our Preferred Plan. Extending the lives of both nuclear plants (Scenario 3) offsets the need for more than 896 MW of firm dispatchable capacity, 120 MW of standalone storage; 2,800 MW of wind; and 876 MW of solar through 2040.

Second, our nuclear units provide vital stability for the transmission system. To determine the transmission system impacts of the nuclear plants' retirement, we conducted a "leave-behind" study. The study is provided in full as Appendix M1: NSP Nuclear Leave Behind Study Report. The study shows that the retirement of PINGP and MNGP, all else remaining constant, would necessitate significant costs in system upgrades to mitigate the resulting thermal violations on the transmission system during peak summer months. In addition, the leave-behind analysis shows that maintaining dynamic system stability in the absence of PINGP and MNGP would require significant replacement generation and load management costs. The reinforcement costs are functionally accounted for in the modeling as capital expenditure based on the timing of retirement. More details are discussed in Appendix M1: NSP Nuclear Leave Behind Study Report.

Third, our nuclear fleet adds important diversity to our generation portfolio to maintain reliability as coal is retired from our system and to provide a hedge against not only gas price volatility but also the uncertainty of technological development, future renewable pricing, and the future of intermittent and dispatchable intermittent resource accreditation. It is also a critical piece of our reliability requirement, as it is not a fuel-limited resource, is not subject to pipeline limitations during the winter season and has a strong operating history during cold (and hot) weather events. In 2022, our nuclear fleet operated at 96 percent capacity factor while working with power marketing to flexibly operate the nuclear plants 14 times to allow for more renewable generation on the grid. To further emphasize this reliability value, our nuclear fleet operated at 100 percent capacity during a massive winter storm in December of 2022 that crossed the Dakotas, Minnesota, and Wisconsin. While this historic winter storm created crushing winter conditions including blizzards and record cold temperatures across the majority of the United States and parts of Canada, our nuclear plants continued to provide the necessary electricity to our customers to keep them warm during this heavy, intense wintery storm.

We recognize that technological developments, like energy storage, hold great promise and that reliable renewable baseload energy continues to develop, as discussed in Appendix I: Minnesota Energy Storage Systems Assessment. Like others, we are excited by storage technology and its potential to further transform our system. We are taking steps as part of this Resource Plan to ensure that we are prepared to take full advantage of better technology as we learn from our pilot programs such as the Form Energy long-duration energy storage facility pilot. As the Company continues targeted initiatives and programs to further develop and gain experience in storage technology, we recognize that this technology is not yet economically at a scale comparable to even a fraction of our nuclear fleet. For this reason, we view nuclear energy as a resource that will help facilitate our transition to even greater renewable generation and storage

opportunities in the longer term, while we continue to pursue aggressive carbon reduction in the near-term.

In addition to the economic benefits identified by EnCompass modeling, our nuclear plants provide significant state, community, and employment benefits. Our nuclear operations employ approximately 1,100 staff in and around our communities with additional contractors hired during refueling outages. The plants are also an important source of tax base for their host communities, resulting in a combined total of approximately $42 million in state and local taxes annually. In total, Xcel Energy's nuclear operations contribute approximately $1 billion in annual economic benefits throughout Minnesota.[6] These and other benefits are to be quantified as part of the University of Colorado Boulder's cost-benefit analysis (CBA), which is discussed in Section II.B below.

Our nuclear plants provide wide-ranging and substantial benefits not only to our customers but also to the environment, the State of Minnesota and the broader region, and the communities we serve. The continued operation of both plants, including an additional 10-year extension of operations at MNGP and 20-year extension of operations at PINGP, is in the public interest, is consistent with Minnesota state policy, and is necessary to achieve our carbon reduction goals at a reasonable cost.

II. TRIBAL ENGAGEMENT AND COST-BENEFIT ANALYSIS

A. Engagement with Prairie Island Indian Community and Other Local Communities

Order Point 22 of the Commission's IRP Order requires that*:* "Xcel [Energy] shall immediately begin stakeholder discussions exploring the future of the Prairie Island Nuclear Generating Plant."

Prairie Island Indian Community (PIIC or the Tribe) is an important Company partner. Xcel Energy leadership meets with the Tribe regularly to discuss key issues on legislation, strategic vision, and plant performance. Our partnership with PIIC includes engaging with the Tribe on important nuclear industry topics and Tribal objectives. For example, in 2023 we organized a tour of PINGP with the U.S. Department of Energy's Transportation Core Team, at the request of the Tribe.

[6] Nuclear Energy Institute, "The Impact of Xcel Energy's Fleet on the Minnesota Economy," April 2017.

The Company has engaged extensively with PIIC since our last IRP was approved to reach agreement on annual payments to PIIC going forward. Our goal was to ensure that PIIC, which does not receive property tax payments, would receive an annual payment comparable to other communities hosting power plants that receive property taxes from the Company. These agreements resulted in passage of a statutory amendment[7] during the 2023 legislative session, providing that:

- In addition to the annual payment of $2.5 million previously required by statute, the Company must pay $7.5 million to the PIIC for each year PINGP is in licensed operation, plus $50,000 per year for each dry cask container containing spent fuel stored at the PINGP, whether or not the plant is in operation;
- The Commission shall approve a rate schedule providing for the automatic adjustment of charges to retail electricity customers to recover these payments;
- Payments shall constitute prudent operating expenses for the Company, and shall constitute consideration for any amended settlement agreement entered into between the Company and PIIC;
- The Commission's approval of a certificate of need allowing for the additional storage of spent nuclear fuel necessary for the extended operation PINGP is effective only if the governor, on behalf of the state, and the Company enter into an agreement binding the parties to the required payments and payment recovery terms above. PIIC is an intended beneficiary of this agreement and has standing to enforce the agreement; and
- These payments may be used by PIIC for any purpose benefitting PIIC. Restrictions in prior statute regarding how many acres PIIC may acquire, and that such lands may only be used for residential purposes, are removed.

In addition, the Company has worked with PIIC to support its Net Zero Project. Through 2020 legislation,[8] which the Company supported, PIIC was appropriated $46.2 million from the Renewable Development Account to implement a Net Zero Project with the goal of developing an energy system that results in net zero emissions. PIIC has used those funds thus far to support two large projects: a 5.4 MW ground-mounted solar array on the reservation, and conversion of Treasure Island Resort & Casino's heating and cooling system to geothermal.[9] These two projects, while addressing the majority of the Tribe's greenhouse gas emissions, left PIIC without a clear financial mechanism to move Tribal housing toward the same Net Zero vision.

[7] Minn. Stat. 216B.1645, Subd. 4.
[8] Laws of Minnesota 2020, Chapter 118, Section 3. See Chapter 118 - MN Laws.
[9] See Prairie Island Net Zero Project - Prairie Island Indian Community.

In response, the Company sought ways to support the net zero goal for Tribal housing while saving Tribal members money on energy costs. As PIIC's natural gas utility, we identified the Natural Gas Innovation Act (NGIA) as a suitable mechanism because it allows gas utilities to provide support for both strategic electrification and energy efficiency—the primary measures of interest to PIIC for Tribal housing.

We have included a proposed Prairie Island Indian Community Weatherization/ Electrification Pilot in our first NGIA plan, filed in December 2023. This pilot, if approved by the Commission, will conduct home energy audits, weatherize and electrify approximately 72 PIIC homes to which the Company provides natural gas service. Most are manufactured/mobile homes. The Company will work with PIIC, PIIC's contractors, and Dakota Electric Association, with PIIC serving as the project lead to ensure a seamless experience for Tribal residents. The typical project will consist of a home energy audit to assess needs, followed by a holistic weatherization/electrification retrofit effort seeking to electrify space heating and water heating end uses, along with any other end uses that are identified as candidates. The Company has proposed utility contributions of approximately $2 million to support these activities in 2025-27. PIIC meets the definition of an Environmental Justice Area in Minnesota statute,[10] and we believe NGIA provides an innovative means to support this project in ways that go beyond what the Company could do through our normal Energy Conservation & Optimization (ECO) incentives. For further details please see our December 15, 2023 NGIA Petition, Docket No. G002/M-23-518.

Likewise, we have long-standing partnerships with the City of Red Wing, City of Monticello, Goodhue County, Wright County and the surrounding communities. Our employees live and work in these areas, and we support the communities by providing vital tax base; supporting local nonprofits through grants, volunteering, and board service; and supporting economic development. Xcel Energy leadership meets regularly with local city officials and at least semi-annually with county officials. Community breakfasts are held in both Red Wing and Monticello annually and include school administrators, local elected officials, the Sheriff, PIIC, and other members of the community. Throughout the year, we meet with various community groups and organizations to share open dialogue regarding our objectives as well as to learn about the objectives and interests of our local communities. These types of events provide an opportunity for Xcel Energy to be transparent with our strategic vision—including the future of PINGP and MNGP—and hear directly from community leaders and other stakeholders throughout the region regarding what is important to them.

[10] See Minn. Stat. § 216B.1691, subd. 1 and Minn. Stat. § 115A.03.

B. Cost-Benefit Analysis

Order Point 23.E requires that the Company conduct a: *"*[t]rue comprehensive cost-benefit analysis, which includes potential environmental and economic impacts to the neighboring communities—in particular, the Prairie Island Indian Community and its Treasure Island Resort & Casino.*"*

In response to this Order Point, the Company began by engaging directly with PIIC to determine an approach to undertaking a comprehensive cost-benefit analysis (CBA) that the Tribe would feel holistically addresses its concerns around the future of PINGP. We and the Tribe recognize that ongoing operation of the plant has both costs and benefits, and that some of those costs and benefits can be quantified in dollar terms while others can only be discussed qualitatively. The Company had several meetings with PIIC staff to discuss possible quantitative and qualitative components of the CBA, and PIIC staff conferred with the Tribal Council for its approval.

The Company and PIIC staff agreed on an approach to a CBA with four components:

- Quantitative modeling of the economic costs and benefits of different plant retirement dates (retirement in 2033/34 versus extension to 2053/54).
- Quantitative analysis of environmental externalities, i.e., the societal costs of a scenario retiring PINGP in 2033/34 and replacing its generation and capacity with other resources.
- Quantitative modeling of the economic costs and benefits of Treasure Island Resort & Casino, a large revenue generator for the Tribe and source of employment in the region.
- Qualitative narrative (developed by PIIC) on cultural, historical and other impacts that cannot be quantified.

The Tribe agreed that this approach would constitute the comprehensive view suggested by the Order. They also requested a commitment to ongoing community engagement from the Company, to help Tribal members feel more educated, better informed, and know whom to reach out to if they have questions or concerns. The Company supports this request and commits to annual meetings with the Tribe and its members as well as quarterly meetings with the Tribe's Office of Emergency Management.

1. *Quantitative Modeling of the Economic Costs and Benefits of PINGP Retirement Scenarios*

To evaluate the economic costs and benefits of PINGP retirement scenarios, the Company engaged the University of Colorado Boulder – Business Research Division (BRD) to conduct an economic analysis using the E3+ model developed by Regional Economic Models, Inc. (REMI). REMI E3+ is a software tool that comprehensively analyzes the linkages between the energy sector, the environment, and the broader economy. The result is a comprehensive evaluation of the macroeconomic and demographic impacts of initiatives related to the energy and environmental sectors.[11]

PINGP represents a large revenue generator, purchaser of goods and services from local and non-local businesses, employer, and source of 24/7 carbon-free electricity. These benefits can be quantified using standard economic models and compared across different scenarios for the future of the plant. The evaluation of the impacts of different PINGP retirement dates is currently underway. BRD is using REMI's E3+model to analyze the net economic impact of plant retirement scenarios, comparing the Baseline Scenario from the 2019 IRP (retirement of the Prairie Island units in 2033 and 2034) to an Extension Scenario (retirement of the units in 2053 and 2054) in line with our Preferred Plan. The analysis considers operating expenditures, capital expenditures, and consumer rate costs for each scenario. Regions analyzed include Goodhue County and "Rest of Minnesota." The analysis is being conducted for the years 2024 through 2060 (extending slightly beyond unit retirement in the Extension Scenario to capture decommissioning costs/benefits and modeling end effects). Data was provided by Xcel Energy for operating expenditures, capital expenditures, revenue requirements (total and by type—residential, commercial, industrial), labor, property taxes, and other key model inputs. Inputs to the REMI E3+ model come directly from our IRP modeling software EnCompass, ensuring consistency of assumptions across the two models. BRD then compares economic costs and benefits in the Extension versus the Baseline Scenario.

Given the discussions leading up to the data sharing, the timing of the availability of the EnCompass output, BRD is still in the process of completing the study. We intend to make a supplemental filing providing the full study in the coming months. As discussed above, we are working closely with the Tribe on these efforts and they are supportive of our current timeline.

[11] https://www.remi.com/model/e3/.

2. Quantitative Analysis of Environmental Externalities

The Company will use EnCompass to determine the change in emissions if the PINGP units retire and are replaced with other resources. Any increase in emissions in this scenario, relative to the Extension Scenario, will be assigned the Commission's approved CO_2 regulatory costs and externality values for greenhouse gases and criteria pollutants. The cumulative externality costs in the Extension Scenario, less those in the Baseline Scenario, represent the net societal damages incurred by retiring PINGP in 2033/2034 -- or stated another way, the societal benefit of avoiding those same emissions by continuing to operate the plant to 2053/2054.

This component of the comprehensive CBA will be included in our forthcoming supplemental filing.

3. Quantitative Modeling of the Economic Costs and Benefits of Treasure Island Resort & Casino

Treasure Island Resort & Casino (TIR&C) represents a significant revenue generator for the Tribe, funding a wide array of services provided by the Tribal government as well as per capita payments to each Tribal member. TIR&C is also a purchaser of goods and services from local and non-local businesses and a large employer in Goodhue County. As such, the economic benefits of TIR&C—and conversely, economic losses if TIR&C were to reduce operations or close—can be quantified using similar modeling techniques as for PINGP retirement scenarios.

BRD is using the E3+ REMI model to analyze the gross economic benefits associated with TIR&C operations that would be foregone should TIR&C close. Regions analyzed include Goodhue County and "Rest of Minnesota." The analysis period begins in 2018 and extends through the year 2023, for a six-year analysis that includes some years reflecting a pre-pandemic level of TIR&C operations. Data was provided to BRD by PIIC under a non-disclosure agreement, including current and projected spending, operating expenditures and capital expenditures, employment and salaries.

We intend to include the TIR&C study with our supplemental filing.

4. Qualitative Narrative on Cultural, Historical and Other Impacts of PINGP Operations

While models like REMI and EnCompass are useful tools to estimate and quantify in dollar terms some of the costs and benefits implicated in decisions about PINGP and

TIR&C, both the Company and PIIC recognize that the models cannot fully capture all of the costs and benefits. PIIC is drafting a narrative on historical and cultural values impacted by decisions around the future of PINGP. This will be included in our supplemental filing.

III. PERFORMANCE AND PLANNED INVESTMENTS

A. Operational Excellence

The future of our nuclear fleet and our carbon reduction goals depends on our ability to deliver exceptional performance at a reasonable cost. Since our 2019 Integrated Resource Plan, we continue to challenge the way we do business with the goal of improving efficiency and, therefore, cost. Xcel Energy understands that, over the past year, our performance is not at the level we desire or that we have achieved in the recent past. The Nuclear Business has evaluated its performance with the assistance of third-party consultants with expertise in both nuclear operations and leadership acumen. The leadership team has refocused the nuclear organization on leadership behaviors, standards and equipment reliability. We anticipate that the evaluation of our performance and implementation of a revised performance improvement strategy as we enter 2024 will secure and maintain our top industry performance as a leader in the commercial nuclear industry. We continue our work with the Institute of Nuclear Power Operations (INPO), Nuclear Energy Institute (NEI), and Electric Power Research Institute (EPRI) to evaluate and incorporate industry learnings and best practices to ensure continued operation on a more consistent, efficient, and safe basis.

1. Safety

Safety is a key value for Xcel Energy and imperative at our nuclear plants. The NRC Reactor Oversight Process classifies U.S. nuclear reactors into various nuclear safety "Columns," which range from 1 (best) to 5 (worst). Both MNGP and PINGP are Column 1 plants with all green safety performance indicators. And while no plant can achieve the standards of perfection imposed by the NRC at all times over its operational life, our track record demonstrates the Company's longstanding commitment to nuclear safety. Further, Xcel Energy has implemented a new approach to safety, which provides a platform for field supervisors and workers to discuss potential risk of planned work and incorporate lessons learned from past work activities. Open dialogue is encouraged between all employees to ensure every work plan is written for a successful and safe outcome. As a result, employee engagement and ownership of individual safety has improved. The Nuclear business unit documents all safety issues and identified risks

through our corrective action program, as required per 10 CFR 50 Appendix B, to ensure resolution is taken. This is also a focus for the organization during outages. For example, in 2023 during the MNGP refueling outage, 100 percent of the safety issues identified were resolved.

Additionally, employees turn to technology to reduce risk and improve safety. Notably, the Company's Nuclear Innovation Team has contributed to improving safety through the use of robotics. Throughout the nuclear fleet in 2023, 32 robotic missions were executed. In one example, a robot was used at MNGP to inspect a pipe that would have otherwise required a worker confined space entry and in another at PINGP, a drone was used to inspect a lightning arrestor, eliminating work at heights. Additionally, there have been multiple examples in 2021 and 2023 at PINGP of the Company using a submersible to inspect equipment in intake bays which would otherwise have required a diver to perform. These are just a few of the examples of how the Company and its employees are pursuing the use of technology to improve worker safety.

2. Capacity Factor and Flexible Operations

With respect to plant availability, MNGP achieved an average capacity factor of 95 percent between 2020 and 2022. Likewise, PINGP achieved a combined average capacity factor of 95 percent between 2020 and 2022, including a 99.8 percent capacity factor for Unit 1 in 2021 and a 99.9 percent capacity factor for Unit 2 in 2022. This data reflects strong performance at both plants, and the availability of our plants drives substantial customer benefits by maximizing the value of the fixed costs associated with nuclear operations. Contributing to these capacity factors was improved performance during plant refueling outages, which were completed on time and on budget. A refueling outage of less than 30 days is considered good performance in the nuclear industry. This assumes a basic refueling outage and no major projects are scheduled. For example, in 2019 and 2021, PINGP's Unit 2 achieved a 27 and 29-day refueling outage, respectively, and in 2020 and 2022, PINGP's Unit 1 achieved a 28 and 27-day refueling outage, respectively. Likewise, we have experienced some of the longest runs of uninterrupted operation in the history of our nuclear fleet, including a record-setting 670 days at PINGP Unit 1 from 2018 to 2020, and a record-setting run of 704 days on Unit 2 from 2019 to 2021. MNGP experienced a record-setting run of 705 days from 2019 to 2021.

In addition to providing the carbon-free baseload energy we have relied upon for 50 years, we are also operating our nuclear units more flexibly. Historically, our nuclear plants were generally offered into MISO as "must-run" resources that did not respond to expected inter-day fluctuations in net load. To accommodate more variable

renewables on the grid, since 2019 we have been honing our operational strategies that allow us to offer the plants into the MISO Day-Ahead market on an economic basis, allowing for MISO to schedule a portion of the plants to be more responsive to market signals and ramp output accordingly. With flexible power operations capabilities to all three nuclear units, we can safely and efficiently ramp up to approximately 280 MW– or over 15 percent – of our nuclear capacity in response to the market. In fact, the Company flexibly operated our nuclear plants 14 times in 2022 and 16 times in 2023. This capability can help us integrate more renewables on our system, while still utilizing our nuclear fleet as a carbon-free, stable, and reliable source of energy. In short, our ability to make renewables and nuclear work together helps us increase the amount of clean energy we can provide our customers.

Nuclear has proven its value as the foundation of our baseload fleet, and its carbon-free generation make it a critical part of our plan to achieve an 80 percent reduction in carbon emissions by 2030. We view flexible power operations as an expansion of nuclear's role in our fleet and in the Company's efforts to integrate substantial amounts of renewable additions during the planning period.

3. O&M and Production Costs

These safety and operational results have been achieved without increasing our production costs. In fact, both O&M and total production costs at our plants have decreased in recent years. Total actual O&M costs for our nuclear fleet between 2019 and 2023 was $186 million less than what was estimated in the 2019 IRP for O&M costs between 2019 and 2023[12]. In 2023, O&M costs totaled approximately $268 million. The Company's Nuclear O&M forecast between 2024 and 2028 ranges from approximately $274 million in 2024 to $288 million in 2028. Normal inflationary increases are contributing to the forecasted increase in O&M costs.

Between 2019 and 2023, we have consistently maintained production costs at $31.25 per megawatt-hour (MWh) or less, which is a decrease of more than 20 percent when compared to 2013 production costs.

[12] For a more like-for-like comparison of cost projections to the 2024 Preferred Plan, nuclear O&M and capital cost inputs for Scenario 7 of the 2019 IRP model were used for this comparison. Scenario 5 of the 2019 IRP was the selected scenario which modeled PINGP retiring at end of current license in 2033/2034 and MNGP license extension to 2040. The 2024 Preferred Plan models operating extensions of both plants with PINGP to 2053/2054 and MNGP to 2050. Scenario 7 of the 2019 IRP was used in this comparison because it most closely modeled the 2024 Preferred Plan with PINGP operating extension to 2043/2044 and MNGP extension to 2040.

Contributing to these results has been Xcel Energy's commitment to driving improvement through efficiency and technology initiatives, which focus on process refinement and the integration of technology to achieve efficiencies. Industry experience shows that successful nuclear organizations are highly process and outcome driven and that focused process improvement has the benefit of driving down costs while at the same time improving plant performance. Through our work with external consultants and INPO, we have been able to effectively improve upon a number of processes and personnel behaviors that has enabled the plants to achieve better results with fewer resources. We also continue to efficiently share our maintenance and operations resources between both plants and integrate these department resources as necessary to efficiently and safely maintain and operate the plants. As we move into 2024, we will continue to look for these opportunities to gain efficiencies while also using these resources to improve equipment reliability to ensure the continued safe and reliable operation of our nuclear fleet for years to come.

Notably, the Inflation Reduction Act (IRA) includes a production tax credit (PTC) for zero emission nuclear generation. As with other PTCs generated by the Company's resources, we intend to return the value of the nuclear PTCs, less any transaction costs associated with applicable tax credit transfers, to our customers in a timely manner. That said, forecasting the value of the PTCs is challenging because it is likely that the value of the PTCs will be an annual calculation based on Locational Marginal Pricing (LMP) that occurs in the market in a given calendar year.

For purposes of EnCompass modeling, we included an estimated value of nuclear PTCs in alignment with LMP assumptions used in the model and the nuclear plant dispatch resulting from the model. The value of the PTCs was added back into the model as a fixed amount. This resulted in close to $900 million total PTC amount on a NPV basis between 2024 and 2032. We assume the PTC will end in 2032,[13] hence it does not affect the cost benefit analysis of the nuclear extension scenarios.

4. Capital

We have completed a reanalysis of our long-term capital budgets for both plants, and we have made changes to our capital forecast relative to our 2019 resource plan. In 2019, we stated we were in a position to materially reduce our capital forecasts. The actual results validate that, between 2019 and 2022, we reduced our capital spend. In the

[13] IRA Section 13105 addresses a "zero-emission nuclear power production tax credit" in Section 45U of the Code (the Nuclear PTC). The Nuclear PTC is available for existing operating nuclear facilities in the taxable years after December 31, 2023 and prior to December 31, 2032.

2019 IRP, a four-year capital forecast between 2019 and 2022 was approximately $413 million. Actual capital spend during this time period was approximately $409 million. In 2023, unforeseen operational impacts resulted in higher capital expenditures of approximately $200 million (compared to the original forecast in the 2019 IRP of approximately $127 million for 2023). Contributing to the higher capital spend were emergent (i.e., unexpected) equipment reliability needs that resulted in loss of generation. Additionally contributing to the higher capital expenditures since 2019 is recently identified industry operating experience requiring PINGP to inspect and replace radial and clevis bolts on the Unit 1 reactor vessel.

In the 2019 IRP, assuming the scenario of 10-year extensions for both MNGP and PINGP (to compare the most like-for-like scenarios), we stated that between 2024 and 2028, we forecasted to spend approximately $559 million in capital. A reanalysis of our operational needs indicates an increase to that forecast of approximately $197 million between 2024 and 2028 for a total of $756 million over the next 5 years. Contributing to the increase are reliability projects that have been identified to support extended operation of both MNGP and PINGP to 2050 and 2053/2054, respectively. Some of these investments are discussed further in Section 4.B, "Planned Investments." Also contributing is a MNGP turbine digital control system upgrade due to current and near-term equipment obsolescence issues (i.e., equipment is no longer supported by vendor and maintenance is not possible or cost is not viable). In some cases, such as with a digital system, we are notified by the vendor that they will no longer support a specific version of the digital software and associated components and the risk to maintain the system becomes too high, so replacement is the most cost effective and lowest risk option. Security and facility expenses have also contributed to the cost increase. For additional investments, refer to Section 4.B.

The updates to our forecast reflect several years of work by numerous Company employees and leadership, as well as a recognition that we had to re-envision our approach to nuclear operations if our plants were going to remain competitive. The forecasts are based on a detailed, long-range capital budgeting process that was undertaken following our last Resource Plan. In fact, this effort included an analysis of operational and equipment reliability needs required by both plants in support of license extension plus 20 years, should approval be received at the state and federal levels. As part of this process, teams from nuclear engineering and capital projects assessed the condition of our plants and developed a long-range project forecast to support continued operations and aging management. These teams then worked with nuclear finance to develop budgets to support project needs, and probabilities were assigned to the various projects reflecting the likelihood each would be necessary to maintain the reliability of our plants. Just as we did in developing the 2019 IRP, we

then worked with independent consultants with expertise in nuclear operations who assessed both our budgeting process and our capital budgets in order to ensure that our forecasts were reasonable and aligned with industry norms.

We recognize that our stakeholders and the Commission will continue to monitor our performance and investments relative to our forecasts. We look forward to demonstrating that our nuclear plants can continue to drive both environmental and operational performance and benefits for our customers.

B. Planned Investments

Order Point 23.A of the Commission's IRP Order requires the Company to explain "[p]lanned investments at the Prairie Island and Monticello, and future plans for Prairie Island."

In this section, we address planned investments at PINGP and MNGP. Future plans for MNGP and PINGP are addressed specifically in section IX: Future Plans and Additional State and Federal Processes noted below. The portfolio discussed in the next sections will reach approximately 70 percent of projected capital spend in 2036, prioritizing asset management and equipment reliability as we enter the license extension period at both MNGP to 2050 and PINGP to 2053/2054.

1. Near-Term Planned Investments

In 2024 through 2028, the Company is planning for $756 million (excluding fuel reloading) in capital investments at MNGP and PINGP.

Approximately 50 percent of these projects address equipment reliability (i.e., aging management) concerns. At MNGP, several of the largest projects in the five-year capital investment plan at MNGP address equipment reliability, including:

- turbine digital control system upgrade,
- residual heat removal motor replacements
- reactor control rod drive rebuilds and replacements,
- refueling bridge upgrade
- turbine valve replacements,
- 4 kilovolt breaker replacements,
- valve packing gland replacements, and
- intake traveling screens and trash rake replacements.

At PINGP, several of the largest equipment investments in the five-year capital plan, include:

- reactor vessel baffle former bolt inspections and replacements,
- reactor vessel clevis bolt inspection and replacement,
- fuel handling crane controls replacement
- plant monitoring system upgrade,
- reactor vessel control rod position indication upgrade,
- fire protection system upgrades,
- water treatment modification,
- inverter replacements,
- nuclear instrumentation system upgrade,
- plant traveling screen replacement.

The above listed equipment reliability investments have been identified through implementation of life cycle and aging management practices. These practices consist of monitoring and managing the effects of aging on equipment through industry established methods of monitoring, detecting, and preventing. Via the application of these methods in addition to the review of industry operating experience and lessons learned, these investments have been identified as those that are important to the continued reliable and safe operation of the plant. While the listed projects do not include all of the current equipment reliability investments, they make up approximately 85 percent of all equipment reliability projects in 2024 through 2028.

The remaining 50 percent of the $756 million five-year capital budget includes:

- MNGP and PINGP SLR projects,
- dry fuel storage projects at both plants including ISFSI expansion and dry fuel storage system procurement and spent fuel loading,
- blanket capital investments such as maintenance for tools, facility infrastructure upgrades such as training center and service building rest room upgrades and HVAC replacement, and regulatory or mandated improvements resulting from inspections or other regulations,
- miscellaneous security investments such as security specific equipment and tools, IT software upgrades for the plant monitoring system and security system computer, and
- training tools and facilities.

These investments provide a supporting infrastructure to continued operation of the plant with a focus on subsequent license extension, continuing dry fuel storage, regulatory improvements, and updates to work areas and training facilities for employee comfort and support.

2. Long-Term Planned Investments

If the Company were to operate both MNGP and PINGP for 20 years beyond the end of their current Nuclear Regulatory Commission (NRC) operating licenses, we estimate approximately $2 billion (excluding fuel reloading) in total capital investments at the plants. Approximately 60 percent of these projects address equipment reliability (i.e., aging management) concerns. At MNGP, large equipment reliability investments include the following:

- traveling screen replacements,
- low pressure turbine rotor replacements,
- turbine valve refurbishments,
- Turbine controls upgrade,
- motor generator set replacement,
- generator stator connector ring replacement,
- reactor manual control system upgrade,
- transformer replacements,
- radiation waste controller upgrade,
- safety injection system cable replacements,
- main condenser nozzle replacement and reinforcement,
- Environmental Qualification (EQ) Program component upgrades (these are components that are in areas of the plant that might be exposed potentially to high temperatures and, therefore, they are tested at higher temperatures before being installed at the plant),
- system and component automation upgrades,
- digital feedwater control system upgrade,
- control rod blade replacement, and
- control rod drive rebuilds and replacements.

PINGP additionally has large equipment reliability investments planned and some of these contributing to the $2 billion include:

- low pressure turbines refurbishment and rotor replacements,
- high pressure turbine refurbishment and rotor replacement,

- turbine valve replacements,
- generator step-up transformer replacement/refurbishment,
- traveling screen refurbishments,
- cooling tower vertical support upgrade,
- digital electro-hydraulic turbine control system upgrade,
- main condenser dog bone and steam bellows replacement,
- main condenser partial tube replacements,
- feedwater heater retubing, load sequencer replacement,
- fire protection system upgrades,
- underground cable replacement,
- low voltage switchgear replacement,
- transformer replacements, breaker panel replacements,
- inverter replacements,
- system and component automation upgrades,
- piping replacement,
- buried fire protection pipe upgrades,
- neutron flux mapping system upgrade,
- containment fan coil units face replacements,
- refueling bridge replacement,
- residual heat removal heat exchanger refurbishments,
- emergency diesel generator and supporting equipment upgrades,
- area radiation monitor replacements,
- cooling water header and piping replacement, control room chiller refurbishments,
- reactor coolant pump seal replacements,
- control rod position indication system upgrade,
- control rod assembly replacement,
- nuclear instrumentation system replacement,
- heating boiler replacement,
- in-core cooling monitoring and reactor vessel level indication system upgrade, and
- radiation protection equipment upgrades.

Although these projects do not make up the entire list of future capital equipment reliability investments, they do make up approximately 89 percent of the planned equipment reliability related investments.

As previously stated, the above listed equipment reliability investments have been identified for future upgrade or replacement through implementation of life cycle and aging management practices and are important to the continued reliable and safe operation of the plant.

The remaining 40 percent of the $2 billion long term capital investments includes:

- PINGP SLR,
- dry fuel storage projects at both plants including ISFSI expansion and dry fuel storage system procurement and spent fuel loading,
- blanket capital investments such as capital maintenance for tools, facility infrastructure upgrades such as plant laboratory upgrades, and regulatory or mandated improvements resulting from inspections or other regulations,
- miscellaneous security,
- IT, and
- training tools and facilities.

IV. AGING MANAGEMENT

Order Point 23.B of the Commission's IRP Order requires the Company to explain, "[a]ny aging management issues that may arise from continued operation."

Throughout the years of operation, aging of plant equipment can occur due to varying processes or mechanisms. Varying temperatures, pressures and flowing water are all examples of mechanisms that can impact structures and components gradually over time. If unmonitored or unaddressed, these aging effects could cause a component to lose its intended function or design purpose prior to the end of its life.

Through industry aging management and life cycle management best practices and station procedures, the Company continues to monitor the reliability and health of the equipment at both plants. Through these processes, the Company has identified opportunities for equipment refurbishment, replacement, or upgrade at both MNGP and PINGP, should both facilities operate 20 years beyond the end of their current NRC licenses. The equipment reliability investments previously listed fall into the category of aging and life cycle management. The Company's aging management program (AMP) applied at both MNGP and PINGP will continue to be rigorously implemented to ensure any aging management issues are identified, addressed, and repaired in a timely manner commensurate with risk. AMPs are a collection of activities involving monitoring, detecting, and preventing. These are governed by administrative

controls and procedures that adequately manage the effects of aging on structures and components. This is a process the industry and company has implemented over the past approximately 50 years of the life of the plants and would continue over the next 10 years and 20 years at MNGP and PINGP nuclear plants, respectively.

In addition to being required per the plants' current licensing basis, as part of SLR implementation, AMPs are required by NRC regulations.[14] NUREG-2191, "Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report," provides the NRC staff's generic evaluation of plant AMPs and establishes the technical basis for their adequacy. As an SLR applicant, the Company evaluates current established AMPs and compares them to the GALL-SLR Report. A feasibility study will be performed as part of the SLR project for PINGP to determine if any major assets require replacement or refurbishment as part of the aging management program in addition to what has already been identified. This was done for MNGP's SLR application (which is a 20-year operating license extension request with the NRC) and no major investments were identified beyond what the station had already identified for equipment reliability improvements.

V. NUCLEAR WORKFORCE

Order Point 23.C of the Commission's IRP Order requires the Company to explain "[e]xpectations regarding future nuclear workforce."

Minn. Stat. § 3.8851, subd. 4 requires the Company to submit to the Commission updates periodically, with the resource plan filing, of the Worker Transition Plan (WTP) required under Minn. Stat. § 116C.772, subd. 3. The WTP is required to address the event of a shutdown of PINGP for longer than six months.

We address both requirements in this section.

A. Future Nuclear Workforce

At the Xcel Energy enterprise level, People & Organizational Health is a marquee initiative, through which we aim to have the innovative, inclusive culture and diverse, high-performing talent to lead the energy transformation within our industry. Maintaining a skilled and engaged workforce is one of the Company's top priorities as it impacts cost, performance, and safety. Specifically, continued operation of the plants requires a specialized workforce and talent pipeline. For decades, we have

[14] 10 CFR 54.

successfully and strategically managed our nuclear workforce to ensure safe, efficient plant operations.

In this section, we discuss our current nuclear workforce and how we are maintaining and planning for the future workforce needs to support continued operations of both plants.

1. Our Current Nuclear Workforce

As shown in Table M-3, 1,105 employees work at, or in support of, Xcel Energy's nuclear plants including contract security employees. The numbers in Table M-3 do not include other contract employees.

Table M-3: Xcel Energy Nuclear Workforce (As of December 2023)

	MNGP	PINGP	Corporate (Minneapolis Headquarters)	Total
Bargaining (includes contract security)	278	391	5	**674**
Non-bargaining	166	148	117	**431**
Total	**444**	**539**	**122**	**1,105**

2. Maintaining Our Nuclear Workforce: Workforce Supply, Demand, and Development

We have created a robust internal succession plan and achieved significant depth in our staffing. We also have a retention plan to ensure continuity of our bench strength. Maintaining a qualified and engaged workforce, however, remains an ongoing priority, and one that all high-performing nuclear organizations view as critical to maintenance of the industry's high standards of performance and safety. As a result, the Company must continue to create staffing pipelines that sustain the supply of qualified licensed-required positions such as operators, radiation protection technicians, and instrumentation and control technicians. Since the extended time for training to meet regulatory qualification expectations for these roles can be up to two years, these pipelines have to be in active hiring mode continuously each year. With the industry being more than 50 years old, many experienced nuclear personnel are well along in

their careers and will be in a position to retire in the next five to 10 years. The supply of possible nuclear employees is becoming more limited, so it is important that the Company maintains a robust talent pipeline through recruiting, engagement, training, and active succession planning.

We have five critical pipelines for roles within the nuclear organization:

- Chemistry
- Engineering
- Instrument & Controls
- Radiation Protection
- Reactor Operators/Senior Reactor Operators

These highly specialized roles will remain crucial to the ongoing successful operation of both plants into the coming decades. As we discuss below, our practices seek to ensure a robust talent pipeline for the near and long term.

a. Recruitment

Company-wide, Xcel Energy's talent acquisition team attends over 100 recruiting events each year, posts all jobs on hundreds of online job boards, and conducts outreach to high schools, diversity groups and chapters, workforce centers, veterans' groups, and more. For the Nuclear organization specifically, our need for highly specialized workforce requires additional, targeted recruitment practices to attract qualified candidates in a competitive labor market. Other nuclear plants in the U.S. and around the world as well as advanced nuclear companies are competing for a limited talent pool, and newer industries such as data centers often recruit similarly skilled candidates as they expand their strategic vision to advanced nuclear technologies for additional generation needs.

With one in 10 new Xcel Energy hires being veterans, we recognize the value military service brings to our workplace. In addition to Xcel Energy's enterprise-wide talent recruitment practices, the Nuclear talent acquisition team maintains relationships with the U.S. Navy, which operates nuclear-powered vessels. We use the Troops to Energy Jobs site, which connects veterans with careers in the energy industry and provides further training and support for energy jobs; Hiring our Heroes, a nationwide effort to connect veterans, service members, and military spouses with meaningful employment opportunities; and DOD Skillbridge, a program that supports transitioning service members through fellowships. We also advertise nuclear job postings on websites such

as Nukeworker and Facebook's Navy Nuke Job Finder, in addition to hundreds of other online job boards.

As the need for a skilled workforce remains for our nuclear plants, the retirement of our coal fleet, by the end of 2030, will create new opportunities for our employees at the Sherco and King plants. Over the past five years, approximately 15 coal plant employees have transferred to our nuclear plants, and we anticipate that over 300 jobs will be open at our nuclear plants in the 2027-2030 timeframe. Our Energy Supply and Nuclear leaders have been meeting with Sherco and King plant employees individually and presenting at plant employee meetings regularly to discuss opportunities at the nuclear plants. We discuss our workforce transition plan further in Appendix O: 2023 Workforce Transition Plan Summary and Appendix O1: 2023 Workforce Transition Plan.

The compensation levels necessary to recruit and retain experienced nuclear employees are increasing due to the limited number of nuclear plants in the United States and the highly competitive practices employed by other nuclear companies in pursuit of the same experienced personnel. To ensure we remain an employer of choice, a deliberate compensation philosophy is required.

A dedicated Compensation team at the Company manages overall compensation guidance and review and set salary structures and grades. Within those structures, managers set employee pay based on performance, anticipated contributions, internal equity, and their position within a salary range. When a job description or role profile is created, the compensation team identifies the relevant labor market for recruiting and retention purposes, in which workers compete for jobs and employers compete for workers. If available, we use market data to inform compensation. The nuclear industry standard compensation benchmarking survey is the Willis Towers Watson Energy survey. Xcel Energy Nuclear positions are matched to the market median, or 50th percentile. The Compensation team also leverages a membership through the Nuclear Human Resource Group (NHRG) for survey participation and industry peer benchmarking. Not all jobs have exact market matches. For these jobs, a "blended match" may be considered, which means compiling data for multiple job matches and averaging them together. The Company's compensation team also reviews all positions to balance external competitiveness with internal equity.

Some nuclear employees in Maintenance, Operations (including radiation and chemistry), and Engineering are also members of unions or are considered bargaining employees. The Company understands the important role these employees have in ensuring safe and successful operations of our nuclear facilities and, therefore, the

Company has worked to build a healthy relationship with our local unions over the years. The dedicated Compensation team described previously would be engaged in much the same way when renegotiating union contracts to ensure a fair and equitable offering for our bargaining employees.

b. Training & Retention

Employee retention is a crucial component of the future nuclear workforce. We employ a number of tools and programs to retain and engage employees, but challenges exist. Given the nuclear industry's openness in sharing issues and their resolution, plants with new performance issues are able to identify and recruit personnel who have worked at other plants who have successfully resolved issues. Our plants have performed well, which makes our employees desirable candidates to other utilities that are seeking to improve their performance, as our employees have demonstrated ability to operate successful plants. These other companies are offering signing bonuses and retention incentives to attract and retain experienced employees from other nuclear companies. We need to ensure that we are providing adequate pay, training, and opportunities to attract and retain the caliber of workers that we need to continue to operate at our current high level. Talent development, including fostering a culture of continuous improvement, is a constant focus for the Nuclear organization, and an essential element to achieve our performance objectives for our stakeholders.

We have incorporated retention provisions in our employee agreements to help attract and retain qualified personnel and have taken other steps to attract and retain the right skilled workforce at our plants; including the planned development of new, multi-skilled union positions.

To create a pipeline of leaders in Nuclear, we have a consistent, integrated, and sustained approach toward employee development. Xcel Energy has a cyclical Talent Review & Succession Planning approach. Human Resources, in partnership with Nuclear leaders, establish and communicate the strategy for developing high potential and succession candidates. This incudes identifying critical positions and identifying individuals for the succession plan. Those identified on the succession plan are made aware of their placement on the succession plan, are required to have a development plan, and engage in quarterly discussions with their leader about their plan and progress. We work to ensure that employees are involved and take ownership in their career development. Senior Reactor Operator (SRO) license classes and industry and external training and development are two important programs to develop our employees and build a leadership pipeline. We address each program below.

Senior Reactor Operator License Class

Senior Reactor Operator (SRO) licenses are valued as both a technical and leadership development strategy. Obtaining an NRC SRO license requires an Initial License Training class, which provides the extensive training needed to prepare employees to become an NRC-licensed SRO and supervise the controls of a nuclear power reactor. Approximately 50 percent of those who enter the Initial License Training class are internal to the Company, which builds and advanced our leadership pipeline. We select internal SRO candidates whom we have identified as employees who can advance through the control room supervisor position and, longer term, to other positions of management outside of operations. Through earning the license, employees gain direct line of sight to the reactor core and the grave responsibility that goes with running a nuclear power reactor. While a license is not required for all key leadership positions, it is expected that individuals with an SRO move through the organization as a benefit of their experience. Across both nuclear sites, we aim to have 76 active license holders.

Industry and External Training and Development INPO or NEI Rotation

Targeted for individuals to broaden and share experience, a rotation offers employees the opportunity to gain insight into best practices and the pursuit of excellence across the nuclear industry. Through an 18-month assignment, employees learn what excellence looks like and understand key processes. INPO also offers seminars on leadership development.

3. Conclusion

As we look to continue operations at our nuclear facilities into 2050 and beyond, a highly skilled workforce is imperative. We have the plans in place to ensure the plants are fully staffed with the skilled employees we need to operate the plants safely, reliably, and affordably into the coming decades.

B. Workforce Transition

1. Introduction

Minn. Stat. § 3.8851, subd. 4 requires the Company to submit to the Minnesota Public Utilities Commission updates periodically, with the resource plan filing, of the Worker Transition Plan (WTP) required under Minn. Stat. § 116C.772, subd. 3. The WTP is required to address the event of a shutdown of PINGP for longer than six months.

The 1995 WTP (the original filing of this plan) reported that the conditions that could lead to a short lead-time reactive worker transition due to an unplanned immediate shutdown were not typical of the scenario facing Minnesota. Minnesota's nuclear generating plants have a long history of being well-maintained resulting in safe, reliable, and economic operations. The WTP described in 1995 assumed a long lead-time, proactive approach. MNGP and PINGP continue to have strong operating records and are expected to operate until at least 2040 and 2033/2034, respectively; our Preferred Plan includes a 20-year extension of both PINGP units to 2053/2054 and an additional 10-year extension of MNGP to 2050. This update continues to assume the long lead-time proactive approach to a WTP.

2. Transition Plan Philosophy

We anticipate that MNGP will operate at least until 2040, and as part of our Preferred Plan, we are proposing an additional 10-year life extension that would continue plant operations until 2050. Also as part of our Preferred Plan, we are proposing to extend PINGP by 20 years, to 2053 and 2054 for Units 1 and 2, respectively. These extended operating periods and Xcel Energy's commitment to employees affords the opportunity to plan for employee transition resulting from a planned plant closure. Xcel Energy will continue to base staffing decisions on operational excellence and NRC requirements that may result in changed staff assignments and levels.

Our nuclear generating plants are operated by dedicated nuclear professionals, as discussed above. The extended plant licenses, the fact that many workers will reach retirement age well before the extended licenses will expire, and a strong management commitment are critical to the success of the Xcel Energy Worker Transition Plan. This strategy provides employees the opportunity to develop their skills, so they are congruent with the changing needs of the company and the marketplace.

The proactive approach to managing human resources produces a workforce that is motivated, cross-functional, and flexible. This approach greatly reduces the need for reactive planning.

Should PINGP or MNGP close, there are four transition paths available. They are:

1. Stay with Xcel Energy in a similar job/career path.
2. Stay with Xcel Energy in a different job/career path.
3. Retire.
4. Leave Xcel Energy for outside employment opportunities.

The proactive strategy for managing human resources allows employees to prepare for each path, and thus position themselves for a number of potential outcomes. The Company acknowledges that a proactive transition requires prior planning, total management support, complete understanding and support throughout all levels of the corporation and a comprehensive guiding process.

Xcel Energy values its employees and recognizes that they make the nuclear operations excellent, and we have an obligation to help employees plan for the future. The result of effective planning is a partnership that yields strong nuclear operations and satisfied employees. Approximately 1,100 MNGP, PINGP, and nuclear corporate permanent employees and skilled positions would be eliminated or restructured should either of the plants close. Providing these employees with avenues to enhance their skills prior to plant closing will make the transition to new jobs (inside or outside of Xcel Energy) easier, but not painless. Xcel Energy's objective is to structure and develop its work force to meet the challenges inherent in a competitive business environment. That objective will be accomplished by:

1. Establishing Business Plan workforce effectiveness goals.
2. Translating those goals into an effective Human Asset Plan.
3. Producing employee development plans.

3. Xcel Energy Transition Processes

The transition processes described below apply to both non-bargaining and bargaining unit employees at MNGP and PINGP. For bargaining unit employees, the transition plan is in accordance with the collective bargaining agreement and Xcel Energy programs and processes as described below.

4. Internal Placement

a. Job Opportunity Bulletin

Xcel Energy provides online notification of employment and career development opportunities in all new or replacement positions. This process, in accordance with our collective bargaining agreement, is used prior to outside hiring.

b. Leadership Essentials

Xcel Energy has a program to identify employees interested in becoming a member of the Xcel Energy management team and provides assessment and development to them.

Leadership Essentials is an on-line resource designed to help both beginning and experienced leaders learn and continue to develop various leadership skills. All union employees are invited to participate.

c. Corporate Training Programs

Xcel Energy offers employees training and development courses for skills needed to stay current in their present job and development courses to prepare them for future positions. This training covers technical, computer and business skills.

d. Apprenticeship Training Programs

An apprentice is a person engaged in training for one of the skill areas covered in the current labor agreement. Programs are State of Minnesota registered and provide on-the-job training and related instruction in all areas of the apprenticeship being served.

e. Tuition Reimbursement

The Tuition Reimbursement Program gives employees financial assistance to take courses offered by accredited schools and institutions of higher learning to complete a degree program.

f. Severance

i. The severance pay agreement for bargaining unit employees is covered in the current labor agreements with IBEW locals 160 and 949.
ii. The Company has a severance plan for non-bargaining employees which covers regular, full-time or part-time employees of the Company not covered by a current labor agreement. To be eligible for severance, certain eligibility requirements must be met.

5. Summary

The foundation for this type of worker transition program is based on the availability of long-term planning. If a premature closure of either plant were to occur, the results would be less favorable. In that case, employees would be afforded less time to prepare themselves for other employment within Xcel Energy or for careers outside of the company. No amount of prior planning can alleviate employees' personal hardships

should a valuable and efficient plant be forced to close prematurely. Such an occurrence would be highly speculative, and it would not be cost-effective to prepare contingencies based on scenarios that are not likely to occur.

6. Conclusions

1. Xcel Energy is committed to its employees. That commitment is reflected in the scope of resources available to employees. Xcel Energy will continue to invest heavily in employees' training and development so that the transition to a business environment will be proactive.
2. Xcel Energy's commitment to excellence in operations is unequivocal, as is the Company's commitment to operate MNGP and PINGP Units 1 and 2.
3. The long lead-time prior to potential plant closings affords Xcel Energy and its employees an opportunity to plan for the transition.
4. An orderly transition is possible through Business and Human Asset Planning as performed by Xcel Energy.

7. Commitments

1. Xcel Energy will continue to account for changes in the workforce through business planning and Human Asset Planning.
2. Xcel Energy will continue to work with affected unions to promote the retention and training of its highly skilled and dedicated workforce.

VI. CYBER SECURITY

Order Point 23.D of the Commission's IRP Order requires the Company to explain, "[c]yber-security issues or concerns as plants move from analog to digital systems."

The current NRC-regulated cyber security program is well established across the nuclear industry, subject to a regular inspection cycle like the many other regulated programs at the plants. The program requires a high degree of management oversight and is highly effective in maintaining plant and public safety as related to potential cyber vulnerabilities associated with digital plant systems and equipment. Digital equipment that has the potential to impact reactor power is isolated from business networks and has significant additional controls in place to meet program requirements. These additional controls are specific to the requested equipment and its function and may

include data access controls (e.g., user restrictions and password requirements); impact and risk analysis; and disaster recovery and contingency planning.

Concerns around digital systems are primarily related to maintenance costs rather than security or safety. In the context of nuclear generation, digital systems have proven highly reliable and effective when kept current. Still, their life cycle is generally shorter than the legacy analog systems they replace, and they are expensive to stay current under existing budgets and engineering processes. It is common for digital plant systems to become obsolete before upgrades can be engineered and installed, which makes maintenance problematic and expensive should failures occur.

Therefore, considering the designs of the Xcel Energy nuclear fleet, ongoing plant upgrades from analog to digital will take place discreetly, replacing specific equipment or systems to generally maintain the historical plant design as opposed to integrating many systems under common digital platforms, as would be expected in more modern plant designs. The existing NRC regulatory framework supports long-established engineering processes, to which cyber processes are linked.

VII. ADDITIONAL SPENT NUCLEAR FUEL

Order Point 23.F of the Commission's IRP Order requires the Company to explain "[a]dditional spent nuclear fuel generated over a 10- or 20-year period."

We anticipate that MNGP will discharge 800 spent fuel assemblies through 2040, or 1,600 spent fuel assemblies through 2050 if the plant is extended beyond the 10-year life extension currently approved by the Commission. At PINGP, we anticipate that continued operation over a 20-year period between 2033/2034 to 2053/2054, if approved, would result in 1,200 fuel assemblies being discharged.

VIII. TRANSPORTING STORED FUEL

Order Point 23.G of the Commission's IRP Order requires the Company to explain "[h]ow fuel stored on-site will be removed during the next integrated resource plan period."

This section examines opportunity for dry fuel storage at both MNGP and PINGP to be transported and stored off-site at a consolidated interim storage facility (CISF) or through the U.S. Department of Energy's (DOE's) Consent-Based Siting process. Two privately owned CISF designs have NRC license approvals but are delayed in the court system. While Yucca Mountain remains an unviable solution, the DOE's Consent-

Based Siting process is intended to further educate and provide transparency to potential future host communities.

A. Consolidated Interim Storage Facilities

1. Interim Storage Partners (ISP) Storage Facility

A consolidated interim storage project was initiated by Waste Control Specialists (WCS) for a site in Andrews County, Texas, adjacent to WCS's existing low-level radioactive waste and hazardous waste storage and disposal facilities. The NRC license application for this project was filed in April 2016. In April 2017, WCS asked the NRC to suspend the review of this application. Subsequently, WCS and Orano USA (formerly Areva Nuclear Materials) formed a joint venture to license the facility. In response to letters to the NRC in June and July 2018 from the joint venture, Interim Storage Partners (ISP), the NRC restarted its review of the application. A number of environmental and other organizations sought to intervene in the NRC proceeding and two organizations moved the NRC to reject the application (and the Holtec application described below), alleging that the NRC lacked the jurisdiction to consider the application. The NRC denied those latter requests and one of the organizations appealed the NRC's denial to the D.C. Circuit in December 2018.

On the NRC's motion, the Court dismissed the case in June 2019, as not ripe for judicial review. In August 2019, the Atomic Safety and Licensing Board considered the hearing requests, admitted one contention submitted by one of the petitioners, and dismissed the remaining contentions and petitioners. A subsequent Licensing Board decision dismissed the remaining contention as moot and rejected an attempt to amend. The Board also dismissed another petitioner's late-filed contention. Appeals from the Board decisions, as well as a motion to reopen the proceeding, were denied by the NRC. The NRC also rejected a late-filed contention not previously ruled on by the Board. Appeals of the NRC decisions to the D.C. Circuit were held in abeyance by the Court pending completion of the NRC proceeding. The NRC issued a license to ISP for their proposed commercial consolidated interim storage facility on September 13, 2021, but on August 25, 2023, the 5th Circuit Court of Appeals issued a ruling stating that the NRC lacks the authority to issue licenses for private, away-from-the-reactor spent fuel storage facilities.

On October 24, 2023, the NRC and ISP filed a rehearing petition before the entire Fifth Circuit, which includes 19 judges. NEI and Holtec submitted friend of the court briefs in support of the rehearing petition. Texas and the other challenger, Fasken, both filed responses in December 2023. A rehearing is awaiting court approval.

2. Holtec HI-STORE Consolidated Interim Storage Facility

Holtec International has proposed the HI-STORE Consolidated Interim Storage Facility for a site in Eddy and Lea Counties in southeastern New Mexico. Holtec filed an application with the NRC for this facility in March 2017. In response to NRC's July 2018 notice of opportunity for hearing, a number of environmental and other organizations filed petitions to intervene in the NRC proceeding. At about the same time, two organizations moved the NRC to reject the application (and the ISP application described above) alleging that the NRC lacked the jurisdiction to consider the application. After the NRC denied those requests, one of the organizations filed an appeal with the U.S. Court of Appeals for the D.C. Circuit in December 2018. On the NRC's motion, the Court dismissed the case in June 2019 as not ripe for judicial review. In May 2019, the Atomic Safety and Licensing Board issued a Memorandum and Order rejecting all the petitions to intervene filed in response to the July 2018 opportunity for hearing. Five of the six petitioners filed appeals with the NRC challenging the Licensing Board's rejection of their petitions. In April 2020, the NRC rejected all the appeals except for remanding to the Licensing Board four contentions put forward by one of the petitioners. In June and September 2020 orders, the Board denied the admission of the remanded contentions and other late-filed contentions—as well as motions to reopen the proceeding. Additionally, in June 2020, April 2021, and June 2021, four of the petitioners who were denied admission in the NRC proceeding filed appeals before the U.S. Court of Appeals for the D.C. Circuit. The Court consolidated these appeals and was holding them in abeyance pending the completion of the NRC proceedings. The NRC issued a license to Holtec on May 9, 2023, authorizing the company to receive, possess, transfer and store 500 canisters holding approximately 8,860 metric tons of commercial spent nuclear fuel for 40 years. In March 2023, New Mexico approved legislation aimed at stopping the project.

The concern by members of the New Mexico Senate Energy and Natural Resources Committee, including Senator Martin Heinrich, is that this will not be interim storage as what it is referred to by the NRC and Holtec, but rather permanent storage unless a permanent repository is legislatively approved and constructed by the DOE.

3. Conclusion

While we believe the centralized storage facilities proposed by ISP and Holtec meet all NRC regulatory requirements and would be a positive development in the management of spent nuclear fuel, we do not consider it a viable alternative to the MNGP or PINGP ISFSIs at this time due to legislative challenges.

Each consolidated interim storage facility will need to work with their respective states on permitting issues and will develop a business model for operations prior to construction. In addition, DOE has begun its own process to find a consent-based interim storage location over the next several years (as described below) and it is unclear how this will impact the two private facilities currently in licensing.

If either of these facilities become operational in the future, or should another solution become available through the DOE Consent-Based Siting Program, we would explore the possibility of shipping fuel to that site. It is unclear if this could be accomplished within the 2024-2040 IRP timeline.

B. Yucca Mountain and DOE Consent-Based Siting Program

The application to license the Yucca Mountain permanent repository remains pending before the NRC, following the unsuccessful attempt by the Obama Administration to terminate the proceeding and withdraw the application. The NRC Staff's technical and environmental reviews have been essentially completed, but the adjudicatory hearings on the application before NRC Atomic Safety and Licensing Board remain suspended—with numerous contentions submitted by Nevada and other opponents remaining to be resolved before the NRC can license the project. The Biden Administration did not seek any funding for Yucca Mountain in the FY2021 or FY2022 budgets. North Las Vegas KLAS News reported that during Senate committee hearings in June 2021, Secretary of Energy Jennifer Granholm testified that the Administration does not support Yucca Mountain as a solution for nuclear waste disposal but will begin a consent-based siting process in 2021.

In June 2023, DOE awarded 13 contracts to consortiums consisting of university, non-profit, and private-sector partners that will work with communities interested in learning more about nuclear energy and spent nuclear fuel storage with a goal of education and transparency. Communities will participate by working with DOE and these consortiums through a phased approach to determine whether and how being a host community could align to their goals. The three phases to this approach include: (1) planning and capacity building, (2) site screening and assessment, and (3) negotiation and implementation.

Xcel Energy is part of a consortium with the Prairie Island Indian Community and several others led by the Southwest Research Institute (SwRI) that was awarded a DOE contract. The consortium will collaborate with a couple of selected communities to educate and provide transparency with the intent to enter into the phased approach described above.

The DOE's Consent-Based Siting Program is in its initial stages. As an unpaid award winner for the program contract, the Company will remain actively engaged with key stakeholders throughout the entire process. Once a community has accepted a host community role, the community and DOE will need to work with respective states on permitting issues and will develop a business model for operations prior to construction. It is unclear how much can be accomplished within the 2024-2040 IRP timeline.

IX. FUTURE PLANS AND ADDITIONAL STATE AND FEDERAL PROCESSES

Order Point 23.H of the Commission's IRP Order requires the Company to explain "[w]hich additional state permits, Certificates of Need, or federal licenses will be required."

Extended plant operations beyond the existing operating license expiration date requires federal approval by the NRC. In this case, both MNGP and PINGP have already extended their operating licenses once through the License Renewal (LR) application process. The second extension is referred to as Subsequent License Renewal (SLR). The Company submitted an SLR application for MNGP on January 9, 2023, and anticipates a decision from the NRC by end of year 2024 and license issuance in 2025. PINGP has just begun development of the application and anticipates submittal before the end of 2026. The federal SLR process is for a 20-year extension.

Also required to extend plant operations beyond the existing operating license is approval from the Commission to expand spent nuclear fuel storage on site in ISFSI. For MNGP, the Company requested approval by the Commission for a 10-year ISFSI expansion through the Certificate of Need process (Minn. Stat. §116B.77- 166B.83), in alignment with the Preferred Plan from our 2019 IRP. The Commission granted the Certificate of Need, which is subject to state legislative action this coming session, with its October 17, 2023, Order.[15] For MNGP, we would seek another Certificate of Need to support the additional 10-year life extension put forth in our Preferred Plan and would likely begin that process shortly after a Commission decision on this Resource Plan.

For PINGP, the Company is filing a Certificate of Need application in the near future in MNPUC Docket No. E002/CN-24-68 for a PINGP 20-year Independent Spent Fuel Storage Installations (ISFSI) expansion in support of SLR, which would expand PINGP's operating license from 2033/2034 to 2053/2054, in alignment with our Preferred Plan.

[15] Docket No. E002/CN-21-668.

Table M-4 lists additional state and federal licenses, permits, and certificates required for an additional 10-year extension of MNGP (to 2050), and a 20-year extension of PINGP's units (to 2053 and 2054). We note that this list encompasses known requirements as this time, but it should be considered preliminary and subject to change.

Table M-4: State and Federal Requirements for Continued MNGP and PINGP Operation

Agency	Authority	Requirement And Plant	Authorized Activity
NRC	Atomic Energy Act [10 CFR Part 50]	MNGP operating license PINGP operating licenses (Unit 1 and Unit 2)	Subsequent License Renewal of +20 years. MNGP SLR currently in review with NRC. PINGP Unit 1 and Unit 2 SLR submittal anticipated in 2026.
MN PUC	Minn. Stat. §216B.243-CERTIFICATE OF NEED FOR LARGE ENERGY FACILITY Minnesota Rule Chapter 7855 – CERTIFICATE OF NEED, LARGE ENERGY FACILITY Minn. Stat. §116B.77-166B.83 – RADIOACTIVE WASTE MANAGEMENT FACILITY ATHORIZATION	MNGP and PINGP Certificate of Need to extend onsite storage of spent fuel	Continued operation of MNGP and PINGP Independent Spent Fuel Storage Installations (ISFSIs)
MPCA	Clean Water Act Section 401 [33 USC 1341]	Certification of water quality standards for both MNGP and PINGP.	Section 401 Water Quality Certification issued by the state for operation of MNGP and PINGP.
USACE	Clean Water Act Section 404 [33 USC 1344]	Regional general permit (Section 404) for both MNGP and PINGP	Maintenance dredging in front of the intake apron on the Mississippi River.
Alliance for Uniform Hazmat Transportation Procedures	49 USC 5119	Uniform Program Credentials (Hazmat permit and registration) MNGP and PINGP	Hazardous material shipment.

Agency	Authority	Requirement And Plant	Authorized Activity
Tennessee Department of Environment and Conservation (TDEC)	TDEC Rule 0400-20-10-.32	License to ship radioactive material MNGP and PINGP	Shipment of radioactive material to a licensed disposal/processing facility in Tennessee.
Utah Department of Environmental Quality (UDEQ)	Utah Administrative Code R313-26	General site access permit for radioactive waste disposal MNGP and PINGP	Delivery of radioactive waste to a land disposal facility located in Utah.
MPCA	Minnesota Rules Part 7045.0225	Hazardous waste generator license MNGP and PINGP	Authorizes facility to operate as a hazardous waste generator.
MPCA	Minnesota Statutes Chapters 115 and 116	NPDES permit MNGP and PINGP	Discharges of wastewater to waters of the state.
MPCA	Minnesota Rules Part 7007.0150	Air emission permit MNGP and PINGP	Operate air emission facility (four diesel generators, diesel fire pump, three flexible pumps, and heating boiler).
MPCA	Minnesota Rules Chapter 7150	Tank registration MNGP and PINGP	Underground storage tank registration.
MPCA	Minnesota Rules Chapter 7151	Tank registration MNGP and PINGP	Aboveground storage tank registration.
MDNR	Minnesota Statutes Chapter 103G	State dredging permit MNGP and PINGP	Maintenance dredging of sand and silt from discharge canal and intake skimmer area.
MDNR	Minnesota Statutes Chapter 103G.271	Water appropriations permit MNGP and PINGP	Groundwater withdrawals from Well #1 and Well #2.
MDNR	Minnesota Statutes Chapter 103G.272	Water appropriations permit MNGP and PINGP	Surface water withdrawals from the Mississippi River.
MDNR	Minnesota Statutes Section 97A.401	Division of Fish and Wildlife special permit MNGP and PINGP	Collection of fish for scientific purposes.

Agency	Authority	Requirement And Plant	Authorized Activity
MDNR	Minnesota Statutes Section 84D.11	Division of Ecological and Water Resources permit MNGP and PINGP	Transport of zebra mussels and other prohibited invasive species to Xcel Energy facilities or to a repair site for purposes of control, disposal, and maintenance of equipment.
City of Monticello	City of Monticello Ordinance Title V, Chapter 52	Sanitary Sewer Wastewater Discharge Agreement MNGP only	Agreement to discharge domestic sanitary waste to the City of Monticello sanitary sewer collection system.

X. CONCLUSION

Xcel Energy's nuclear fleet has provided carbon-free electricity to our Upper Midwest customers safely and reliably for decades. The continued operation of PINGP and MNGP is crucial to achieving the Company's—and our states'—policy objectives, while keeping bills low and maintaining a reliable, resilient system. We have robust plans in place to ensure operational excellence, continue our efforts to ensure spent fuel can be transported offsite, manage costs, and maintain a skilled workforce that will operate the plants over the coming decades as we continue to reduce carbon emissions.

PUBLIC DOCUMENT—NOT-PUBLIC DATA HAS BEEN EXCISED
INCLUDES TRADE SECRET AND CEII DATA
YELLOW HIGHLIGHT DENOTES PROTECTED DATA

Nuclear Leave Behind Study Report

Performed by:
Craig Wrisley
Jessica Kiddoo
Matthew Kukacka

Transmission Planning
13 Nov, 2023

PUBLIC DOCUMENT—NOT-PUBLIC DATA HAS BEEN EXCISED
INCLUDES TRADE SECRET AND CEII DATA
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INCLUDES TRADE SECRET AND CEII DATA
YELLOW HIGHLIGHT DENOTES PROTECTED DATA

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Certification

I hereby certify that this report was prepared
by me or under my direct supervision and that
I am a duly Licensed Professional Engineer under the
Laws of the state of Minnesota

Craig Wrisley
11/13/2023
License# 54948

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Executive Summary

This analysis was performed to determine the steady state impacts and dynamic resources needed online as a result of retiring the Monticello Nuclear Generating Plant, Prairie Island Nuclear Generating Plant, and both the Monticello and Prairie Island Nuclear Generating Plants. Integrated System Planning (ISP) Transmission Planning engineers performed a study to evaluate the transmission system with the nuclear generation station retirements along with the planned Sherco coal generation replacement with Minnesota Energy Connection (MNEC) renewable generation and the AS King coal generation replacement with King Transmission Connection solar generation. Existing natural gas resources were turned on to replace the generation shortfalls based on the MISO dispatch of renewables in the model. This study is a reliability only look – system transfer capability and resource capacity analyses are out of the work scope of this study.

This study looks at the retirement of the nuclear generating stations without replacement of generation rights. The following Table M1-1 shows the retirement scenarios analyzed.

Table M1-1
Nuclear Generation Retired

Scenario Analyzed	Monticello Generation Retired (MW)	Prairie Island Generation Retired (MW)	Total Generation Retired (MW)
Monticello Retire	637	0	637
Prairie Island Retire	0	1150	1150
Monticello and Prairie Island Retire	637	1150	1778

The steady state analysis identified the retirement of the nuclear generation plants without replacement generation resulted in thermal overloads and voltage violations requiring system upgrades.

Based on the dynamic analysis results performed in this study, significant replacement generation is needed:

- Summer Peak Load Case, in addition to generation on in the base model, required all available gas generation on at Anson, Inver Grove, and Blue Lake (total 521 MW) as well as load reduction in the Twin Cities area.
    - Monticello Retire – 10% (537.37 MW)
    - Prairie Island Retire – 20% (1074.74 MW)
    - Monticello and Prairie Island Retire – 30% (1612.11 MW)
- Shoulder Load Average Wind Case, in addition to the generation on in the base model required additional combustion generation turned on.
    - Monticello Retire – High Bridge 7 and 9 (388MW), Riverside 7 and 9 (318 MW). Total generation addition of 706 MW.
    - Prairie Island Retire - High Bridge 7 and 9 (388MW), Riverside 7, 9, and 10 (476 MW), Blue Lake 7 and 8 (302 MW). Total generation addition of 1,166 MW.

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- Monticello and Prairie Island Retire – High Bridge 7, 8, and 9 (550 MW), Riverside 7, 9, and 10 (476 MW), Blue Lake 1-4, 7, and 8 (455MW), Inver Grove 1-6 (282 MW). Total generation addition of 1763 MW.

Scenarios Analyzed

2028 Summer Shoulder Average Wind, and Summer Peak scenarios are analyzed in this study. Renewables in the NSP system are modeled at seasonal generation levels; Solar at 50% for Summer Peak, 31% for Summer Shoulder Average Wind, Wind at 15.5% for Summer Peak, 27% for Summer Shoulder Average Wind.

NSP load information is shown in following Table M1-2.

Table M1-2
NSP Load Level

Year	Season	Load Level
2028	Summer Shoulder Average Wind	6,383 MW
2028	Summer Peak	9,064 MW

Steady State Simulation Results

Steady state analysis was performed on the base case, Monticello retire case, Prairie Island retire case, and both Monticello and Prairie Island retire case for both the Summer Peak and Summer Shoulder Average Wind case. Available NSP natural gas generation was turned on to reduce the number of unsolved contingencies. The number of unique facilities with new or increased >0.5% voltage violations and thermal violations beyond the preexisting violations in the base case and associated costs to mitigate them for each case are listed in Table M1-3.

Table M1-3
Voltage and Thermal Upgrades with cost for Steady State Violations

Transient Stability Simulation Results

Transient stability analysis was performed on the base case, Monticello retire case, Prairie Island retire case, and both Monticello and Prairie Island retire case for both the Summer Peak and

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Summer Shoulder Average Wind case. Available NSP natural gas generation was turned on to achieve stable dynamic response. If no additional NSP natural gas resources were available, load in the Twin Cities area was scaled down to achieve stable dynamic response.

Table M1-4
Generation and Load Adjustments with cost for Stable Dynamic Response

	Summer Peak			Summer Shoulder		
Scenario Analyzed	**Additional Generation On (MW/$)**	**Load Reduction (MW/$)**	**Total Cost ($)**	**Additional Generation On (MW)**	**Load Reduction (MW)**	**Total Cost ($)**

Without Twin Cities Load reduction for the summer peak case, and additional gas generation turned on in both summer peak and shoulder average wind case, generator rotor angles exceed +/- 300 degrees, which is indicative of the point where the generator would lose synchronization with the grid and trip offline. Example plots of Unstable and Stable Response are shown in Figure M1-1 and Figure M1-2.

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Figure M1-1
2028SHAW Unstable Generator Angle Response

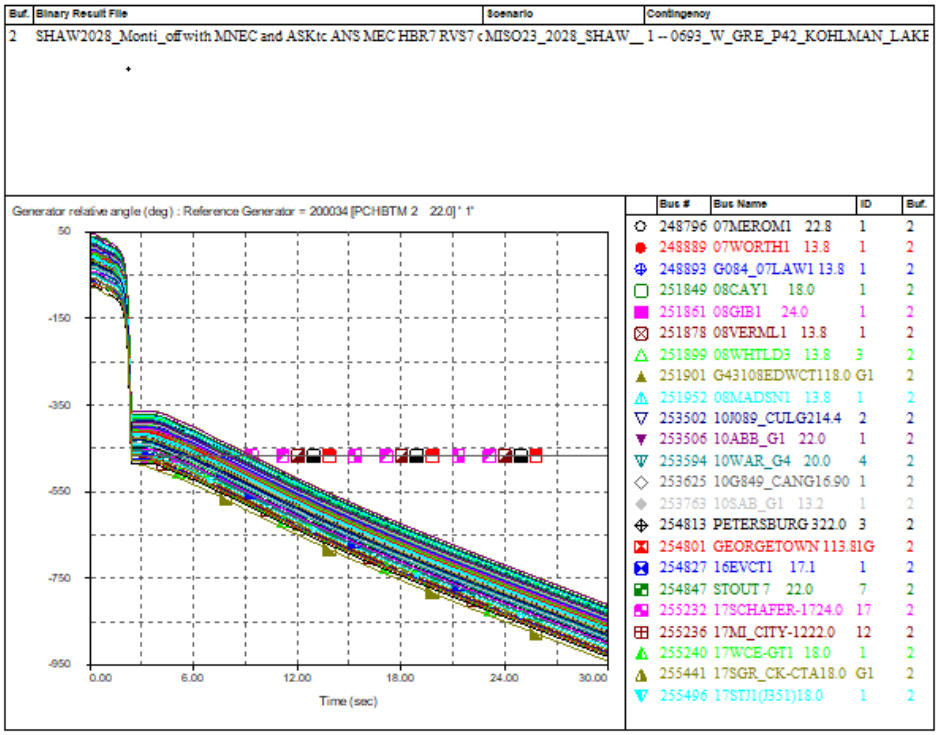

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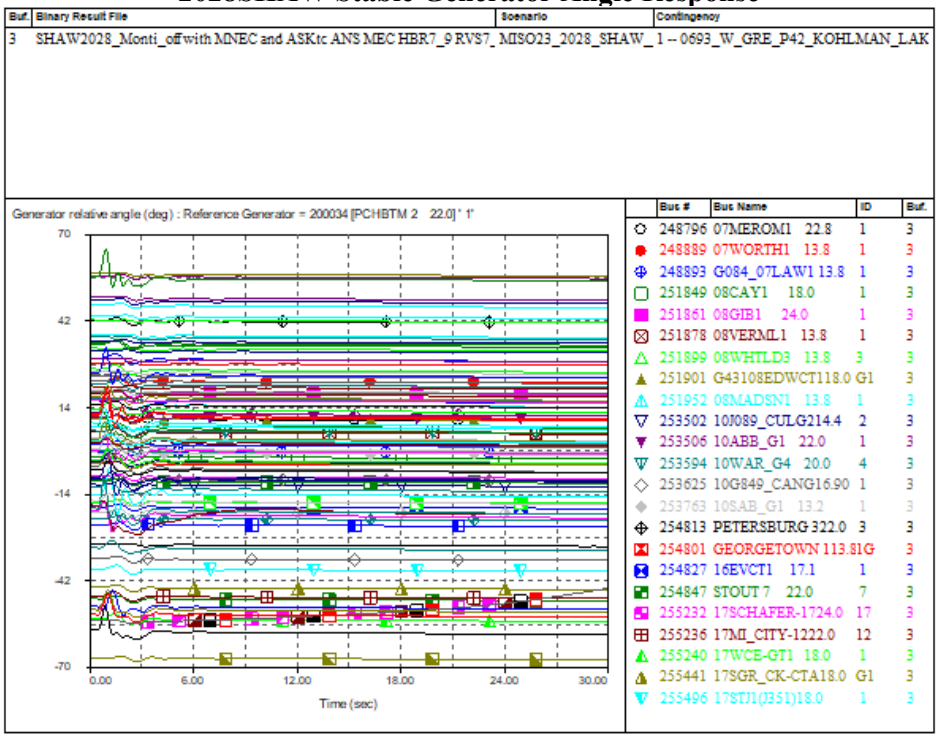
Figure M1-2
2028SHAW Stable Generator Angle Response



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Introduction

This analysis was performed to determine the steady state impacts and dynamic resources needed online as a result of separately retiring the Monticello Nuclear Generating Plant and the Prairie Island Nuclear Generating Plant. For further analysis, the retirements of both the Monticello and Prairie Island Nuclear Generating Plants simultaneously were included in the analysis. Additionally, Integrated System Planning (ISP) Transmission Planning engineers performed a study to evaluate the transmission system steady state with the nuclear generation station retirements along with the planned Sherco coal generation replacement with Minnesota Energy Connection (MNEC) renewable generation and the AS King coal generation replacement with King Transmission Connection solar generation. Existing natural gas resources were turned on to replace the generation shortfalls based on the MISO dispatch of renewables in the model. This study is a reliability only look – system transfer capability and resource capacity analyses are out of the work scope of this study.

Assumptions

This study is performed utilizing Siemens PSSE version 35.3.2 for steady state analysis and Powertech TSAT version 22.3.39 for dynamic analysis and based on the MISO Transmission Expansion Plan (MTEP) 2023 steady state models and dynamics package. MISO MTEP 2023 series, year 2028 models are selected as the starting models; no substantial load growth is assumed in this study. Sherco coal generation is replaced with Minnesota Energy Connection renewable generation at MISO renewable dispatch levels. AS King coal generation is replaced with King Transmission Connection solar generation at MISO solar dispatch levels.

Potential Limitations

Model

Sherco and King generation replacement locations and details are assumed based on the preliminary project scope, final project details may have minor differences.

Retirement of the nuclear generating stations were assumed to have no replacement generation installed. Load reduction where needed for stability was performed as a percent reduction across all loads in the Twin Cities area.

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1 Models and Assumptions

1.1.1 Models Utilized

Siemens PSSE version 35.3.2 for steady state analysis and Powertech TSAT version 22.3.39 for dynamic analysis and based on the MISO MTEP 2023 steady state models and dynamics package. MISO MTEP 2023 series, year 2028 models are selected as the starting models; no substantial load growth is assumed in this study.

1.1.2 Model Development

MTEP 2023, year 2028 Summer Peak (SUM) and 2028 Shoulder Average Wind (SHAW) models are selected as the starting models. Sherco coal generation is replaced with Minnesota Energy Connection renewable generation at MISO renewable dispatch levels. AS King coal generation is replaced with King Transmission Connection solar generation at MISO solar dispatch levels.

2028 Summer Shoulder Average Wind, and Summer Peak scenarios are analyzed in this study. Renewables in the NSP system are modeled at seasonal generation levels; Solar at 50% for Summer Peak and 31% for Summer Shoulder Average Wind; Wind at 15.5% for Summer Peak and 27% for Summer Shoulder Average Wind. NSP load information is shown in Table M1-5.

Table M1-5
NSP Load Level and Thermal Generation Level

Year	Season	Load Level
2028	Summer Shoulder Average Wind	6,383 MW
2028	Summer Peak	9,064 MW

1.1.3 Modeling Assumption

MTEP 2023, year 2028 Summer Peak (SUM) and 2028 Shoulder Average Wind (SHAW) models are selected as the starting models. Sherco coal generation is replaced with Minnesota Energy Connection renewable generation at MISO renewable dispatch levels. AS King coal generation is replaced with King Transmission Connection solar generation at MISO solar dispatch levels. Analysis is performed on cases with Monticello Nuclear Generating Plant retired, Prairie Island Nuclear Generating Plant retired, and both Monticello and Prairie Island Nuclear Generating Plants retired.

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2 Steady State Analysis

MISO MTEP 2023 Steady State 2033SUM and 2033SHAW models are used to conduct the steady state analysis. Steady analysis was performed on the base case, Monticello retire case, Prairie Island retire case, and both Monticello and Prairie Island retire case for both the Summer Peak and Summer Shoulder Average Wind case. Full N-1 and N-1-1 contingencies were run for LRZ 1.

Available NSP natural gas generation was turned on to reduce the number of unsolved contingencies. Robust solution in PSSE was used to allow for system adjustment of reactive devices and generation during contingency analysis to reduce the number of unsolved contingencies.

3 Stability Analysis

MISO MTEP 2023 Transient Dynamic package is used to conduct the transient stability analysis. Three phase faults with normal clearance time and single line to ground faults with a stuck breaker are tested for major 345 kV substations, transmission lines in Twin Cities and neighboring areas. Selected 345 kV bus voltages and transmission line power flow in Twin Cities and neighboring areas are monitored and plotted. The disturbances studied are listed in Table M1-6:

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Table M1-6
Disturbances Simulated in the Study

Name	Description
0693 redacted	
0857 redacted	
0860 redacted	
0865 redacted	
0866 redacted	
0867 redacted	
0868 redacted	
0879 redacted	
0890 redacted	
0891 redacted	
0892 redacted	
0893 redacted	
0896 redacted	
0898 redacted	
0920 redacted	
0922 redacted	
0927	

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Name	Description
0935 redacted	
0936 redacted	
0941 redacted	
0942 redacted	
0943 redacted	
0944 redacted	
0945 redacted	
2199 redacted	
2218 redacted	
2219 redacted	
2229 redacted	
2238 redacted	
2242 redacted	
2257 redacted	
2277 redacted	

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Available natural gas generation was turned on iteratively to achieve stability. Where insufficient natural gas generation was available to achieve stability, scalable load in the Twin Cities was reduced by a percentage of area load until stability was achieved.

- Summer Peak Load Case, in addition to generation on in the base model, required all available generation on at Anson, Inver Grove, and Blue Lake (total 521 MW) as well as load reduction in the Twin Cities area.
  - Monticello Retire – 10% (537.37 MW)
  - Prairie Island Retire – 20% (1,074.74 MW)
  - Monticello and Prairie Island Retire – 30% (1,612.11 MW)
- Shoulder Load Average Wind Case, in addition to the generation on in the base model required additional combustion generation turned on.
  - Monticello Retire – High Bridge 7 and 9 (388 MW), River Side 7 and 9 (318 MW). Total generation addition of 706 MW.
  - Prairie Island Retire - High Bridge 7 and 9 (388 MW), River Side 7, 9, and 10 (476 MW), Blue Lake 7 and 8 (302 MW). Total generation addition of 1,166 MW.
  - Monticello and Prairie Island Retire – High Bridge 7, 8, and 9 (550 MW), Riverside 7, 9, and 10 (476 MW), Blue Lake 1-4, 7, and 8 (455 MW), Inver Grove 1-6 (282 MW). Total generation addition of 1,763 MW.

4 Analysis Results

In the steady state analysis, available NSP natural gas generation was turned on to reduce the number of unsolved contingencies. The number of unique facilities with new or increased >0.5% voltage violations and thermal violations beyond preexisting violations in the base case were

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identified. Associated costs assigned based on MISO Transmission Cost Estimation Guide For MTEP23[1] for rebuild of overloaded lines to larger conductor size and assuming 5 150MVAR statcoms, situated in the vicinity of the retired nuclear units would resolve the voltage violations observed. The cost breakdown of the associated upgrades is listed in Table M1-7:

Table M1-7
Voltage and Thermal Upgrades with cost for Steady State Violations

In the dynamic analysis, available NSP natural gas generation was iteratively turned on to achieve stability. Once all available NSP natural gas was turned on, Twin Cities load was scaled down to achieve stability. Generation additions and load reduction are summarized in Table M1-8:

Table M1-8
Generation and Load Adjustments for Stable Dynamic Response

	Summer Peak		Summer Shoulder	
Scenario Analyzed	**Additional Generation On (MW)**	**Load Reduction (MW)**	**Additional Generation On (MW)**	**Load Reduction (MW)**
Monticello Retire	**512**	**537.37**	**706**	**0**
Prairie Island Retire	**512**	**1074.74**	**1,166**	**0**
Monticello and Prairie Island Retire	**512**	**1612.11**	**1,763**	**0**

[1] MISO Transmission Cost Estimation Guide for MTEP23337433.pdf (misoenergy.org)

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5 Analysis Results Discussion

For the steady state results, any line with thermal violations is assumed to need an upgrade. Transformers with thermal violations are assumed to be replaced with transformer sized to carry the contingency level flows. Voltage violations are assumed to need reactive support in the form of capacitors or reactors. MISO cost estimation values are used to determine the estimated cost of upgrades as summarized in Table M1-9.

Table M1-9
Steady State Upgrade Summary

	Summer Peak			Summer Shoulder		
	Line Upgrade (miles/cost $)	**Reactive Support (MVAR/cost $)**	**Total Cost ($)**	**Line Upgrade (miles/cost $)**	**Reactive Support (MVAR/cost $)**	**Total Cost ($)**
Monticello Retire						
Prairie Island Retire						
Monticello and Prairie Island Retire						

For the dynamic results, cost was applied to the natural gas units turned on to maintain system stability assuming gas price of [redacted]. Cost was also applied to load reduction to maintain system stability in the Summer Peak load case. Costs associated with dynamic stability are summarized in Table M1-10.

Table M1-10
Dynamic Generation and Load Adjustments Costs

	Summer Peak			Summer Shoulder		
Scenario Analyzed	**Additional Generation On (MW/$)**	**Load Reduction (MW/$)**	**Total Cost ($)**	**Additional Generation On (MW)**	**Load Reduction (MW)**	**Total Cost ($)**
Monticello Retire						
Prairie Island Retire						
Monticello and Prairie Island Retire						

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2028 Summer Peak Case:

Generator angular stability issues were identified at generation and load reduction levels below those indicated in Table 6 as indicated by generator angles exceeding +/- 300 degrees, which reflects the angle at which the generator would lose synchronization with the electric grid and trip offline. Indicative plot of angular instability is shown in Figure M1-3. Stable generator angle plot examples for each retirement scenario are shown in Figure M1-4, Figure M1-5, and Figure M1-6.

Figure M1-3
SUM28 Prairie Island and Monticello Retirement Angular Instability

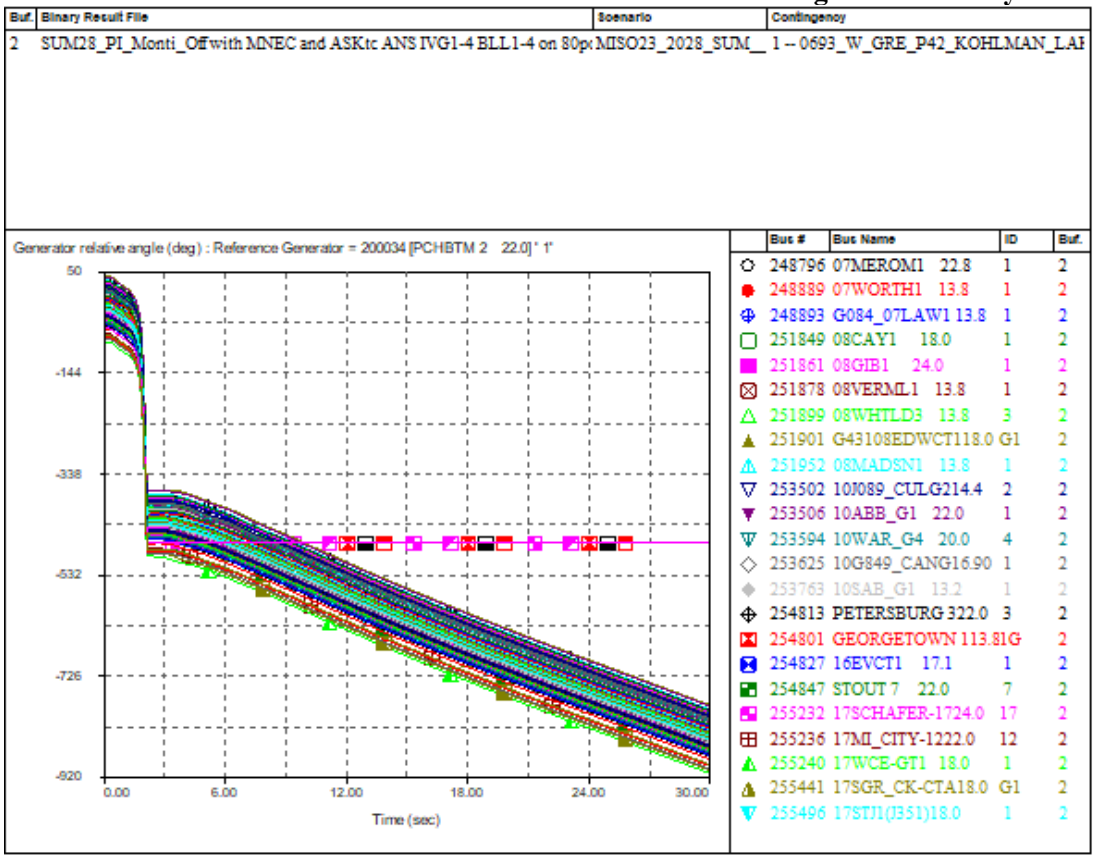

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Figure M1-4
SUM28 Monticello Retirement Angular Stability

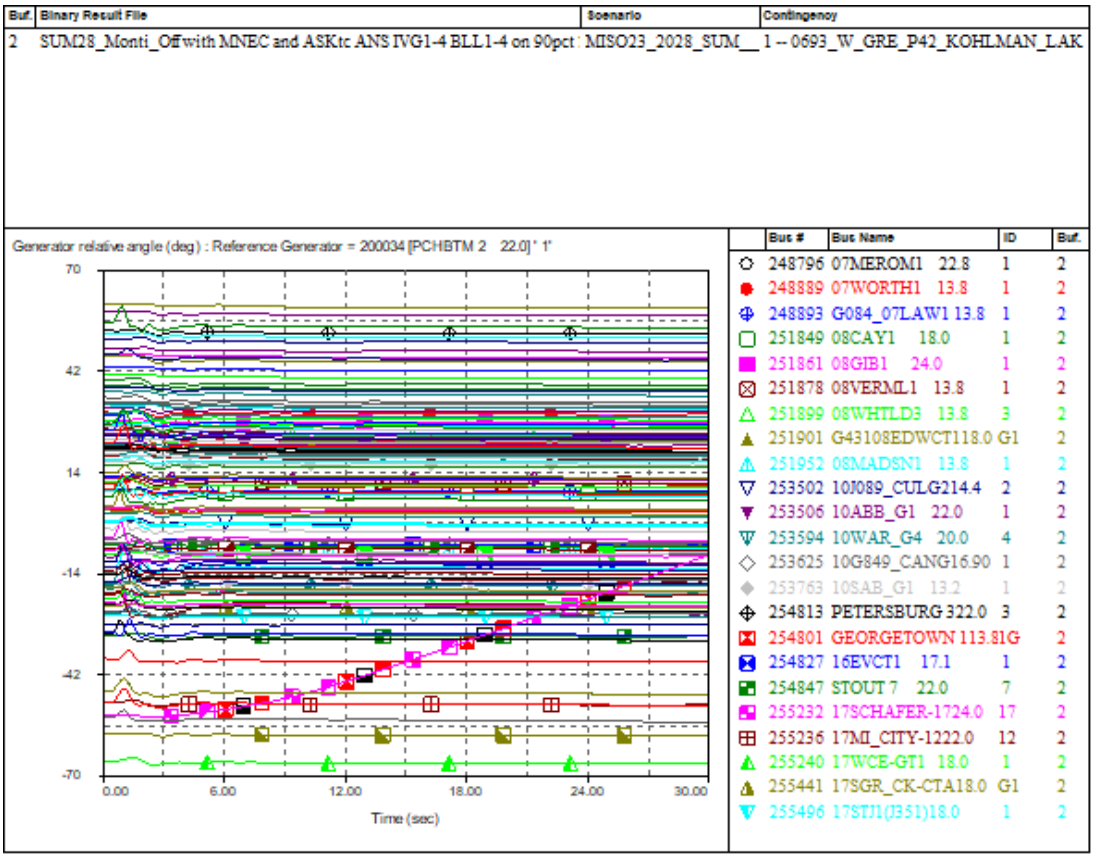

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Figure M1-5
SUM28 Prairie Island Retirement Angular Stability

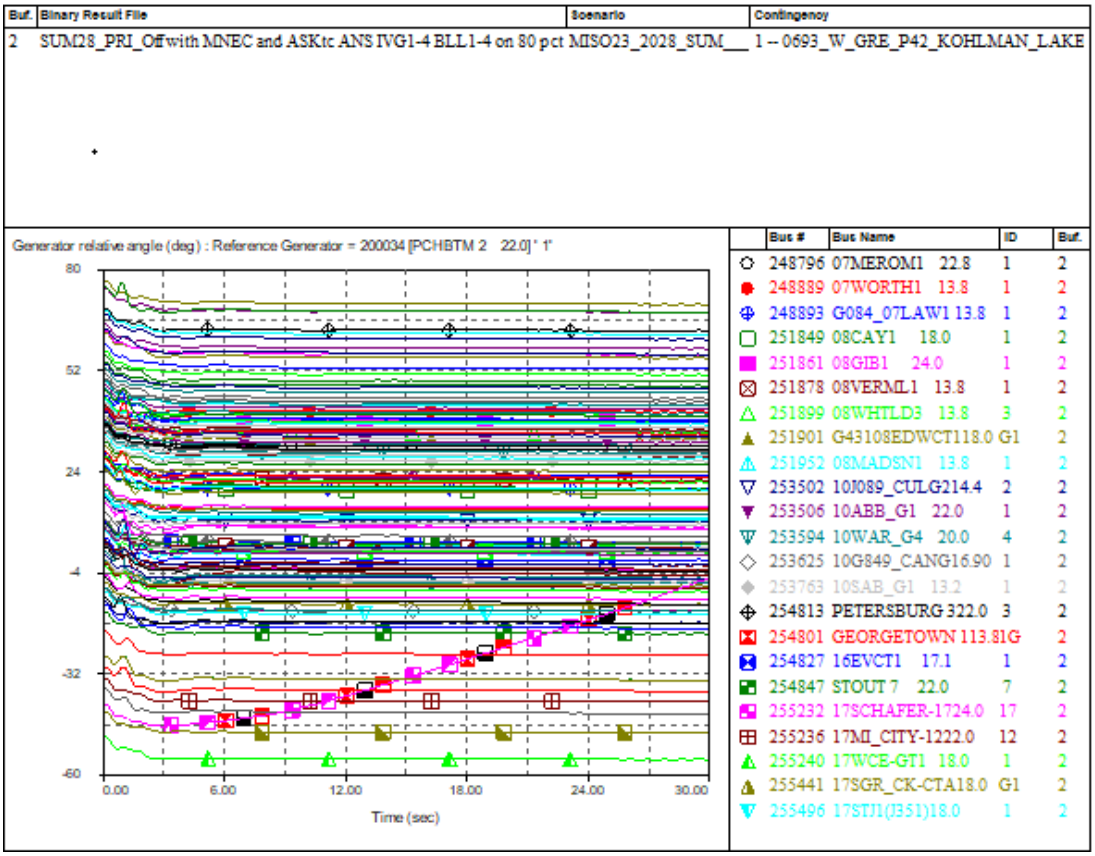

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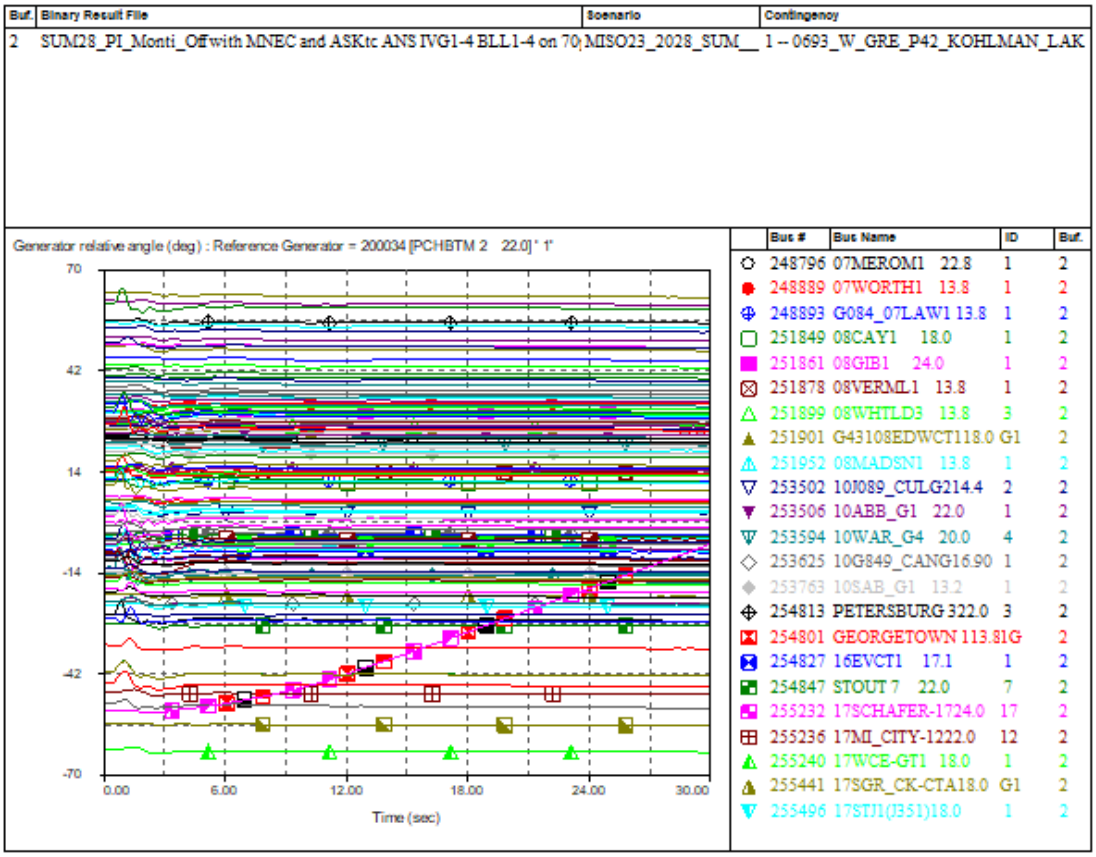
Figure M1-6
SUM28 Prairie Island and Monticello Retirement Angular Stability



Bus Voltage and Frequency were also montiored with no identified instability.

2028 Summer Shoulder Average Wind Case:

Generator angular stability issues were identified at generation levels below those indicated in Table 6 as indicated by generator angles exceeding +/- 300 degrees, which reflects the angle at which the generator would lose synchronization with the electric grid and trip offline. Indicative plot of angular instability is shown in Figure M1-7. Stable generator angle plot examples for each retirement scenario are shown in Figure M1-8, Figure M1-9, and Figure M1-10.

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Figure M1-7
SHAW28 Prairie Island and Monticello Retirement Angular Instability

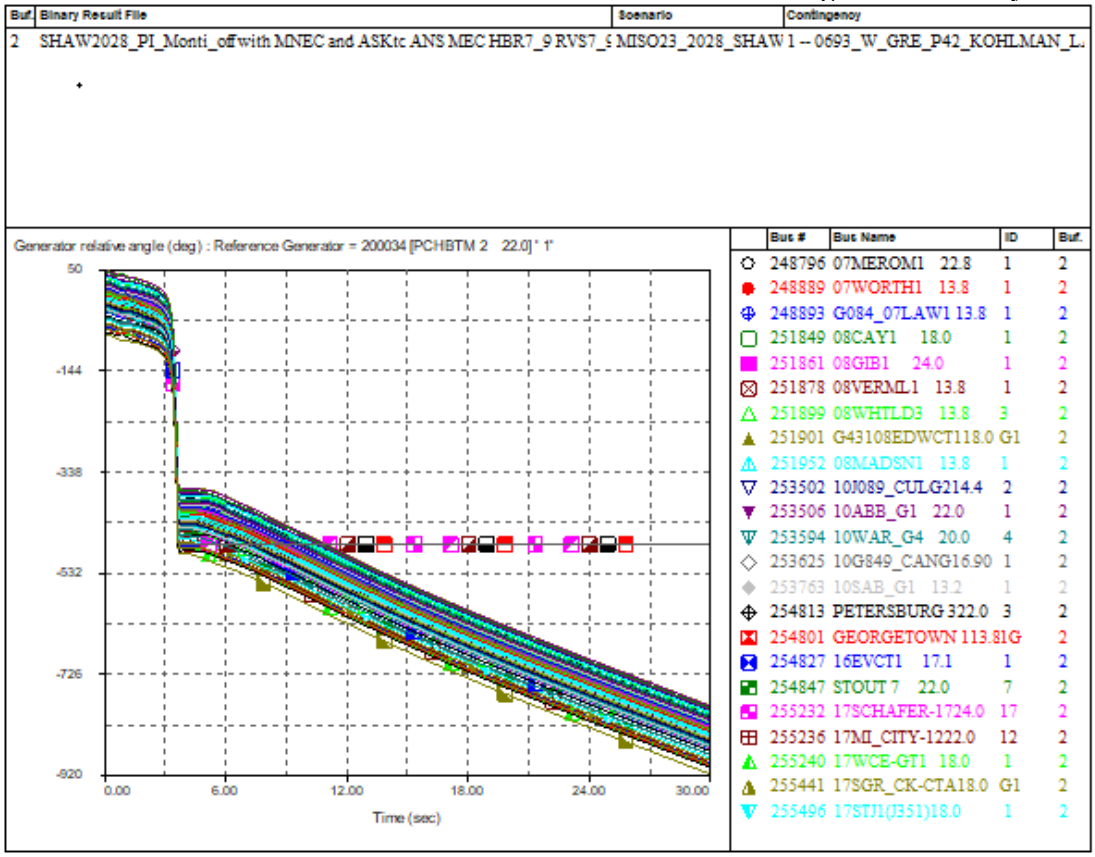

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Figure M1-8
SHAW28 Monticello Retirement Angular Stability

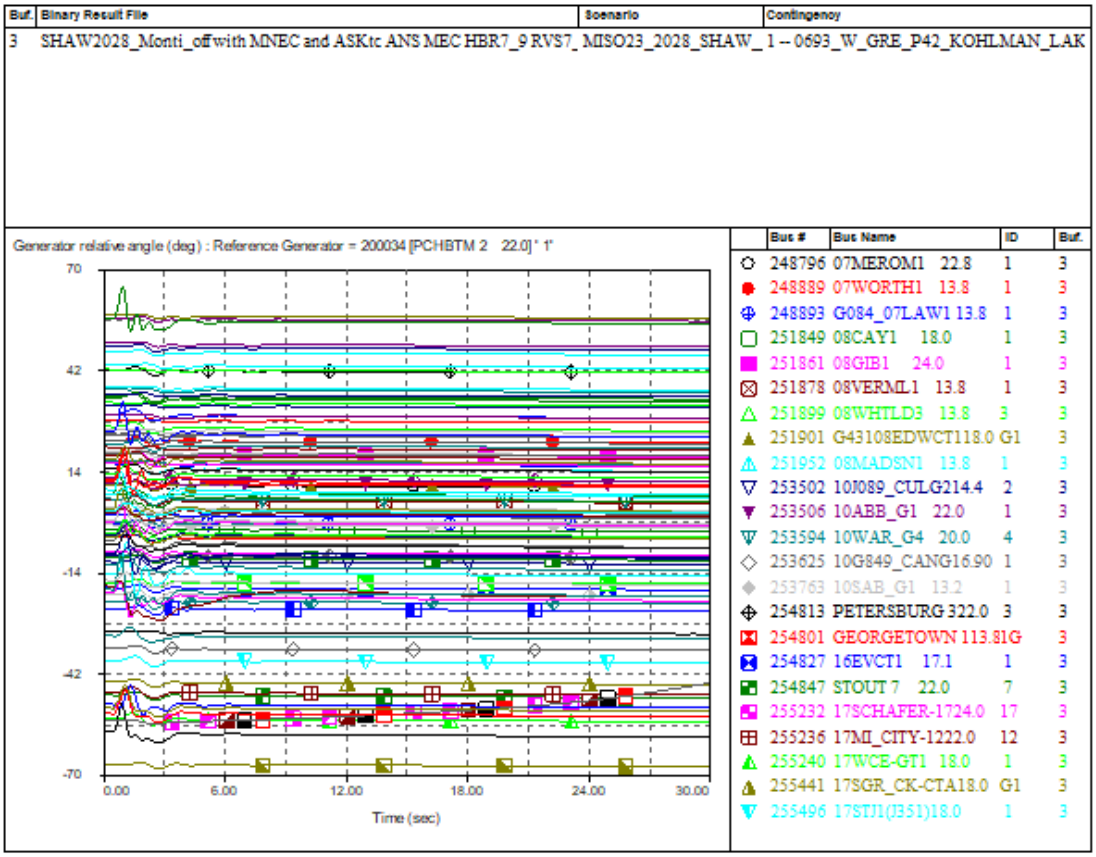

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Figure M1-9
SHAW28 Prairie Island Retirement Angular Stability

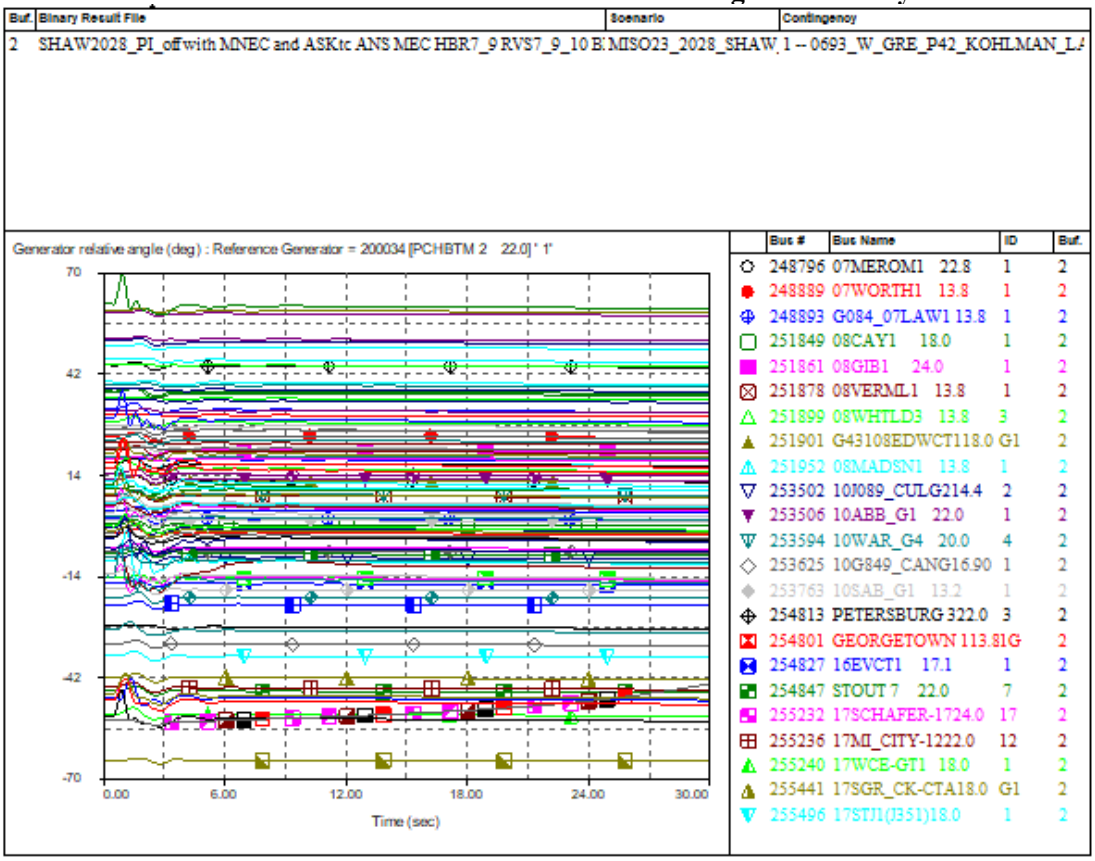

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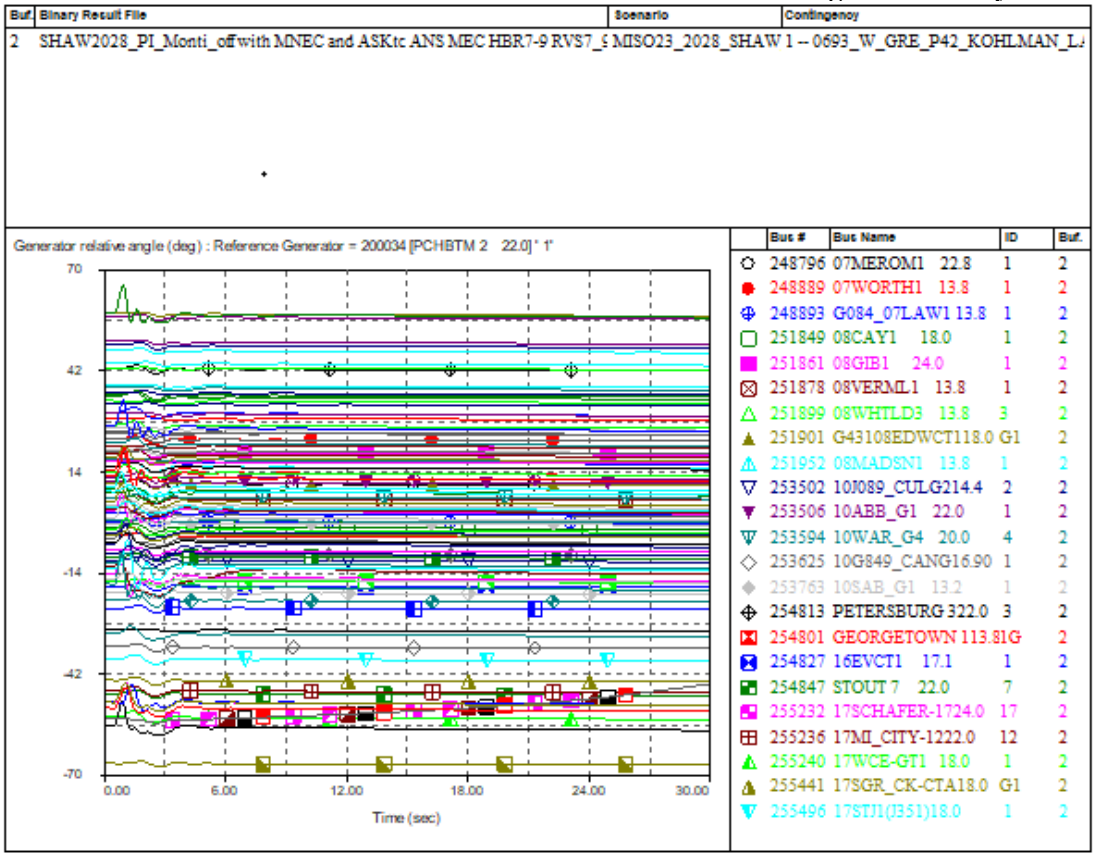
Figure M1-10
SHAW28 Prairie Island and Monticello Retirement Angular Stability



Bus Voltage and Frequency were also montiored with no identified instability.

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6 Observation

Based on the steady state results performed in this study, significant line upgrades and voltages support are needed to mitigate violations with their associated fixed costs as a result of the retirement of the nuclear units:

Table M1-11
Steady State Upgrade Cost Summary

	Summer Peak			Summer Shoulder		
	Line Upgrade (miles/cost $)	**Reactive Support (MVAR/cost $)**	**Total Cost ($)**	**Line Upgrade (miles/cost $)**	**Reactive Support (MVAR/cost $)**	**Total Cost ($)**
Monticello Retire						
Prairie Island Retire						
Monticello and Prairie Island Retire						

Based on the dynamic analysis results performed in this study, significant replacement generation is needed along with the associated annual costs of the generation:

- Summer Peak Load Case, added generation to achieve generator angular stability needed was 521 MW as well as load reduction in the Twin Cities area based on the nuclear generation being retired.
  - Monticello Retire – 10% (537.37 MW) Total Annual Cost [redacted].
  - Prairie Island Retire – 20% (1,074.74 MW) Total Annual Cost [redacted].
  - Monticello and Prairie Island Retire – 30% (1,612.11 MW) Total Annual Cost [redacted]
- Shoulder Load Average Wind Case, added generation to achieve generation angular stability based on the nuclear generation being retired.
  - Monticello Retire – Total generation addition of 706 MW Total Annual Cost [redacted]
  - Prairie Island Retire - Total generation addition of 1,166 MW Total Annual Cost [redacted]
  - Monticello and Prairie Island Retire - Total generation addition of 1,763 MW Total Annual Cost [redated]

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Appendix 1 – Steady State Analysis Thermal Overloads

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APPENDIX N – STANDARD OBLIGATIONS

As part of this filing, we have included Appendices N1 and N2 – the 2021 REO-RES-SES Report and the 2022 REO-RES-SES Report, respectively. These appendices detail our compliance with the verification and filing requirements for the RES, REC retirement, and Green Pricing REC requirement required by Minn. Stat. § 216B.1691, Subd. 3, and were filed in Docket Nos. E999/M-22-85, E999/PR-22-12, and E999/PR-02-1240 and Docket Nos. E999/PR-23-12 and E999-PR-02-1240, respectively. However, because of the legislative amendment to Minn. Stat. 216B.1691, the reporting requirements to Minn. Stat. 216B.1691, subd. 3 have been expanded to include additional reporting detailing, including:

> (5) the number of Minnesotans employed to construct facilities designed to meet the utility's standard obligations under this section;
> (6) efforts taken to retain and retrain workers employed at electric generating facilities that the utility has ceased operating or designated to cease operating for new positions constructing or operating facilities used to meet a utility's standard obligation;
> (7) the impacts of facilities designed to meet the utility's standard obligations under this section on environmental justice areas;
> (8) efforts made to increase the diversity of both the utility's workforce and vendors; and
> (9) for an electric utility utilizing renewable energy credits to satisfy any portion of the electric utility's obligations under this section, the following information:
> (i) the name and location of energy facilities that generated the energy associated with the credits;
> (ii) the dates when the energy associated with the credits was generated;
> (iii) the type of fuel that generated the energy associated with the credits; and
> (iv) whether the energy associated with the credits was purchased by the utility purchasing the credits.

We plan on including this information in our REO-RES-SES reports along with the other information required under Minn. Stat. § 216B.1691, Subd. 3 beginning in our next anticipated filing.

Below, we provide an overview of specific state targets and our compliance with renewable standards and carbon reduction standards.

I. STATE TARGETS

Our Upper Midwest integrated system provides service to five states, each with varying levels of renewable and/or carbon-free energy requirements and objectives. Each state's target is expressed as a percentage of electric retail sales from qualifying resources by a certain date.

Specific targets are as follows:

- North Dakota and South Dakota each have a voluntary Renewable and Recycled Energy Objective to have 10 percent renewable or recycled energy by 2015.[1]
- Michigan – as of November 2023 – has a Renewable Energy Standard (RES) that requires 50 percent renewable energy by 2030 and 60 percent by 2035; and a clean energy standard requiring 100 percent clean electricity by 2040.
- Wisconsin has a Renewable Portfolio Standard (RPS) that requires Xcel Energy to have approximately 12.9 percent renewable energy by 2015 and to maintain that percentage for each year thereafter.
- Minnesota has a renewable energy standard (RES), solar energy standard (SES), distributed solar energy standard (DSES), and a carbon-free energy standard (CFS):
    - The RES requires 30 percent renewable energy by 2020; and 55 percent by 2035.[2]
    - The SES requires 1.5 percent solar energy by 2020, 10 percent of which must be met by solar energy from PV devices with capacity of 40 kW or less.
    - The DSES requires three percent distributed solar energy by 2030.[3]
    - The CFS requires 80 percent carbon-free energy by 2030; 90 percent by 2035; and 100 percent by 2040.[4]

[1] As defined in North Dakota Century Code, 49-02-25, recycled energy means "systems producing electricity from currently unused waste heat resulting from combustion or other processes into electricity and which do not use an additional combustion process. The term does not include any system whose primary purpose is the generation of electricity unless the generation system consumes wellhead gas that would otherwise be flared, vented, or wasted." South Dakota Codified Law 49-34A-94 contains a similar definition. For North Dakota, we sell renewable energy credits and return proceeds from the sale to North Dakota customers.
[2] Minn. Stat. § 216B.1691 Subd. 2a, "Eligible energy technology standard." Eligible energy technologies are solar, wind, hydroelectric, green hydrogen, and biomass.
[3] Minn. Stat. § 216B.1691 Subd. 2h states that projects must comply with eligibility requirements to count toward the DSES. Eligibility requirements stipulate that the project must be: 10 MW or less; connected to our distribution system; located in our Minnesota service territory; and constructed/procured after August 1, 2023 using a Commission-approved competitive bidding process; etc.
[4] Minn. Stat. § 216B.1691 Subd. 2g, "Carbon-free standard".

II. RENEWABLE STANDARDS

In 2023, the Minnesota Legislature amended the requirements set forth in Minn. Stat. § 216B.1691 to include additional milestones for renewable energy (see Minn. Laws 2023, chp. 7). First, the statute requires Xcel Energy to achieve a renewable energy standard of 55 percent by 2035. Second, subd. 2h of Minn. Stat. § 216B.1691 amended the distributed solar energy standard (DSES). This amendment mandates that at least three percent of the Company's retail electric sales in Minnesota must be generated from solar energy generating systems. To be counted towards this standard, the solar generating system must have a capacity of ten megawatts or less, be connected to the distribution system, be located in our Minnesota service territory, and be constructed or procured after August 1, 2023.

We plan and operate our NSP generation and transmission facilities as an integrated system, and in the most cost-effective way possible to benefit all our customers across our five Upper Midwest jurisdictions. We also plan our system to comply with the regulations of each state in which we operate. To meet each of the renewable energy objectives in those five states, we maintain a set of banked Renewable Energy Credits (RECs) for future compliance. We maintain our REC inventory in the regional Midwest Renewable Energy Tracking System (M-RETS), which was established for compliance tracking relative to state renewable energy standards. In M-RETS, one MWh of generation from a renewable source equals one REC.

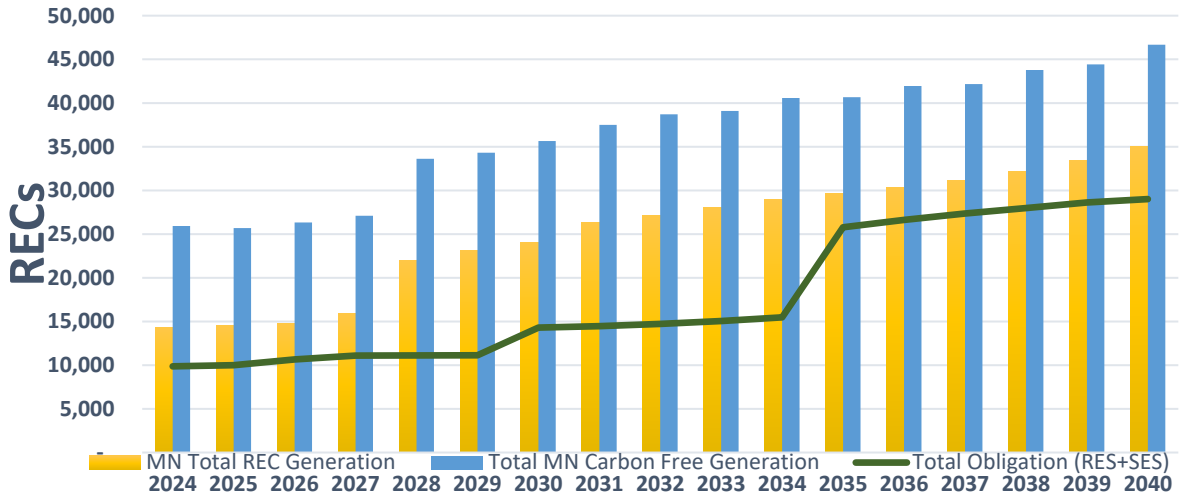
A. Renewable Energy Standard Solar Energy Standard and Compliance

The Company expects to generate a sufficient number of RECs throughout the planning period to satisfy our renewable obligations under our Preferred Plan. Figure N-1 below demonstrates our compliance through the Resource Plan planning period with the Minnesota Renewable Energy Standard and 1.5 percent Solar Energy Standard (SES). Figure N-1 also provides our total carbon-free generations.

Appendix N1: 2021 REO-RES-SES Report is the Company's most recent Minnesota biennial RES Compliance filing and was filed on June 1, 2022, in Docket Nos. E999/M-22-85, E999/PR-22-12, and E999/PR-02-1240.

Appendix N2: 2022 REO-RES-SES Report is the Company's most recent Minnesota SES Compliance filing, which was filed on Jun 1, 2023, in Docket Nos. E999/PR-23-12 and E999/PR-02-1240.

Figure N-1: State of Minnesota Annual RES and SES REC Obligation and Production



III. CARBON REDUCTION STANDARDS

As mentioned above, in 2023, the Minnesota Legislature amended the requirements set forth in Minn. Stat. § 216B.1691 to create new carbon-free energy standards (see Minn. Laws 2023, chp. 7). The new legislation requires Xcel Energy to generate or procure carbon-free energy equivalent to 100 percent of its Minnesota retail sales by 2040. The law, Minn. Stat. § 216B.1691, also requires Xcel Energy to achieve interim carbon-free standards of 80 percent by 2030, and 90 percent by 2035.

Further, both Wisconsin and Michigan's Governors recently put forward 100 percent by 2040 carbon reduction goals for their respective states' electric sector. Proceedings by those states' Public Utilities Commissions are still in the early stages and have not produced any final compliance requirements for electric utilities.

A. Carbon-Free Standards

The Company is well positioned to achieve compliance with the CFS based on our

Preferred Plan included with this IRP filing. Therefore, the assumptions used in this IRP will result in a plan that complies with the MN CFS for our system.

We note that Table N-1 does not rely on renewable energy credits (RECs), or partial carbon-free energy credits associated with market purchases to demonstrate compliance with the CFS, although it is our understanding that those represent acceptable compliance pathways per the legislation.

Table N-1: 2024 Preferred Plan Carbon-Free Energy

	2030	2035	2040
Carbon-Free Generation (GWh)	46,515	52,681	60,162
MN Allocated CF Generation (GWh)	35,644	40,668	46,666
MN Elec Retail Sales (GWh)	35,725	39,668	44,624
Carbon Free Standard Requirement	80%	90%	100%

The accounting for demonstrating compliance with the carbon-free standard is based on the ratio of the annual utility generation or procurement from carbon-free technologies allocated to Minnesota, and the annual retail electric sales in Minnesota. Compliance with the carbon-free standards is determined by the delta between carbon-free generation and the total of retail electric sales in Minnesota. For example, if a utility were to generate and procure 10,000 kWhs of carbon-free electricity in a year allocated to Minnesota and have 10,000 kWhs of MN retail sales that same year, the utility's generation/procurement would be 100 percent carbon free under the statute. If that utility were to have 12,000 kWhs of MN retail sales that year, the utility's generation/procurement to serve that load would be 83 percent carbon-free.

The Minnesota Public Utilities Commission has opened an Investigation docket[5] into the Carbon-Free Standard (CFS). Parties and the Commission will weigh in on several topics in that docket over the next couple of years, and the Minnesota Commission intends to issue several notices requesting comments on the changes made to Minn. Stat § 216B.1691. The current notice is focused on the clarification of new and amended terms added to Minn. Stat § 216B.1691, including carbon-free, partial compliance, and environmental justice areas.

[5] Docket No. E999/CI-23-151.

414 Nicollet Mall
Minneapolis, MN 55401

June 1, 2022

—VIA ELECTRONIC FILING—
PUBLIC DOCUMENT
NOT PUBLIC INFORMATION EXCISED

Mr. Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, Minnesota 55101-2147

RE: RENEWABLE ENERGY OBLIGATION (REO)-RENEWABLE ENERGY STANDARD (RES) AND SOLAR ENERGY STANDARDS (SES) COMPLIANCE REPORT

COMMISSION CONSIDERATION AND DETERMINATION ON COMPLIANCE WITH RENEWABLE ENERGY STANDARDS
DOCKET NO. E999/M-22-85

RENEWABLE ENERGY CERTIFICATE RETIREMENT AND SOLAR ENERGY STANDARDS REPORTING FOR COMPLIANCE YEAR 2021
DOCKET NO. E999/PR-22-12

GREEN PRICING VERIFICATION FILING PROCESS
DOCKET NO. E999/PR-02-1240

Dear Mr. Seuffert:

Northern States Power Company, doing business as Xcel Energy, submits the attached compliance report to fulfill the verification and filing requirements for the Renewable Energy Standards (RES), Renewable Energy Credit (REC) retirement, and Green Pricing REC retirement required by Minn. Stat. § 216B.1691, Subd. 3. The Company also submits the 2021 Annual Report as required by the Minnesota Public Utilities Commission in an Order dated January 29, 2021 in Docket Nos. E-999/M-20-464 and E-999/M-13-542, Solar Energy Standards (SES).

We have provided the required information in the attached Excel spreadsheet templates. Attachment A contains RES, Green Pricing, and SES Retail Sales; RES,

Green Pricing, and SES REC Retirements; Biennial Compliance Requirements; and REC Purchases and Sales.

REC Retirement

By May 1, 2022, the Company retired approximately 8.6 million RECs, representing 30 percent of annual retail sales for calendar year 2021, using the Midwest Renewable Energy Tracking System (M-RETS). The Company is therefore in compliance with the Minnesota RES requirements identified in Minn. Stat. § 216B.1691 subd. 2(a) and the Commission's March 19, 2010 Order in Docket No. E999/CI-03-869.

In addition, by May 1, 2022, the Company retired approximately 618,000 RECs for our Green Pricing Programs. Approximately 441,000 RECs were retired for the Windsource Program, approximately 167,000 RECs were retired for Renewable*Connect, and approximately 10,000 RECs were retired for the Renewable*Connect Government Program. Details of the Company's Green Pricing Program REC retirements are included in Attachment A.3.

The required information specified in the Commission's April 17, 2014 NOTICE and the May 28, 2013 ORDER FINDING UTILITIES IN COMPLIANCE WITH MINN. STAT. § 216B.1691 AND MODIFYING BIENNIAL REPORTING PROCEDURES in Docket No. E999/M-12-958, including the RES calculations, the RECs retired and the names of the M-RETS retirement sub-accounts, is provided in Attachment A.

As noted in Attachment A.7, the Company purchased 227,740 RECs for our Windsource program.

Biennial REO-RES Compliance

Attachment A.6 to this report provides the Company's forecasted retail sales data for 2022-2025, projected generation data for this reporting period, other state RES or Objectives to which the utility is subject, actions taken to address the RES requirements, and a discussion of potential obstacles to meeting our requirements and solutions to the same.

Certified Renewable Percentage

The Company began offering the Certified Renewable Percentage (CRP) to our customers in 2019 for calendar year 2018.

Each year, the Company calculates the CRP for the preceding year, after all program participation, REC sales, REC retirements for the RES, trade margin sales, and all other data points that affect the CRP are available. After the annual CRP is calculated, the Company then retires the additional RECs to match the amount of renewable energy delivered to customers.

The 2021 CRP is calculated at 34.3 percent. The increase over the previous year is due largely to additional wind resources brought online in 2021. We estimate that the CRP will continue to increase each year as new renewable resources continue to come online. The 2021 CRP is higher than the RES obligation and therefore the Company plans to retire additional RECs for the 2021 CRP beyond what is required for the RES.

Below is an overview of the MN CRP from 2018 to 2021. The 2019 and 2020 CRPs are currently in the process of third-party verification and the Company plans to verify the 2021 CRP in Summer 2022. The 2019, 2020, and 2021 CRPs are subject to change as an outcome of the verification process.

Year	CRP Percent
2018	26.6
2019	23.3
2020	31.8
2021	34.3

Renewable*Connect Government Program

The security and privacy of customer data, including energy usage data, is a key concern for the Company. As a matter of course, the Company generally does not publicly disclose energy usage data related to an individual customer.

In previous years of the REO/RES REC filing, the customer participating in the Renewable*Connect Government Program has requested certain information related to its energy usage be considered Non-Public, but the Department of Commerce has requested the information be submitted publicly. In advance of this year's Compliance filing, the Company reached out to this customer asking if the information that it normally considers Non-Public could be submitted publicly for this year's 2021 REO/RES REC filing. The customer consented to the Company submitting the information as Public information. Notwithstanding this one-time

consent, the Company reserves the right to submit similar information as Non-Public in the future.

Summary of ongoing efforts to obtain solar energy, including a brief summary of the anticipated mix of project sizes for SES compliance.

For purposes of this Section, Solar Energy Standard (SES) compliance means the requirement set forth in Minn. Stat. § 216B.1691, Subd. 2f, whereby Xcel Energy, by the end of 2020, needs to generate or procure sufficient electricity generated by solar energy so that at least 1.5 percent of the Company's total retail electric sales in Minnesota is generated by solar energy. The additional requirement in Subd. 2f regarding the 10 percent solar carve-out requirement from systems of 40 kW (AC) or less is addressed below.

The Company has developed a large portfolio of resources and programs to provide renewable options to residential and commercial customers. Since the passage of the SES under the 2013 Energy Omnibus Bill, we have grown our utility portfolio of solar resources to expand access of solar benefits to all customers while achieving compliance in reporting year 2021. The Company expects to accumulate and exceed the amount of solar RECs (SRECs) required to satisfy the MN SES compliance requirements beginning in 2020 and continue well beyond 2034. SRECs accumulated in the REC bank beyond what is needed for compliance requirements, will be applied towards the MN state RPS obligations to avoid any REC expirations.

Progress towards the 10% carve-out for systems 40 kW_{ac} or less, including the method by which the utility will meet the carve-out.

A subset of programs from the section above can be used towards our 10 percent small solar carve out. Table 1 describes these impacts. These are further detailed in this section.

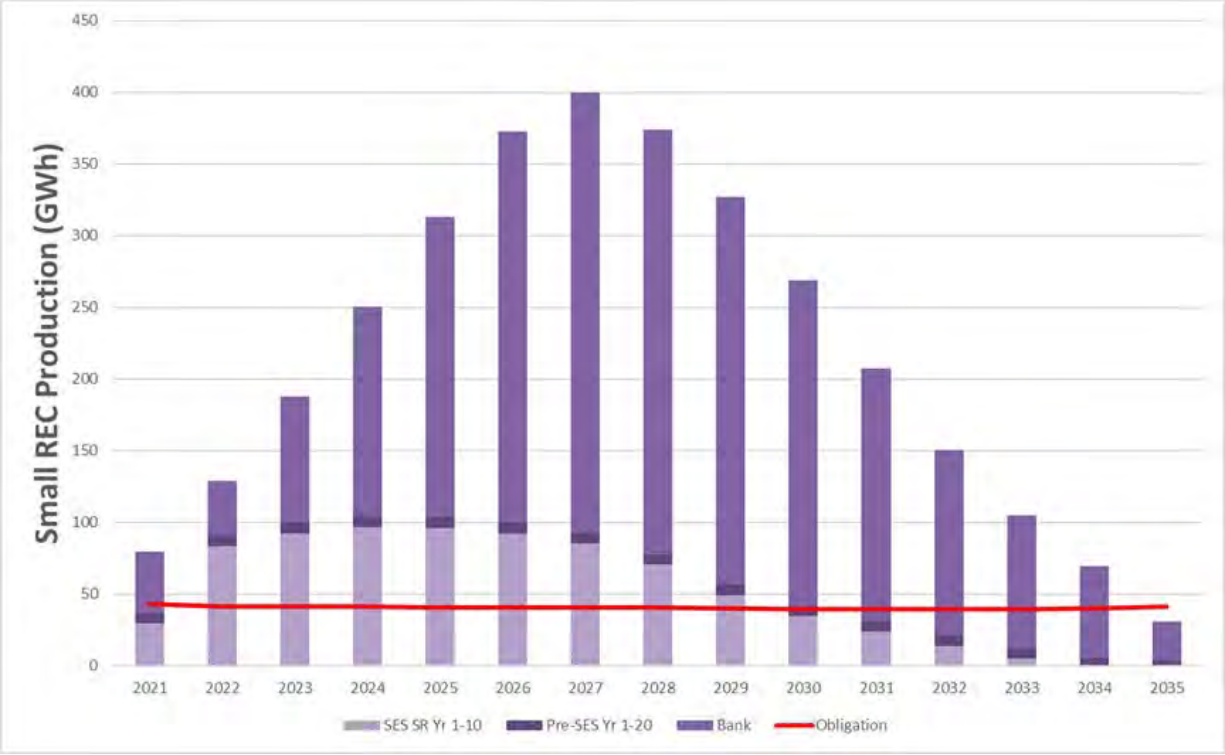
Table 1: Small Solar Carve Out – Programs

Program Name	Size	Years Available
Solar*Rewards (First Generation)	**≤40 kW (DC)***	**2010 – August 2014**
Solar*Rewards (Second Generation)	**≤ 20 kW (DC)* ≤ 40 kW (DC)***	**August 2014 – May 2018 June 2018 – May 2019**
Solar*Rewards (Third Generation)	**≤ 40 kW (AC)**	**June 2019 - 2024**
Solar*Rewards for Schools	**≤ 40 kW (AC) >40 kW – 1 MW**	**May 2022 – June 2027**
Made in Minnesota	**≤40 kW**	**2014 – 2017**

*Energy produced in DC goes through an inverter to get converted to AC. In this process there is energy loss, meaning that DC output results in a lower AC output.

Graph 1 below represents our current projection for REC compliance with the 10 percent small solar carve out. This chart shows the Company may be in compliance with the small solar carve out through 2034. However, this representation uses program assumptions, discussed below, and thus has embedded risk that the actual results could be significantly different than the forecast. The Company cannot predict what the installation rate will be for small rooftop solar.

Graph 1
Small SREC Production with Solar*Rewards
Program Extension through 2024



The chart above assumes 100 percent of Solar*Rewards funds are allocated based on estimated solar system performance and that of these projects, 75 percent of them are completed each year for the Solar*Rewards program through 2024. If actual solar installations are lower than forecasted levels, the Company may not be able to meet the small solar carve-out requirements through 2034 as projected in the chart above.

With the prospect that the Solar*Rewards program may be extended in future years, the Company believes it will have sufficient small-solar RECs to meet our obligations

without a buy-back option. If, at some time, it appears that the Company will not have sufficient RECs to meet its obligations, it may revisit the REC buy-back option.

Also, the above analysis is based on the understanding that the nameplate capacity for purposes of this statute is measured in alternating current (AC). This is consistent with the definition of capacity in Minn. Stat. § 216B.164, Subd. 2a.(c), as well as how capacity is used or interpreted under the following statutes: Minn. Stat. §§ 216B.1611, Subd.2(a), and Subd.3a(a)(1); 216B.1613; 216B.164, and Subd. 4c; 216B.1641 (b).

Discussion on the utilities' efforts to reach, by 2030, the energy goal that ten percent of the retail electric sales in Minnesota be generated by solar energy.

The 10 percent by 2030 goal is an energy goal of the state of Minnesota. We understand this question to be evaluating our current efforts to reach our proportional share of the state's energy goal.

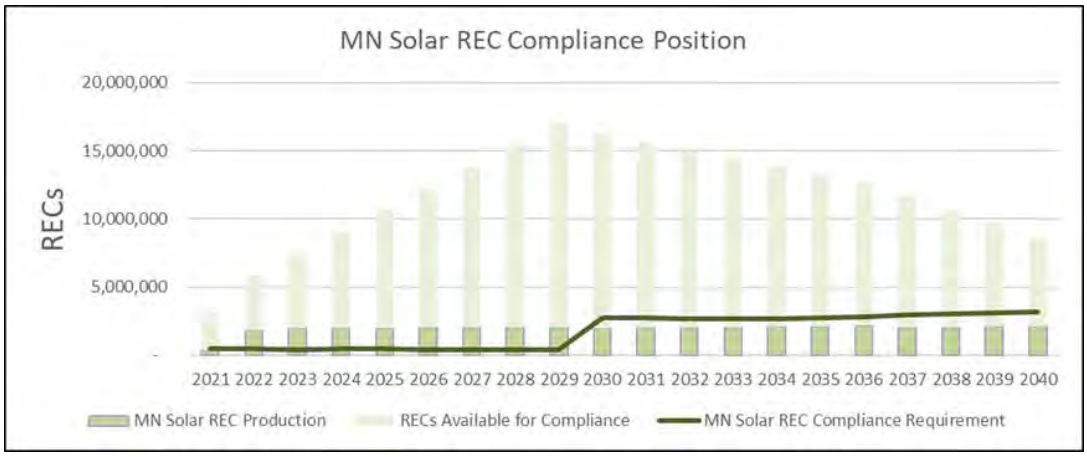
As shown in Graph 2 below, the Company forecasts that existing solar resources alone will not be sufficient to meet the 10 percent by 2030 goal. However, the Company has also proposed to add substantial amounts of solar generation to our portfolio in the coming years in our recently approved 2020-2034 Integrated Resource Plan.[1] In the Commission's Order approving the plan, it authorized the Company to procure approximately 900 MW of solar capacity coming online by the end of 2025, incremental to the proposed 460 MW solar generating facility near the Company's current Sherburne County coal generating facility's site.[2] Our plan also includes additional solar capacity build out, to replace and reuse interconnection made available when Sherco 1 and A.S. King coal units retire in the latter half of the 2020s. This capacity will provide substantial solar generation to our system and would contribute toward meeting the 10 percent SES goal into the future; in fact, by 2030, we expect over 10 percent of our generation to come from solar resources. As always, we will continually review the need for additional solar resources in our future resource plans, in order to achieve the goal long-term.

We note that there is currently significant supply chain uncertainty surrounding a recent decision by the U.S. Department of Commerce to accept an antidumping and countervailing duty trade complaint levied against solar components imported from four southeast Asian countries. In the near term, specific projects may be delayed beyond their originally envisioned timelines. However, at this time, we do not expect

[1] Docket No. E002/RP-19-368.
[2] Docket No. E002/M-20-891.

this investigation to negatively impact our long-term goals to add solar capacity to our system.

Graph 2



Attachment A contains certain portions that have been designated as Trade Secret information pursuant to Minnesota Statute § 13.37, subd. 1(b). In particular, the information designated as Trade Secret relates to specific Purchase Power Agreements (PPAs). The terms of the Commission approved PPAs require that this information be non-public. Other information marked as trade secret relates to specific production from specific customer facilities. Further, this is considered to be "non-public data" pursuant to Minn. Stat. §13.02, Subd.9, and is also "Trade Secret" information pursuant to Minn. Stat. §13.37, subd. 1(b) as it derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by other persons who can obtain economic value from its disclosure or use. In general, we publicly show the names of the Renewable*Connect resources because they are already publicly disclosed and therefore their identity is public, but their actual production is non-public. The names of the Windsource facilities have similarly already been publicly identified along with their capacities, but the actual production from each is not public. The smaller wind facilities generally are our retail customers and Minnesota regulations prohibit us from disclosing a customer name alone; therefore, we have treated as non-public the customer names along with their M-RETS ID that would otherwise identify them. Where we have biomass plants, because we have fewer than 15, we have treated as nonpublic the name and RECs of each. We note that the number of RECs retired from specific solar gardens is publicly provided because our solar garden tariff at tariff sheet 9-78 specifically authorizes us to make garden generation data public for each. Other REC retirement data for smaller facilities has been aggregated and de-identified.

Pursuant to Minn. Stat. § 216.17, subd. 3, we have electronically filed this document and served copies on all parties on the attached service list. If you have any questions about this information, please contact me at bria.e.shea@xcelenergy.com, or Pamela Gibbs at pamela.k.gibbs@xcelenergy.com or (612) 330-2889.

Sincerely,

/s/

BRIA E. SHEA
REGIONAL VICE PRESIDENT, REGULATORY POLICY

Attachments
c: Service Lists

PUBLIC DOCUMENT
NOT PUBLIC DATA HAS BEEN EXCISED

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

Minnesota Public Utilities Commission: Docket No. E999/PR-22-12 and Docket No. E999/M-22-85 **Attachment 1**
Minnesota Department of Commerce: Docket No. E999/PR-02-1240 Reporting Period: **January 1, 2021 - December 31, 2021**

Renewable Energy Certificate Retirement Report for Renewable Energy Standards and Green Pricing Programs

Report Year	2021	Date Submitted	June 1, 2022

FILING UTILITY INFORMATION		CONTACT INFORMATION	
Company ID #	85	Contact Name	Pamela Gibbs
Company Name	Xcel Energy	Contact Title	Regulatory Case Specialist
Street Address Line 1	414 Nicollet Mall	Contact Telephone	612-330-2889
Street Address Line 2		Contact E-Mail	pamela.k.gibbs@xcelenergy.com
City	Minneapolis	COMMENTS/NOTES	
State	MN		
Zip Code	55401		

Filing for **RENEWABLE ENERGY STANDARDS** on behalf of:

Utility Name	Utility Name	Utility Name	Utility Name
Northern States Power Company - Minnesota			

Filing for **GREEN PRICING PROGRAMS** on behalf of:

Utility Name	Utility Name	Utility Name	Utility Name
Northern States Power Company - Minnesota			

Filing for **SOLAR ENERGY STANDARD** on behalf of:

Utility Name	Utility Name	Utility Name	Utility Name
Northern States Power Company - Minnesota			

Minnesota Public Utilities Commission: Docket No. E999/PR-22-12 and Docket No. E999/M-22-85 **Attachment 2**

Minnesota Department of Commerce: Docket No. E999/PR-02-1240 Reporting Period: **January 1, 2021 - December 31, 2021**

Total Retail Sales to Minnesota Customers and
Renewable Energy Certificates Required to be Retired for RENEWABLE ENERGY STANDARD Compliance

Retail Sales Total	28,810,844
RES Percentage Obligation	30%
RECs Required to be Retired	8,643,254
Actual RECs Retired	8,643,254

Enter current reporting year data.

Utility ID #	Utility	Retail Sales Amount (MWh)	Notes
85	Xcel Energy (NSP-MN)	28,810,844	

PUBLIC DOCUMENT
NOT PUBLIC DATA HAS BEEN EXCISED

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

Minnesota Public Utilities Commission: Docket No. E999/PR-22-12 and Docket No. E999/M-22-85 — **Attachment 3**
Minnesota Department of Commerce: Docket No. E999/PR-02-1240 — Reporting Period: **January 1, 2021 - December 31, 2021**

GREEN PRICING Program Sales

TOTAL **GREEN PRICING** Sales (MWh)	618,333
RECS retired for **GREEN PRICING** programs	0

List the cumulative retail sales of green pricing electricity, including utility-managed community solar, and the number of customers as of December 31, 2021.

Utility ID # (on Worksheet 1)	Utility Name	Program Name	No. of Program Customers	Program Sales (MWh)	Retail Rate ($/kWh)	Notes - Per kWh
85	Xcel Energy (NSP-MN)	Windsource Minnesota	76,439	440,555	$0.0353	Windsource rate per kWh
85	Xcel Energy (NSP-MN)	Renewable * Connect	1,035	11,118	$0.03647	2021 Month-to-Month Rate
85	Xcel Energy (NSP-MN)	Renewable * Connect	1,111	60,508	$0.03345	2021 5-year rate
85	Xcel Energy (NSP-MN)	Renewable * Connect	656	95,847	$0.03295	2021 10-year rate
85	Xcel Energy (NSP-MN)	Renewable * Connect Government	1	10,305	$0.03295	2021 Rate
85	Xcel Energy (NSP-MN)	Community Solar Gardens				No sales because company receives all RECs and subscribers do not get CSG energy

Minnesota Public Utilities Commission: Docket No. E999/PR-22-12 and Docket No. E999/M-22-85
Minnesota Department of Commerce: Docket No. E999/PR-02-1240

Attachment 4
Reporting Period: **January 1, 2021 - December 31, 2021**

SES Retail Sales and
Solar Renewable Energy Certificates Required to be Retired for SOLAR ENERGY STANDARD Compliance

Retail Sales Total (MWh)	28,810,844
SES Excluded Retail Sales (MWh)	130,872
SES Retail Sales Obligation (MWh)	28,679,972
SES Total Percentage Obligation	1.50%
SES Small Scale obligation	0.15%
Non-Small Scale obligation	1.35%
Total SRECs Required to be Retired	430,200
Small SRECs to be retired	43,020
Non-Small Scale to be retired	387,180
Total Actual RECs Retired	430,200
Total actual small SRECs retired	43,020
Total actual non-Small Scale retired	387,180

Additional SES Reporting

Projected SES compliance for the current plus three (3) upcoming years. Include banked RECs.

Year	Actual/Projected MN retail sales (MWh) minus SES exempt sales	SES Total Req (MWh)	SES Small Scale Req (MWh)	SES Non-Small Scale Req (MWh)	Projected Total SRECs (MWh)	Projected SRECs 40 kW or less (MWh)	Projected SRECs greater than 40 kW (MWh)	Projected Total Surplus/ (Deficit) (MWh)	Projected SREC Surplus/(Deficit) 40 kW or less (MWh)	Projected SREC Surplus/(Deficit) greater than 40 kW (MWh)
2021	28,810,844	432,163	43,216	388,946	1,970,703	36,223	1,934,480	1,538,540	(6,993)	1,545,534
2022	28,310,524	424,658	42,466	382,192	2,037,774	98,000	1,939,774	1,613,116	55,534	1,557,582
2023	28,260,253	423,904	42,390	381,513	2,176,430	113,000	2,063,430	1,752,526	70,610	1,681,917
2024	28,296,449	424,447	42,445	382,002	2,199,617	116,000	2,083,617	1,775,171	73,555	1,701,615

Annual solar generation on the utilities' system for the previous calendar year

	Number of Facilities on Utility System	Capacity (MW)	Number registered in M-RETS	Capacity registered in M-RETS	SRECs Generated (2021)
40 kW or less	7,495	82	60	26.11	36,756
Generation from CSGs	881	826	881	826.29	1,419,215
Greater than 40 kW	69	4.05	37	271.31	514,732

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

Minnesota Public Utilities Commission: Docket No. E999/PR-22-12 and Docket No. E999/M-22-85 — **Attachment 5**
Minnesota Department of Commerce: Docket No. E999/PR-02-1240 — Reporting Period: **January 1, 2021 - December 31, 2021**

Renewable Energy Certificate Retirements for Renewable Energy Standards and Green Pricing Programs

Renewable Energy Standard REC Retirement Account Name:	NSP-MN RES Retirement-2021 / 4407E181-EFF7
Renewable Energy Standard REC Retirement Account Name:	NSP-MN SES Retirement-2021 / C256DDB6-872A
Green Pricing REC Retirement Account Name:	MN Renewable Connect 2021 / 3FA86168-25E4
Green Pricing REC Retirement Account Name:	NSP-MN Windsource Retirement-2021 / 3896023C-6BC8

	Total RECs or SRECs		8,643,254	0	43,020	387,180	1 REC = 1 MWh
MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
[NOT PUBLIC DATA BEGINS				[NOT PUBLIC DATA BEGINS			
	North Star Solar PV - North Star Solar PV	Solar					MN Renewable*Connect 2021
	Odell Wind Farm - Odell Wind Farm	Wind					MN Renewable*Connect 2021
	North Star Solar PV - North Star Solar PV	Solar					MN Renewable*Connect Government 2021
	Odell Wind Farm - Odell Wind Farm	Wind					MN Renewable*Connect Government 2021
	Black Oak Wind, LLC - BOGWF	Wind					MN Windsource
	Boeve Windfarm - Boeve Windfarm	Wind					MN Windsource
	Border Winds Wind Farm - Border Wind	Wind					MN Windsource
	Buffalo Ridge I - Buffalo Ridge I	Wind					MN Windsource
	Buffalo Ridge II - Buffalo Ridge II	Wind					MN Windsource
	Cisco Wind Energy - Cisco Wind Energy	Wind					MN Windsource
	Courtenay Wind Farm - Courtenay Wind Farm	Wind					MN Windsource
	Elm Creek 2 - Elm Creek 2	Wind					MN Windsource
	JJN Windfarm - JJN Windfarm	Wind					MN Windsource
	K-Brink Wind Farm - K-Brink Wind Farm	Wind					MN Windsource
	McNeilus Group - McNeilus Group	Wind					MN Windsource
	Moraine II - Moraine II	Wind					MN Windsource
	Red Pine Wind Project, LLC	Wind					MN Windsource
	Rugby - Rugby	Wind					MN Windsource
	West Ridge - West Ridge	Wind					MN Windsource
	Windcurrent Farms - Windcurrent Farms	Wind					MN Windsource
NOT PUBLIC DATA ENDS]				NOT PUBLIC DATA ENDS]			
M627	SRMN2010-J-01 - SRMN2010-J-01	Solar			1,936		
M714	SRMN2011-01 - SRMN2011-01	Solar			1,136		
M737	SRMN2011-02 - SRMN2011-02	Solar			1,276		
M882	SRMN2011-03 - SRMN2011-03	Solar			94		
M766	SRMN2012-01 - SRMN2012-01	Solar			1,008		
M786	SRMN2012-02 - SRMN2012-02	Solar			1,461		
M797	SRMN2012-03 - SRMN2012-03	Solar			1,799		
M836	SRMN2012-04 - SRMN2012-04	Solar			175		
M881	SRMN2013-01 - SRMN2013-01	Solar			1,576		
M883	SRMN2013-02 - SRMN2013-02	Solar			1,680		
M931	SRMN2013-I-01 - SRMN2013-I-01	Solar			337		
M934	SRMN2013-J-01 - SRMN2013-J-01	Solar			46		
M936	SRMN2014-01 - SRMN2014-01	Solar			608		
M937	SRMN2014-I-01 - SRMN2014-I-01	Solar			1,589		
M938	SRMN2014-I-02 - SRMN2014-I-02	Solar			1,304		
M988	SRMN2014-I-03 - SRMN2014-I-03	Solar			623		
M939	SRMN2014-J-01 - SRMN2014-J-01	Solar			1,030		
M940	SRMN2014-J-02 - SRMN2014-J-02	Solar			1,147		
M949	SRMN2014-J-03 - SRMN2014-J-03	Solar			1,054		
M1061	SRMN2014-J-04 - SRMN2014-J-04	Solar			47		
M968	SRMN2015-I-01 - SRMN2015-I-01	Solar			1,533		
M1060	SRMN2015-I-02 - SRMN2015-I-02	Solar			1,311		
M1405	SRMN2015-I-03	Solar			444		
M969	SRMN2015-J-01 - SRMN2015-J-01	Solar			1,120		
M989	SRMN2015-J-02 - SRMN2015-J-02	Solar			993		
M1000	SRMN2015-J-03 - SRMN2015-J-03	Solar			1,071		
M1058	SRMN2015-J-04 - SRMN2015-J-04	Solar			998		
M1059	SRMN2016-I-01 - SRMN2016-I-01	Solar			1,271		
M1224	SRMN2016-I-02 - SRMN2016-I-02	Solar			1,080		
M1536	SRMN2016-I-03	Solar			166		
M1062	SRMN2016-J-01 - SRMN2016-J-01	Solar			1,075		
M1067	SRMN2016-J-02 - SRMN2016-J-02	Solar			1,078		
M1068	SRMN2016-J-03 - SRMN2016-J-03	Solar			1,062		
M1194	SRMN2016-J-04 - SRMN2016-J-04	Solar			1,043		
M1406	SRMN2016-J-05	Solar			588		
M1488	SRMN2017-I-01	Solar			1,488		
M1537	SRMN2017-I-02	Solar			441		
M1223	SRMN2017-J-01 - SRMN2017-J-01	Solar			1,115		
M1408	SRMN2017-J-02	Solar			1,096		
M1409	SRMN2017-J-03	Solar			1,137		
M1410	SRMN2017-J-04	Solar			1,072		
M1539	SRMN2017-J-05	Solar			1,032		
M1540	SRMN2017-J-06	Solar			173		
M2025	SRMN2018-I-02	Solar			38		
M1541	SRMN2018-J-01	Solar			660		
M1955	SRMN2018-J-03	Solar			4		
M2026	SRMN2018-J-05	Solar			5		
[NOT PUBLIC DATA BEGINS							
		Solar				14,740	
		Solar				10,282	
		Solar				7,095	
		Solar				10,036	
		Solar				10,787	
		Solar				8,794	
		Solar				6,475	
		Solar				6,593	

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
		Solar				11,448	
		Solar				5,555	
		Solar				5,858	
		Solar				17,136	
		Solar				7,116	
		Solar				15,051	
		Solar				9,677	
		Solar				12,563	
	NOT PUBLIC DATA ENDS]						
M1157	Blue Lake Wastewater Treatment (WWTP)Solar Project - Blue Lake Wastewater Treatn	Solar				641	
M1170	CHS Field - CHS Field Solar Arrays	Solar				35	
M1202	Court International LLC - Court International LLC	Solar				182	
M630	FreEner-g-2010-01 - FreEner-g-2010-01	Solar				68	
M1005	Hutchinson Wastewater Treatment Facility - Hutchinson WWTF Solar	Solar				180	
M1065	Marshall Solar Energy - Marshall Solar Energy	Solar				89,172	
M655	MCC - Solar	Solar				285	
M730	Merrick Solar - Merrick Solar	Solar				43	
M1036	Minneapolis /St. Paul International Airport - T1 Blue Ramp Solar	Solar				8	
M738	MNRDF_DNR - MNRDF_DNR	Solar				49	
M1064	North Star Solar PV - North Star Solar PV	Solar				135,240	
M1072	Parade Ice Garden - Parade Ice Garden	Solar				46	
M962	School Sisters of Notre Dame Solar Park - School Sisters of Notre Dame Solar Park	Solar				486	
M796	Slayton Solar - Slayton Solar LLC	Solar				849	
M559	St. John's Solar Farm - St. John's Solar Farm	Solar				259	
M1071	Target Midway Store - Target Midway Solar	Solar				198	
M1195	UEL Real Estate Holdings - UEL Real Estate Holdings LLC	Solar				92	
M1347	UNIVERSITY CENTRE AT 1919 LLP - UNIVERSITY CENTRE	Solar				141	
[NOT PUBLIC DATA BEGINS							
		Biogas	4,362				
		Hydroelectric Water	13,483				
		Hydroelectric Water	37,092				
		Hydroelectric Water	35,100				
		Hydroelectric Water	5,104				
		Hydroelectric Water	4,679				
		Hydroelectric Water	16,221				
		Hydroelectric Water	14,484				
		Hydroelectric Water	11,173				
		Hydroelectric Water	10,470				
		Hydroelectric Water	80,883				
		Hydroelectric Water	40,366				
		Hydroelectric Water	984				
		Hydroelectric Water	31,338				
		Hydroelectric Water	30,716				
		Hydroelectric Water	31,144				
		Hydroelectric Water	58,746				
		Hydroelectric Water	2,747				
		Hydroelectric Water	61,963				
		Hydroelectric Water	11,048				
		Hydroelectric Water	24,541				
		Hydroelectric Water	2,280				
		Hydroelectric Water	6,593				
		Hydroelectric Water	48,752				
		Hydroelectric Water	93,154				
		Hydroelectric Water	7,543				
		Hydroelectric Water	3,542				
		Hydroelectric Water	7,807				
		Hydroelectric Water	769				
		Hydroelectric Water	4,362				
		Hydroelectric Water	61,591				
		Hydroelectric Water	66,960				
	NOT PUBLIC DATA ENDS]						
M1621	330th Street West Solar Project 1	Solar	1,930				
M1622	330th Street West Solar Project 2	Solar	2,004				
M1623	330th Street West Solar Project 3	Solar	2,001				
M1624	330th Street West Solar Project 4	Solar	2,034				
M1625	330th Street West Solar Project 5	Solar	1,880				
M1359	Andromeda CSG1, LLC	Solar	2,031				
M1360	Andromeda CSG2, LLC	Solar	2,118				
M1361	Andromeda CSG3, LLC	Solar	2,165				
M1362	Andromeda CSG4, LLC	Solar	2,618				
M1363	Andromeda CSG5, LLC	Solar	2,043				
M1831	Antares CSG1, LLC	Solar	1,275				
M1832	Antares CSG2, LLC	Solar	1,260				
M1833	Antares CSG3, LLC	Solar	1,425				
M1299	Antila CSG1, LLC - Antila CSG1, LLC	Solar	2,319				
M1300	Antila CSG2, LLC - Antila CSG2, LLC	Solar	2,148				
M1880	Argo Navis CSG 3	Solar	950				
M1636	Argo Navis CSG1, LLC	Solar	1,146				
M1663	Argo Navis CSG2, LLC	Solar	1,266				
M1301	Aries CSG1, LLC - Aries CSG1, LLC	Solar	2,058				
M1302	Aries CSG2, LLC - Aries CSG2, LLC	Solar	2,041				
M1303	Aries CSG3, LLC - Aries CSG3, LLC	Solar	1,791				
M1304	Aries CSG4, LLC - Aries CSG4, LLC	Solar	1,937				
M1637	Armstrong Unit 1	Solar	1,647				
M1638	Armstrong Unit 2	Solar	1,539				
M1639	Armstrong Unit 3	Solar	1,653				
M1412	Aspen01	Solar	2,261				
M1413	Aspen02	Solar	2,064				
M1414	Aspen03	Solar	2,290				
M1415	Aspen04	Solar	2,247				
M1416	Aspen05	Solar	2,228				
[NOT PUBLIC DATA BEGINS							
		Solar	12,272				
		Solar	6,128				

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
		Solar	4,112				
		Solar	5,788				
		Solar	6,592				
		Solar	5,406				
		Solar	5,453				
		Solar	4,510				
		Solar	7,331				
		Solar	3,018				
		Solar	3,402				
		Solar	10,272				
		Solar	4,310				
		Solar	10,464				
		Solar	4,641				
		Solar	8,214				
	NOT PUBLIC DATA ENDS]						
M1339	B.R. Corcoran - Hennepin Kaat 1 - MINNESOTA SOLAR CSG 19, LLC	Solar	2,063				
M1340	B.R. Corcoran - Hennepin Kaat 2 - MINNESOTA SOLAR CSG 19, LLC	Solar	1,956				
M1341	B.R. Corcoran - Hennepin Kaat 3 - MINNESOTA SOLAR CSG 19, LLC	Solar	1,879				
M1342	B.R. Corcoran - Hennepin Kaat 4 - MINNESOTA SOLAR CSG 19, LLC	Solar	1,970				
M1343	B.R. Corcoran - Hennepin Kaat 5 - MINNESOTA SOLAR CSG 19, LLC	Solar	1,992				
M1616	Bartlett Unit 1	Solar	1,812				
M1617	Bartlett Unit 2	Solar	1,882				
M1618	Bartlett Unit 3	Solar	1,849				
M1619	Bartlett Unit 4	Solar	1,885				
M1620	Bartlett Unit 5	Solar	1,838				
M1905	Betcher CSG LLC	Solar	908				
[NOT PUBLIC DATA BEGINS							
		Solar	22				
	NOT PUBLIC DATA ENDS]						
M1321	Big Lake Holdco LLC #1 - Big Lake Holdco LLC #1	Solar	2,193				
M1322	Big Lake Holdco LLC #2 - Big Lake Holdco LLC #2	Solar	2,199				
M1323	Big Lake Holdco LLC #3 - Big Lake Holdco LLC #3	Solar	2,142				
M1324	Big Lake Holdco LLC #4 - Big Lake Holdco LLC #4	Solar	2,208				
M1325	Big Lake Holdco LLC #5 - Big Lake Holdco LLC #5	Solar	2,195				
M1761	Big Lake Solar Project 1	Solar	1,474				
M1769	Big Lake Solar Project 2	Solar	1,472				
M1770	Big Lake Solar Project 3	Solar	1,484				
M1772	Big Lake Solar Project 4	Solar	1,484				
M1773	Big Lake Solar Project 5	Solar	1,423				
M1100	Blue Lake 1 - Blue Lake 1	Solar	1,697				
M1101	Blue Lake 2 - Blue Lake 2	Solar	1,858				
M1102	Blue Lake 3 - Blue Lake 3	Solar	1,849				
[NOT PUBLIC DATA BEGINS							
		Solar	948				
	NOT PUBLIC DATA ENDS]						
M1598	Brase Unit 1	Solar	1,827				
M1599	Brase Unit 2	Solar	1,875				
M1600	Brase Unit 3	Solar	1,625				
M1601	Brase Unit 4	Solar	754				
M1053	Buhl Family CSG - Buhl Family CSG	Solar	380				
M1896	Butterfield CSG LLC	Solar	268				
M1290	Caelum CSG1, LLC - Caelum CSG1, LLC	Solar	1,968				
M1291	Caelum CSG2, LLC - Caelum CSG2, LLC	Solar	2,150				
M1369	Capella CSG1, LLC	Solar	1,904				
M1370	Capella CSG2, LLC	Solar	1,546				
M1371	Capella CSG3, LLC	Solar	1,409				
M1372	Capella CSG4, LLC	Solar	1,340				
M1373	Capella CSG5, LLC	Solar	1,323				
M1555	Carina CSG1, LLC	Solar	2,059				
M1556	Carina CSG2, LLC	Solar	1,874				
M1557	Carina CSG3, LLC	Solar	1,504				
M1558	Carina CSG4, LLC	Solar	1,823				
M1602	Carver Gladden Unit 1	Solar	1,707				
M1603	Carver Gladden Unit 2	Solar	1,703				
M1604	Carver Gladden Unit 3	Solar	1,733				
M1881	CEF Edina Community Solar, LLC	Solar	247				
M1838	CEF Shiloh Community Solar, LLC	Solar	164				
M1292	Centaurus CSG1, LLC - Centaurus CSG1, LLC	Solar	2,084				
M1293	Centaurus CSG2, LLC - Centaurus CSG2, LLC	Solar	1,927				
M1549	CF GM NES of Porter Way CSG A	Solar	1,951				
M1550	CF GM NES of Porter Way CSG B	Solar	1,955				
M1551	CF GM NES of Porter Way CSG C	Solar	1,911				
M1103	Chisago Community Solar 1, LLC - Chisago Community Solar 1	Solar	1,759				
M1104	Chisago Community Solar 2, LLC - Chisago Community Solar 2	Solar	1,782				
M1105	Chisago Community Solar 3, LLC - Chisago Community Solar 3	Solar	1,807				
M1106	Chisago Community Solar 4, LLC - Chisago Community Solar 4	Solar	1,796				
[NOT PUBLIC DATA BEGINS							
		Solar	61				
	NOT PUBLIC DATA ENDS]						
M1890	Clara City CSG 1, LLC	Solar	739				
M1781	Corvus CSG1, LLC	Solar	472				
M1780	Corvus CSG2, LLC	Solar	459				
M1779	Corvus CSG3, LLC	Solar	506				
M1778	Corvus CSG4, LLC	Solar	468				
M1777	Corvus CSG5, LLC	Solar	409				
M1640	Cottage Grove PV1	Solar	1,357				
M1641	Cottage Grove PV2	Solar	1,390				
M1642	Cottage Grove PV3	Solar	1,381				
M1643	Cottage Grove PV4	Solar	1,352				
M1644	Cottage Grove PV5	Solar	1,352				
[NOT PUBLIC DATA BEGINS							
		Solar	260				
	NOT PUBLIC DATA ENDS]						
M1374	Crater CSG1, LLC	Solar	2,161				

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
M1375	Crater CSG2, LLC	Solar	2,097				
M1376	Crater CSG3, LLC	Solar	2,061				
M1628	Delphinus CSG1, LLC	Solar	1,701				
M1629	Delphinus CSG2, LLC	Solar	1,819				
M1875	DG Minnesota CSG 1, LLC	Solar	877				
M1876	DG Minnesota CSG 1, LLC	Solar	841				
M1877	DG Minnesota CSG 1, LLC	Solar	865				
M1878	DG Minnesota CSG 1, LLC	Solar	888				
M1879	DG Minnesota CSG 1, LLC	Solar	910				
M1822	DG Minnesota CSG, LLC	Solar	604				
M1823	DG Minnesota CSG, LLC	Solar	585				
M1824	DG Minnesota CSG, LLC	Solar	503				
M1825	DG Minnesota CSG, LLC	Solar	598				
M1826	DG Minnesota CSG, LLC	Solar	588				
M1817	DG Minnesota CSG, LLC	Solar	437				
M1818	DG Minnesota CSG, LLC	Solar	417				
M1819	DG Minnesota CSG, LLC	Solar	478				
M1820	DG Minnesota CSG, LLC	Solar	479				
M1821	DG Minnesota CSG, LLC	Solar	518				
M1873	DG Minnesota CSG, LLC	Solar	504				
M1874	DG Minnesota CSG, LLC	Solar	354				
M1230	Dodge Holdco LLC #1 - Dodge Holdco LLC #1	Solar	1,780				
M1231	Dodge Holdco LLC #2 - Dodge Holdco LLC #2	Solar	1,798				
M1232	Dodge Holdco LLC #3 - Dodge Holdco LLC #3	Solar	1,709				
M1233	Dodge Holdco LLC #4 - Dodge Holdco LLC #4	Solar	1,793				
M1234	Dodge Holdco LLC #5 - Dodge Holdco LLC #5	Solar	1,850				
M1417	DodgeSun CSG 1	Solar	2,413				
M1418	DodgeSun CSG 2	Solar	2,431				
M1419	DodgeSun CSG 3	Solar	2,448				
M1420	DodgeSun CSG 4	Solar	2,445				
M1421	DodgeSun CSG 5	Solar	2,440				
M1676	DragonFly Solar	Solar	195				
M1590	Dundas Solar Farm 1	Solar	1,875				
M1591	Dundas Solar Farm 2	Solar	1,893				
M1592	Dundas Solar Farm 3	Solar	1,975				
M1593	Dundas Solar Farm 4	Solar	1,882				
M1594	Dundas Solar Farm 5	Solar	1,963				
M1107	Eichtens - Eichtens 039467	Solar	1,736				
M1108	Eichtens - Eichtens 040717	Solar	1,741				
M1109	Eichtens - Eichtens 040718	Solar	1,734				
M1110	Eichtens - Eichtens 040841	Solar	1,758				
M1111	Empire 1 - Empire 1	Solar	1,901				
M1112	Empire 2 - Empire 2	Solar	2,010				
M1113	Empire 3 - Empire 3	Solar	2,130				
M1114	Empire 4 - Empire 4	Solar	2,016				
M1115	Empire 5 - Empire 5	Solar	1,983				
M1312	Equuleus Community Solar Gardens #1 - Equuleus Community Solar Gardens #1	Solar	2,385				
M1313	Equuleus Community Solar Gardens #2 - Equuleus Community Solar Gardens #2	Solar	2,409				
M1314	Equuleus Community Solar Gardens #3 - Equuleus Community Solar Gardens #3	Solar	2,081				
M1315	Equuleus Community Solar Gardens #4 - Equuleus Community Solar Gardens #4	Solar	2,409				
M1316	Equuleus Community Solar Gardens #5 - Equuleus Community Solar Gardens #5	Solar	2,188				
M1235	Farmington Holdco, LLC #1 - Farmington Holdco, LLC #1	Solar	1,814				
M1236	Farmington Holdco, LLC #2 - Farmington Holdco, LLC #2	Solar	1,855				
M1237	Farmington Holdco, LLC #3 - Farmington Holdco, LLC #3	Solar	1,890				
M1238	Farmington Holdco, LLC #4 - Farmington Holdco, LLC #4	Solar	1,850				
M1239	Farmington Holdco, LLC #5 - Farmington Holdco, LLC #5	Solar	1,862				
M1809	Foreman's Hill CSG LLC	Solar	1,074				
M1810	Foreman's Hill CSG LLC	Solar	1,086				
M1811	Foreman's Hill CSG LLC	Solar	1,112				
M1812	Foreman's Hill CSG LLC	Solar	1,113				
M1813	Foreman's Hill CSG LLC	Solar	1,099				
M1240	Forest Lake Holdco #1 - Forest Lake Holdco #1	Solar	2,031				
M1241	Forest Lake Holdco #2 - Forest Lake Holdco #2	Solar	2,064				
M1242	Forest Lake Holdco #3 - Forest Lake Holdco #3	Solar	1,676				
M1243	Forest Lake Holdco #4 - Forest Lake Holdco #4	Solar	1,750				
M1244	Forest Lake Holdco #5 - Forest Lake Holdco #5	Solar	1,708				
M1868	Fox CSG 1, LLC	Solar	816				
M1869	Fox CSG 1, LLC	Solar	816				
M1870	Fox CSG 1, LLC	Solar	813				
M1871	Fox CSG 1, LLC	Solar	811				
M1872	Fox CSG 1, LLC	Solar	800				
M630	FreEner-g-2010-01 - FreEner-g-2010-01	Solar	125				
M1294	Gemini CSG1, LLC - Gemini CSG1, LLC	Solar	2,072				
M1295	Gemini CSG2, LLC - Gemini CSG2, LLC	Solar	2,267				
M1296	Gemini CSG3, LLC - Gemini CSG3, LLC	Solar	2,307				
M1422	Gopher 1	Solar	2,002				
M1423	Gopher 2	Solar	2,056				
M1424	Gopher 3	Solar	1,979				
M1425	Gopher 4	Solar	1,791				
M1426	Gopher 5	Solar	2,050				
M1907	Greenway Solar, LLC	Solar	191				
M1658	Grimm 049571	Solar	1,654				
M1386	Hauer Unit 1	Solar	1,983				
M1387	Hauer Unit 2	Solar	2,153				
M1388	Hauer Unit 3	Solar	1,835				
M1389	Hauer Unit 4	Solar	2,126				
M1390	Hauer Unit 5	Solar	1,555				
M1904	Heyer CSG LLC	Solar	1,309				
M1427	Hickory01	Solar	2,252				
M1428	Hickory02	Solar	2,306				
M1429	Hickory03	Solar	2,291				
M1430	Hickory05	Solar	2,275				
M1431	Hickory06	Solar	2,317				
M1659	Huneke I 049242	Solar	1,576				

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
[NOT PUBLIC DATA BEGINS							
		Solar	212				
	NOT PUBLIC DATA ENDS]						
M1245	Hwy 14 Holdco LLC #1 - Hwy 14 Holdco LLC #1	Solar	2,084				
M1246	Hwy 14 Holdco LLC #2 - Hwy 14 Holdco LLC #2	Solar	2,156				
M1247	Hwy 14 Holdco LLC #3 - Hwy 14 Holdco LLC #3	Solar	2,257				
M1248	Hwy 14 Holdco LLC #4 - Hwy 14 Holdco LLC #4	Solar	2,143				
M1249	Hwy 14 Holdco LLC #5 - Hwy 14 Holdco LLC #5	Solar	2,266				
M1326	IMS #1 - IMS #1	Solar	1,959				
M1327	IMS #2 - IMS #2	Solar	2,009				
M1328	IMS #3 - IMS #3	Solar	2,045				
M1329	IMS #4 - IMS #4	Solar	1,963				
M1330	IMS #5 - IMS #5	Solar	2,083				
M1559	Johnson CSG 1	Solar	2,263				
M1560	Johnson CSG 2	Solar	2,316				
M1561	Johnson CSG 3	Solar	2,286				
M1562	Johnson CSG 4	Solar	2,305				
M1563	Johnson CSG 5	Solar	1,615				
M1886	Johnson I CSG LLC	Solar	956				
M1887	Johnson II CSG LLC	Solar	702				
M1432	Kramer CSG 1	Solar	2,470				
M1433	Kramer CSG 2	Solar	2,473				
M1434	Kramer CSG 3	Solar	2,435				
M1660	Krause 049570	Solar	1,735				
M1840	Kreye01 CSG A	Solar	237				
M1841	Kreye01 CSG B	Solar	244				
M1843	Kreye01 CSG D	Solar	245				
M1844	Kreye02 CSG A	Solar	243				
M1845	Kreye02 CSG B	Solar	241				
M1846	Kreye02 CSG C	Solar	232				
M1847	Kreye02 CSG D	Solar	221				
M1842	Kreyer01 CSG C	Solar	247				
M1435	Lahr 1	Solar	1,872				
M1436	Lahr 2	Solar	2,193				
M1437	Lahr 3	Solar	2,194				
M1438	Lahr 4	Solar	2,179				
M1439	Lahr 5	Solar	2,018				
M1116	Lake Calhoun 17 - Lake Calhoun 17	Solar	2,038				
M1117	Lake Calhoun 18 - Lake Calhoun 18	Solar	2,037				
M1118	Lake Calhoun 19 - Lake Calhoun 19	Solar	2,012				
M1119	Lake Calhoun 20 - Lake Calhoun 20	Solar	2,034				
M1120	Lake Calhoun 21 - Lake Calhoun 21	Solar	2,024				
M1121	Lake Calhoun 27 - Lake Calhoun 27	Solar	2,012				
M1122	Lake Calhoun 28 - Lake Calhoun 28	Solar	2,035				
M1123	Lake Calhoun 29 - Lake Calhoun 29	Solar	2,000				
M1766	Lake Calhoun 43 LLC	Solar	865				
M1765	Lake Calhoun 44 LLC	Solar	816				
M1764	Lake Calhoun 45 LLC	Solar	858				
M1763	Lake Calhoun 47 LLC	Solar	882				
M1762	Lake Calhoun 49 LLC	Solar	807				
M1582	Lake Waconia Solar Garden	Solar	1,866				
M1583	Lake Waconia Solar IV Garden	Solar	1,866				
M1440	Lenzen Unit 1	Solar	1,851				
M1441	Lenzen Unit 2	Solar	1,907				
M1442	Lenzen Unit 3	Solar	1,770				
M1443	Lenzen Unit 4	Solar	752				
M1444	Lenzen Unit 5	Solar	1,847				
M1782	LeSun, LLC	Solar	528				
M1783	LeSun, LLC	Solar	517				
M1784	LeSun, LLC	Solar	544				
M1785	LeSun, LLC	Solar	480				
M1786	LeSun, LLC	Solar	566				
M1900	Libra Community Solar Garden, LLC	Solar	672				
M1188	Lind 1 - Lind SRC 041230	Solar	1,814				
M1189	Lind 2 - Lind SRC 041231	Solar	2,039				
M1190	Lind 3 - Lind SRC 041232	Solar	2,034				
M1191	Lind 4 - Lind SRC 041233	Solar	1,884				
M1192	Lind 5 - Lind SRC 041234	Solar	1,892				
M1650	Lindstrom CSG 1, LLC	Solar	1,864				
M1651	Lindstrom CSG 2, LLC	Solar	1,853				
M1652	Lindstrom CSG 3, LLC	Solar	1,857				
M1552	Lyra CSG1, LLC	Solar	1,918				
M1553	Lyra CSG2, LLC	Solar	1,786				
M1554	Lyra CSG3, LLC	Solar	1,812				
M1198	Mapleton CSG1 - Mapleton CSG1, LLC	Solar	2,032				
M1199	Mapleton CSG2 - Mapleton CSG2, LLC	Solar	1,947				
M1200	Mapleton CSG3 - Mapleton CSG3, LLC	Solar	1,794				
M1827	Mapleton Solar LLC	Solar	938				
M1828	Mapleton Solar LLC	Solar	901				
M1829	Mapleton Solar LLC	Solar	949				
M1830	Mapleton Solar LLC	Solar	468				
M1646	Marmas CSG 1	Solar	1,513				
M1647	Marmas CSG 2	Solar	1,560				
M1648	Marmas CSG 3	Solar	1,582				
M1649	Marmas CSG 4	Solar	1,553				
[NOT PUBLIC DATA BEGINS							
		Solar	73,417				
	NOT PUBLIC DATA ENDS]						
M655	MCC - Solar	Solar	389				
M1584	McHattie Unit 1	Solar	1,947				
M1585	McHattie Unit 2	Solar	1,999				
M1586	McHattie Unit 3	Solar	2,027				
M1587	McHattie Unit 4	Solar	1,992				
M1445	Menke Unit 1	Solar	2,069				

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
M1446	Menke Unit 2	Solar	2,259				
M1447	Menke Unit 3	Solar	2,319				
M730	Merrick Solar - Merrick Solar	Solar	66				
M1396	Michael 1	Solar	2,329				
M1397	Michael 2	Solar	2,341				
M1398	Michael 3	Solar	2,342				
M1399	Michael 4	Solar	2,276				
[NOT PUBLIC DATA BEGINS							
		Solar	3				
	NOT PUBLIC DATA ENDS]						
M1834	Minnesota Solar CSG 1, LLC	Solar	203				
M1835	Minnesota Solar CSG 1, LLC	Solar	647				
M1836	Minnesota Solar CSG 1, LLC	Solar	660				
M1837	Minnesota Solar CSG 1, LLC	Solar	630				
M1383	MINNESOTA SOLAR CSG 21, LLC	Solar	1,493				
M1384	MINNESOTA SOLAR CSG 21, LLC	Solar	1,566				
M1385	MINNESOTA SOLAR CSG 21, LLC	Solar	1,618				
M1364	MINNESOTA SOLAR CSG 9, LLC	Solar	2,004				
M1365	MINNESOTA SOLAR CSG 9, LLC	Solar	1,959				
M1366	MINNESOTA SOLAR CSG 9, LLC	Solar	2,015				
M1367	MINNESOTA SOLAR CSG 9, LLC	Solar	2,012				
M1368	MINNESOTA SOLAR CSG 9, LLC	Solar	2,019				
M1588	MN Lake Unit 1	Solar	1,800				
M1589	MN Lake Unit 2	Solar	1,543				
M1790	MN Solar Community, LLC	Solar	711				
M1791	MN Solar Community, LLC	Solar	692				
M1792	MN Solar Community, LLC	Solar	967				
M1793	MN Solar Community, LLC	Solar	824				
M1794	MN Solar Community, LLC	Solar	797				
M738	MNRDF_DNR - MNRDF_DNR	Solar	76				
M1344	Montgomery W - Highlander 1 - MINNESOTA SOLAR CSG 4, LLC	Solar	1,959				
M1345	Montgomery W - Highlander 2 - MINNESOTA SOLAR CSG 4, LLC	Solar	2,004				
M1346	Montgomery W - Highlander 3 - MINNESOTA SOLAR CSG 4, LLC	Solar	2,010				
M1250	Morgan CSG1, LLC - Morgan CSG1, LLC	Solar	2,289				
M1251	Morgan CSG2, LLC - Morgan CSG2, LLC	Solar	2,288				
M1252	Morgan CSG3, LLC - Morgan CSG3, LLC	Solar	2,139				
M1797	MSC Carver01, LLC	Solar	228				
M1798	MSC Carver01, LLC	Solar	197				
M1799	MSC Carver01, LLC	Solar	241				
M1800	MSC Carver01, LLC	Solar	241				
M1801	MSC Carver02, LLC	Solar	240				
M1802	MSC Carver02, LLC	Solar	237				
M1803	MSC Carver02, LLC	Solar	241				
M1804	MSC Carver02, LLC	Solar	227				
M1849	MSC-Wash01, LLC	Solar	235				
M1848	MSC-Wash02, LLC	Solar	237				
M1850	MSC-Wash03, LLC	Solar	238				
M1851	MSC-Wash04, LLC	Solar	223				
M1852	MSC-Wash05, LLC	Solar	213				
M1853	MSC-Wash06, LLC	Solar	217				
M1854	MSC-Wash07, LLC	Solar	213				
M1855	MSC-Wash08, LLC	Solar	187				
M1856	MSC-Wash09, LLC	Solar	203				
M1857	MSC-Wash10, LLC	Solar	212				
M1858	MSC-Wash11, LLC	Solar	209				
M1859	MSC-Wash12, LLC	Solar	213				
M1860	MSC-Wash13, LLC	Solar	213				
M1861	MSC-Wash14, LLC	Solar	210				
M1862	MSC-Wash15, LLC	Solar	214				
M1863	MSC-Wash16, LLC	Solar	217				
M1864	MSC-Wash17, LLC	Solar	215				
M1865	MSC-Wash18, LLC	Solar	217				
M1866	MSC-Wash19, LLC	Solar	215				
M1867	MSC-Wash20, LLC	Solar	211				
M1317	NES - CF of Tyler CSG A - NES - CF of Tyler CSG A	Solar	424				
M1448	Nesvold 1 - 1	Solar	2,225				
M1449	Nesvold 1 - 2	Solar	2,076				
M1450	Nesvold 1 - 3	Solar	1,833				
M1451	Nesvold 1 - 4	Solar	2,033				
M1452	Nesvold 1 - 5	Solar	2,131				
M1610	New Germany Solar Garden	Solar	2,091				
[NOT PUBLIC DATA BEGINS							
		Solar	100,341				
	NOT PUBLIC DATA ENDS]						
M1124	Northfield CSG1 - Northfield CSG1	Solar	2,034				
M1125	Northfield CSG2 - Northfield CSG2	Solar	1,954				
M1126	Northfield CSG3 - Northfield CSG3	Solar	1,913				
M1127	Northfield CSG4 - Northfield CSG4	Solar	2,125				
M1128	Northfield CSG5 - Northfield CSG5	Solar	2,085				
M1453	Northfield Holdco LLC Unit 1	Solar	2,327				
M1454	Northfield Holdco LLC Unit 2	Solar	2,252				
M1455	Northfield Holdco LLC Unit 3	Solar	2,290				
M1456	Northfield Holdco LLC Unit 4	Solar	2,398				
M1457	Northfield Holdco LLC Unit 5	Solar	2,228				
M1052	Novel CSG of Faircon - Novel CSG of Faircon	Solar	144				
M1257	Novel CSG of Twin Pine Farm - Novel CSG of Twin Pine Farm	Solar	61				
M1548	Novel CSG of Vetter Farms B	Solar	50				
M1265	Novel CSG of Winona A - Novel CSG of Winona A	Solar	499				
M1891	Novel Solar Eight LLC	Solar	136				
M1897	Novel Solar Eight LLC	Solar	119				
M1898	Novel Solar Eight LLC	Solar	169				
M1635	Nystuen	Solar	1,385				
M1899	Oak Leaf Solar XI LLC	Solar	511				
M2031	OE WI Solar 2 (Ore Dock)	Solar	29				

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Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
M1129	Orion CSG1 - Orion CSG1	Solar	1,910				
M1130	Orion CSG2 - Orion CSG2	Solar	1,733				
M1131	Orion CSG3 - Orion CSG3	Solar	1,838				
M1759	Osakis Solar LLC	Solar	953				
M1805	Osakis Solar LLC	Solar	1,015				
M1814	Osakis Solar LLC	Solar	1,008				
M1815	Osakis Solar LLC	Solar	1,020				
M1816	Osakis Solar LLC	Solar	1,046				
[NOT PUBLIC DATA BEGINS							
		Solar	42				
	NOT PUBLIC DATA ENDS]						
M1133	Paynesville CSG 2 - Paynesville CSG 2	Solar	2,199				
M1134	Paynesville CSG 3 - Paynesville CSG 3	Solar	1,961				
M1135	Paynesville CSG 4 - Paynesville CSG 4	Solar	1,749				
M1136	Paynesville CSG 5 - Paynesville CSG 5	Solar	2,158				
M1132	Paynesville CSG1 - Paynesville CSG1	Solar	2,123				
M1297	Pegasus CSG1, LLC - Pegasus CSG1, LLC	Solar	2,276				
M1298	Pegasus CSG2, LLC - Pegasus CSG2, LLC	Solar	2,396				
M1253	Pine Island Holdco, LLC #1 - Pine Island Holdco, LLC #1	Solar	1,896				
M1254	Pine Island Holdco, LLC #2 - Pine Island Holdco, LLC #2	Solar	1,876				
M1255	Pine Island Holdco, LLC #3 - Pine Island Holdco, LLC #3	Solar	1,887				
M1256	Pine Island Holdco, LLC #4 - Pine Island Holdco, LLC #4	Solar	2,102				
M1377	Pollux CSG1, LLC	Solar	1,400				
M1888	Prinsburg CSG 1, LLC	Solar	696				
M1137	Red Wing SD - Red Wing SD 42423	Solar	1,769				
M1138	Red Wing SD - Red Wing SD 42425	Solar	1,803				
M1139	Red Wing SD - Red Wing SD 42426	Solar	1,829				
M1140	Red Wing SD - Red Wing SD 42427	Solar	1,816				
M1141	Red Wing SD - Red Wing SD 42428	Solar	1,843				
M1400	Richmond 1	Solar	2,179				
M1401	Richmond 2	Solar	2,227				
M1402	Richmond 3	Solar	2,209				
M1403	Richmond 4	Solar	2,182				
M1404	Richmond 5	Solar	2,181				
M1889	RJC I CSG LLC	Solar	1,220				
M1894	RJC II CSG LLC	Solar	1,473				
M1142	Rosemount CSG1 - Rosemount CSG1	Solar	2,056				
M1143	Rosemount CSG2 - Rosemount CSG2	Solar	2,008				
M1144	Rosemount CSG3 - Rosemount CSG3	Solar	2,053				
M1145	Rosemount CSG4 - Rosemount CSG4	Solar	2,059				
M1146	Rosemount CSG5 - Rosemount CSG5	Solar	2,018				
M1806	Scandia CSG LLC	Solar	476				
M1807	Scandia CSG LLC	Solar	1,035				
M1808	Scandia CSG LLC	Solar	1,038				
M1458	Scandia Trail Unit 1	Solar	2,401				
M1459	Scandia Trail Unit 2	Solar	2,417				
M1460	Scandia Trail Unit 3	Solar	2,345				
M1461	Scandia Trail Unit 4	Solar	2,336				
M1462	Scandia Trail Unit 5	Solar	2,358				
M1662	School Sisters 051877	Solar	1,403				
[NOT PUBLIC DATA BEGINS							
		Solar	594				
	NOT PUBLIC DATA ENDS]						
M1614	Sherburne Community Solar Garden 1	Solar	1,640				
M1615	Sherburne Community Solar Garden 2	Solar	1,668				
M1613	Sherburne Community Solar Garden 3	Solar	1,684				
M1612	Sherburne Community Solar Garden 4	Solar	1,676				
M1611	Sherburne Community Solar Garden 5	Solar	1,668				
M796	Slayton Solar - Slayton Solar LLC	Solar	1,778				
M1630	South Street West Solar Project 1	Solar	1,697				
M1631	South Street West Solar Project 2	Solar	1,717				
M1632	South Street West Solar Project 3	Solar	1,645				
M1633	South Street West Solar Project 4	Solar	1,696				
M1634	South Street West Solar Project 5	Solar	1,646				
M1305	Spica CSG1, LLC - Spica CSG1, LLC	Solar	2,013				
M1306	Spica CSG2, LLC - Spica CSG2, LLC	Solar	2,255				
M559	St. John's Solar Farm - St. John's Solar Farm	Solar	420				
M1768	SunE Feely 1, LLC	Solar	989				
M1771	SunE Feely 1, LLC	Solar	988				
M1774	SunE Feely 1, LLC	Solar	981				
M1775	SunE Feely 1, LLC	Solar	925				
M1776	SunE Feely 1, LLC	Solar	954				
M1391	SunE Koppelman 1, LLC	Solar	2,366				
M1392	SunE Koppelman 2, LLC	Solar	2,390				
M1393	SunE Koppelman 3, LLC	Solar	2,372				
M1394	SunE Koppelman 4, LLC	Solar	2,232				
M1395	SunE Koppelman 5, LLC	Solar	2,326				
M1378	SunE Rengstorf 1, LLC	Solar	2,204				
M1379	SunE Rengstorf 2, LLC	Solar	2,184				
M1380	SunE Rengstorf 3, LLC	Solar	2,238				
M1381	SunE Rengstorf 4, LLC	Solar	2,185				
M1382	SunE Rengstorf 5, LLC	Solar	2,225				
M1653	SunE St. Cloud 1, LLC Unit 1	Solar	1,548				
M1654	SunE St. Cloud 1, LLC Unit 2	Solar	1,523				
M1655	SunE St. Cloud 1, LLC Unit 3	Solar	1,564				
M1656	SunE St. Cloud 1, LLC Unit 4	Solar	1,561				
M1657	SunE St. Cloud 1, LLC Unit 5	Solar	1,545				
M1595	SunE Stolee PV1	Solar	1,827				
M1596	SunE Stolee PV2	Solar	1,855				
M1597	SunE Stolee PV3	Solar	1,901				
M1147	Sunrise CSG 1 - Sunrise CSG 1	Solar	2,230				
M1148	Sunrise CSG 2 - Sunrise CSG 2	Solar	2,067				
M1149	Sunrise CSG 3 - Sunrise CSG 3	Solar	2,000				
M1150	Sunrise CSG 4 - Sunrise CSG 4	Solar	2,022				

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Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
M1151	Sunrise CSG 5 - Sunrise CSG 5	Solar	2,020				
[NOT PUBLIC DATA BEGINS							
		Solar	296				
	NOT PUBLIC DATA ENDS]						
M1795	Taurus CSG 1, LLC	Solar	894				
M1796	Taurus CSG 2, LLC	Solar	652				
M1626	Taurus CSG3, LLC	Solar	1,240				
M1627	Taurus CSG4, LLC	Solar	1,205				
M1463	Taylors Falls 1	Solar	1,879				
M1464	Taylors Falls 2	Solar	1,714				
M1465	Taylors Falls 3	Solar	1,928				
M1466	Taylors Falls 4	Solar	1,903				
M1467	Taylors Falls 5	Solar	1,873				
M1569	TJ Farms Unit 1	Solar	1,409				
M1570	TJ Farms Unit 2	Solar	1,343				
M1571	TJ Farms Unit 3	Solar	1,422				
M1572	TJ Farms Unit 4	Solar	309				
[NOT PUBLIC DATA BEGINS							
		Solar	232				
	NOT PUBLIC DATA ENDS]						
M1347	UNIVERSITY CENTRE AT 1919 LLP - UNIVERSITY CENTRE	Solar	802				
M1152	Ursa CSG1 - Ursa CSG1	Solar	1,842				
M1153	Ursa CSG2 - Ursa CSG2	Solar	2,032				
M1154	Ursa CSG3 - Ursa CSG3	Solar	2,032				
M1155	Ursa CSG4 - Ursa CSG4	Solar	2,053				
M1156	Ursa CSG5 - Ursa CSG5	Solar	1,883				
M1903	USS Big Lake 1 LLC	Solar	742				
M1901	USS Dubhe Solar LLC	Solar	709				
M1906	USS Good Solar LLC	Solar	706				
M1902	USS Kasch Solar LLC	Solar	798				
M1910	USS Nillie Corn Solar LLC	Solar	456				
M1908	USS Rockpoint Solar LLC	Solar	478				
M1909	USS Solar Dawn LLC	Solar	473				
M1307	Vega CSG1, LLC - Vega CSG1, LLC	Solar	2,352				
M1308	Vega CSG2, LLC - Vega CSG2, LLC	Solar	2,172				
M1309	Vega CSG3, LLC - Vega CSG3, LLC	Solar	2,303				
M1310	Vega CSG4, LLC - Vega CSG4, LLC	Solar	2,372				
M1311	Vega CSG5, LLC - Vega CSG5, LLC	Solar	2,370				
M1573	Veseli Solar Garden	Solar	2,019				
M1574	Vetter Estate Unit 1	Solar	1,324				
M1575	Vetter Estate Unit 2	Solar	1,696				
M1576	Vetter Estate Unit 3	Solar	1,576				
M1258	Wabasha Holdco LLC #1 - Wabasha Holdco LLC #1	Solar	1,792				
M1259	Wabasha Holdco LLC #2 - Wabasha Holdco LLC #2	Solar	1,786				
M1260	Wabasha Holdco LLC #3 - Wabasha Holdco LLC #3	Solar	1,765				
M1318	Walz #1 - Walz #1	Solar	555				
M1319	Walz #2 - Walz #2	Solar	2,191				
M1320	Walz #3 - Walz #3	Solar	2,132				
M1577	WasecaSun, LLC Unit 1	Solar	2,137				
M1578	WasecaSun, LLC Unit 2	Solar	2,084				
M1579	WasecaSun, LLC Unit 3	Solar	2,135				
M1580	WasecaSun, LLC Unit 4	Solar	2,148				
M1581	WasecaSun, LLC Unit 5	Solar	2,139				
M1468	Waterford Holdco LLC Unit 3	Solar	1,564				
M1469	Waterford Holdco LLC Unit 4	Solar	2,313				
M1470	Waterford Holdco LLC Unit 5	Solar	2,247				
M1564	Waterville Community Solar Farm 1	Solar	1,785				
M1565	Waterville Community Solar Farm 2	Solar	1,762				
M1566	Waterville Community Solar Farm 3	Solar	1,779				
M1567	Waterville Community Solar Farm 4	Solar	1,730				
M1568	Waterville Community Solar Farm 5	Solar	1,791				
M1661	Webster 049585	Solar	1,078				
M1261	Webster Holdco LLC #1 - Webster Holdco LLC #1	Solar	1,853				
M1262	Webster Holdco LLC #2 - Webster Holdco LLC #2	Solar	2,067				
M1267	Webster Holdco LLC #3 - Webster Holdco LLC #3	Solar	2,030				
M1263	Webster Holdco LLC #4 - Webster Holdco LLC #4	Solar	1,832				
M1264	Webster Holdco LLC #5 - Webster Holdco LLC #5	Solar	1,856				
M1839	WGL Solar Anderson, LLC	Solar	981				
M1882	WGL Solar Barone, LLC	Solar	716				
M1883	WGL Solar Bolduan, LLC	Solar	628				
M1895	WGL Solar Cornille, LLC	Solar	886				
M1892	WGL Solar Eichtens II, LLC	Solar	787				
M1760	WGL Solar Goodhue 1, LLC	Solar	1,088				
M1767	WGL Solar Goodhue 1, LLC	Solar	1,108				
M1893	WGL Solar Guse, LLC	Solar	753				
M1885	WGL Solar Huneke II, LLC	Solar	847				
M1787	WGL Solar Red Maple 1, LLC	Solar	1,258				
M1788	WGL Solar Red Maple 1, LLC	Solar	1,312				
M1789	WGL Solar Red Maple 1, LLC	Solar	1,292				
M1884	WGL Solar Winegar, LLC	Solar	709				
M1605	Wyoming 2 PV1	Solar	1,651				
M1606	Wyoming 2 PV2	Solar	1,677				
M1607	Wyoming 2 PV3	Solar	1,742				
M1608	Wyoming 2 PV4	Solar	1,150				
M1609	Wyoming 2 PV5	Solar	1,743				
M1645	Zumbro Solar Garden	Solar	1,733				
[NOT PUBLIC DATA BEGINS							
		Wind	55,426				
		Wind	3,914				
		Wind	115,058				
		Wind	5,210				
		Wind	265,176				
		Wind	4,025				
		Wind	87,227				

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Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
		Wind	98,106				
		Wind	43,396				
		Wind	41,305				
		Wind	429,775				
		Wind	604				
		Wind	48,196				
		Wind	22,175				
		Wind	58,808				
		Wind	186,116				
		Wind	107,584				
		Wind	5,051				
		Wind	16,619				
		Wind	308,347				
		Wind	28,696				
		Wind	299,356				
		Wind	55,089				
		Wind	3,378				
		Wind	183,932				
		Wind	3,372				
		Wind	2,844				
		Wind	4,604				
		Wind	125,889				
		Wind	205,402				
		Wind	55,745				
		Wind	534				
		Wind	201,068				
		Wind	194,058				
		Wind	168,540				
		Wind	40,645				
		Wind	366,149				
		Wind	433,528				
		Wind	39,728				
		Wind	31,192				
		Wind	33,943				
		Wind	610,441				
		Wind	2,513				
		Wind	20,957				
		Wind	793,305				
		Wind	481,714				
		Wind	77,414				
		Wind	4,818				
		Wind	57,861				
		Wind	5,002				
		Wind	5,184				
		Wind	8				
		Wind	24,896				
		Wind	14,965				
		Wind	11,544				
		Wind	26,854				
		Wind	27,637				
		Wind	18,076				
		Wind	3,451				
		Wind	3,176				
		Wind	35,770				
		Wind	2,093				
		Wind	49,220				
		Wind	60,515				

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Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

Minnesota Public Utilities Commission: Docket No. E999/PR-22-12 and Docket No. E999/M-22-85 — **Attachment 6**
Minnesota Department of Commerce: Docket No. E999/PR-02-1240 — Reporting Period: **January 1, 2021 - December 31, 2021**

Biennial Compliance reporting

Please report the following items in compliance with the PUC May 28, 2013 Order in Docket No. E999/M-12-958

RES Ordering Point

4.A. & 5.H. **The year through which the utility can maintain compliance with its current renewable portfolio***: Beyond 2040

*Include banked Renewable Energy Credits (RECs)

4.B. & 5.I. **Projected RES compliance for the current plus three (3) upcoming years.**

Year	Actual/Projected MN retail sales (MWh)	RES Req.(%)	RES Req. (MWh)	Projected Resources (MWh)	Projected Surplus/ (Deficit) (MWh)
	[NOT PUBLIC DATA BEGINS		[NOT PUBLIC DATA BEGINS		
2022		30%			
2023		30%			
2024		30%			
2025		30%			
	NOT PUBLIC DATA ENDS]				NOT PUBLIC DATA ENDS]

5.E.2 & 5.F. **Identify other State Renewable Standards or Objectives to which the utility is subject, and the percentage of renewable energy allocated to meet the renewable requirements.**

State	RES Req. (MWh)	RES Req. (%)	Percent of utility's total system renewable generation apportioned to this state (%)*
WI	858,032	12.89%	16.36%
MI	20,614	15%	0.34%
SD	214,473	10% Voluntary	5.33%
ND	0	Voluntary	5.29%

*apportionment of renewable energy should reflect each state's percentage of the utility's total system sales.

5.E.3 (i) **The status of the utility's renewable energy mix relative to the objective & standards.**

The Company's overall renewable energy mix exceeds the renewable portfolio standard (RPS) obligations for the state of Minnesota, and other states it operates in, and is sufficiently able to comply with these increasing requirements. The Company continues to increase its renewable energy mix, primarily in wind and solar, to take advantage of cost-effective resource additions and to decrease carbon emissions.

5.E.3(ii) **Efforts taken to meet the objective and standards**

In 2021, we added 650 MW of renewable generation capacity to our system and the Company continues to exceed our RES mandate for Minnesota. As approved in our most recent Upper Midwest Integrated Resource Plan, we will continue to add of renewable energy in the coming years.

5.E.3(iii) **Obstacles encountered or anticipated in meeting the objective or standards**

The annual Renewable Portfolio Standard (RPS) percentage rate and overall renewable requirement for Xcel Energy has significantly increased over the past several years. At the same time, the Company has been able to take advantage of cost-effective renewable resource additions to meet and exceed its compliance obligations.

5.E.3(iv) **Potential solutions to the obstacles**

The Company is currently positioned to meet and exceed our compliance obligations.

5.G. **List any renewable generation facilities expected to become operational during the upcoming year**

Facility Name	Type	Capacity (MW)	MISO Capacity Accreditation	Expected Comm'l Operation Date
Heartland Divide Wind II, LLC	Wind	200 MW	32 MW	April 2022
Dakota Range 1&2	Wind	300 MW	49 MW	Jan 2022
Ewington (repower)	Wind	20 MW	3 MW	Sept 2022
Northern Wind (repower)	Wind	120 MW	19 MW	Dec 2022

Note: As stated in our March 7, 2022 Letter in Docket Nos. E002/M-19-33 and E002/M-21-222, we currently expect that construction of the Elk Creek solar facility and the associated commercial operation date will likely be delayed until 2024. Therefore, we have removed Elk Creek Solar LLC from this list. We will continue to update the Commission on this project.

5.K. **Identify efforts taken to adequately protect against undesirable economic impacts on ratepayers, including, but not limited to keeping customer's bills and the utility's rates as low as practicable, given regulatory and other constraints.**

The Company continues to take advantage of opportunities as these are identified and determined to be beneficial to our customers.

SES Utilities Only

Ongoing efforts to meet SES objective and a brief summary of project mix for SES compliance.

See the "Summary of ongoing efforts to obtain solar energy, including a brief summary of the anticipated mix of project sizes for SES compliance" section within the Compliance Report on page 4.

Discussion on efforts to reach the 2030 goal that 10% of MN retail sales be generated by solar energy (Attach A, 14)

As noted in our filing, the Company already exceeds the current 1.5% requirement and we have substantial SRECs banked. We expect our REC bank to carry us through several more years of demonstrated solar compliance and provide partial fulfillment of the 10% goal. In order to increase solar generation so that we may meet the goal on an ongoing basis, the Company plans to add substantial amounts of solar generation to our portfolio in the coming years, as approved in our recent 2020-2034 Integrated Resource Plan. We will continually review the need for additional solar resources in our future resource plans, in order to achieve the goal long-term.

SES - A summary of progress toward compliance with the ten percent carve out for systems under 40 kW.

See the "Progress towards the 10% carve-out for systems 40 kWac or less, including the method by which the utility will meet the carve-out" section within the Compliance Report on page 4.

PUBLIC DOCUMENT
NOT PUBLIC DATA HAS BEEN EXCISED

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

Docket Nos. E999/PR-02-1240
E999/PR-22-12
E999/M-22-85
Attachment A, Page 15 of 15

Minnesota Public Utilities Commission: Docket No. E999/PR-22-12 and Docket No. E999/M-22-85 — **Attachment 7**
Minnesota Department of Commerce: Docket No. E999/PR-02-1240 — Reporting Period: **January 1, 2021 - December 31, 2021**

M-RETS RECs Bought and Sold

Ordering pt. 4C requires reporting REC sales & purchases for the 2 preceding calendar years

REC Purchases Total	227,740
REC Sales Total	0

Enter REC data for the 2 preceding calendar years.

Wholesale REC Purchases	Wholesale REC Sales	PRICE	Type of purchase	NOTES
227,740		$4.15	For Green Pricing	MN Windsource REC Purchase

CERTIFICATE OF SERVICE

I, Christine Schwartz, hereby certify that I have this day served copies or summaries of the foregoing document on the attached list of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States Mail at Minneapolis, Minnesota

xx electronic filing

DOCKET NOS. E999/PR-02-1240
E999/PR-22-12
E999/M-22-85

Dated this 1st day of June 2022

/s/

_____

Christine Schwartz Regulatory Administrator

414 Nicollet Mall
Minneapolis, MN 55401

PUBLIC DOCUMENT
NOT PUBLIC DATA EXCISED

June 1, 2023

—Via Electronic Filing—

Mr. Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

RE: RENEWABLE ENERGY OBLIGATION (REO)-RENEWABLE ENERGY STANDARD (RES) AND SOLAR ENERGY STANDARDS (SES) COMPLIANCE REPORT

RENEWABLE ENERGY CERTIFICATE RETIREMENT AND SOLAR ENERGY STANDARDS REPORTING FOR COMPLIANCE YEAR 2022
DOCKET NO. E999/PR-23-12

GREEN PRICING VERIFICATION FILING PROCESS
DOCKET NO. E999/PR-02-1240

Dear Mr. Seuffert:

Northern States Power Company, doing business as Xcel Energy, submits this compliance report to fulfill the verification and filing requirements for the Renewable Energy Standard (RES), Renewable Energy Credit (REC) retirement, and Green Pricing REC retirement required by Minn. Stat. § 216B.1691, Subd. 3. The Company also submits this as the 2022 Annual Report as required by the Minnesota Public Utilities Commission in its January 29, 2021 Order in Docket Nos. E999/M-20-464 and E999/M-13-542, Solar Energy Standards (SES).

We have provided the required information in Attachment A. Attachment A contains RES, Green Pricing, and SES Retail Sales; RES, Green Pricing, and SES REC Retirements; and REC Purchases and Sales. We note that the Commission has opened Docket No. E999/CI-23-151 to examine future reporting needs resulting from the recent changes to the RES and the newly created carbon free standard under Minn. Stat. § 216B.1691, and this report does not address these changes.

A. REC Retirement

By May 1, 2023, the Company retired approximately 8.6 million RECs, representing 30 percent of annual retail sales for calendar year 2022, using the Midwest Renewable Energy Tracking System (M-RETS). The Company is therefore in compliance with the Minnesota RES requirements identified in Minn. Stat. § 216B.1691 subd. 2(a) and the Commission's March 19, 2010 Order in Docket No. E999/CI-03-869.

In addition, by May 1, 2023, the Company retired approximately 677,000 RECs for our Green Pricing Programs. Approximately 493,000 RECs were retired for Windsource, approximately 172,000 RECs were retired for Renewable*Connect, and approximately 11,000 RECs were retired for Renewable*Connect Government. Details of the Company's Green Pricing Program REC retirements are included in Attachment A.3.

The required information specified in the Commission's April 17, 2014 Notice and the May 28, 2013 ORDER FINDING UTILITIES IN COMPLIANCE WITH MINN. STAT. § 216B.1691 AND MODIFYING BIENNIAL REPORTING PROCEDURES in Docket No. E999/M-12-958, including the RES calculations, the RECs retired and the names of the M-RETS retirement sub-accounts, is provided in Attachment A.

As noted in Attachment A.7, the Company purchased 330,000 RECs for our Windsource program.

B. Certified Renewable Percentage

The Company began offering the Certified Renewable Percentage (CRP) to our customers in reporting year 2018.

Each year, the Company calculates the CRP for the preceding year, after all program participation, REC sales, REC retirements for the RES, trade margin sales, and all other data points that affect the CRP are available. After the annual CRP is calculated, the Company then retires the additional RECs to match the amount of renewable energy delivered to customers.

The 2022 CRP is calculated at 42.55 percent compared to 34.3 percent in 2021. The increase over the previous year is due largely to additional wind resources brought online in 2022. We estimate that the CRP will continue to increase each year as additional renewable resources continue to come online. The 2022 CRP is higher than the RES obligation, and therefore the Company plans to retire additional RECs for the 2022 CRP beyond what is required for the RES.

Below is an overview of the Minnesota CRP from 2018 to 2022. All prior CRP calculations have completed the thorough process of third-party verification. The Company anticipates that the 2022 CRP will be verified by Fall of 2023.

Table 1: Annual CRP Percentages

Year	CRP Percent
2018	26.6
2019	23.3
2020	31.8
2021	34.3
2022	42.55

C. Renewable*Connect Government Program

The security and privacy of customer data, including energy usage data, is a key concern for the Company. As a matter of course, the Company generally does not publicly disclose energy usage data related to an individual customer.

In previous years of the REO/RES REC filing, the customer participating in the Renewable*Connect Government Program has requested certain information related to its energy usage be considered non-public, but the Department of Commerce has requested the information be submitted publicly. In advance of this year's Compliance filing, the Company reached out to this customer asking if the information that it normally considers non-public could be submitted publicly for this year's 2022 REO/RES REC filing. The customer consented to the Company submitting the information as public information. Notwithstanding this one-time consent, the Company reserves the right to submit similar information as non-public in the future.

D. Summary of ongoing efforts to obtain solar energy, including a brief summary of the anticipated mix of project sizes for SES compliance

For purposes of this Section, SES compliance means the requirement set forth in Minn. Stat. § 216B.1691, Subd. 2f, whereby Xcel Energy, by the end of 2020, needs to generate or procure sufficient electricity generated by solar energy so that at least 1.5 percent of the Company's total retail electric sales in Minnesota is generated by solar energy. The additional requirement in Subd. 2f regarding the 10 percent solar carve-out requirement from systems of 40 kW (AC) or less is addressed in Section E below.

The Company has developed a large portfolio of resources and programs to provide renewable options to residential and commercial customers. Since the passage of the SES in 2013, we have grown our utility portfolio of solar resources to expand access of solar benefits to all customers while achieving compliance in reporting year 2022. The Company began to satisfy the Minnesota SES compliance requirements in 2020 and expects to accumulate and exceed the amount of solar RECs (SRECs) required well beyond 2034. SRECs accumulated in the REC bank beyond what is needed for compliance requirements will be applied towards the Minnesota state RPS obligations to avoid any REC expirations.

E. Progress towards the 10 percent carve-out for systems 40 kW_{ac} or less, including the method by which the utility will meet the carve-out

A subset of programs from Section D above can be used towards our 10 percent small solar carve out. Table 2 describes these impacts. These are further detailed in this section.

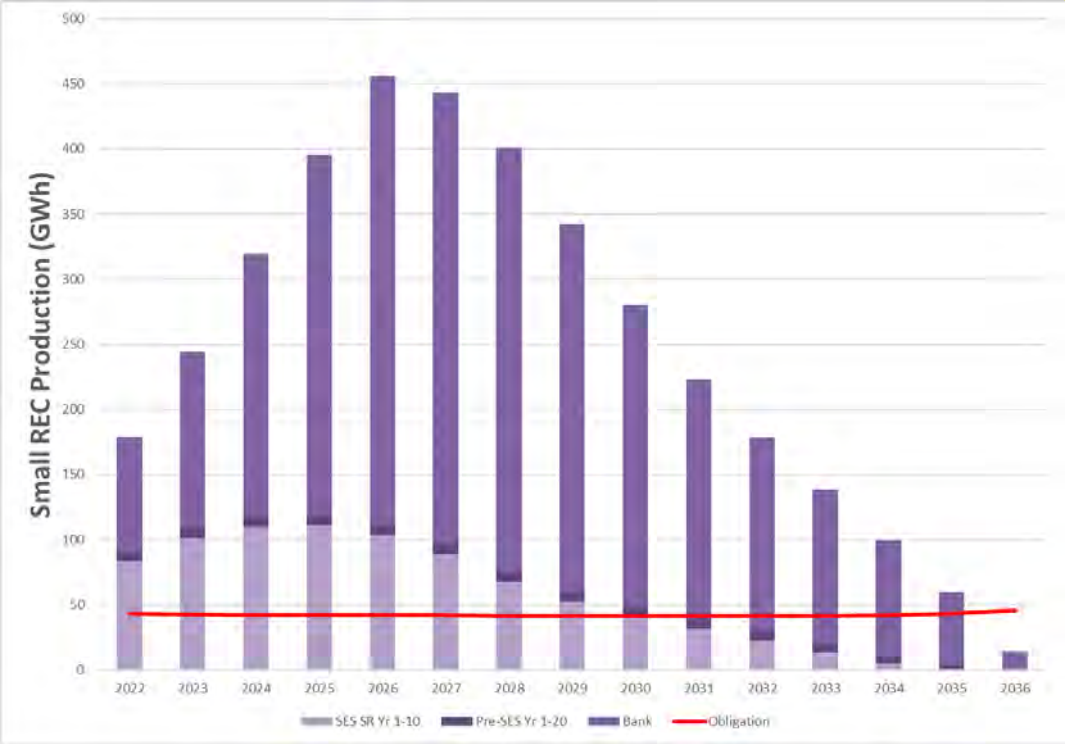
Table 2: Small Solar Carve Out – Programs

Program Name	Size	Years Available
Solar*Rewards (First Generation)	**≤40 kW (DC)***	**2010 – August 2014**
Solar*Rewards (Second Generation)	**≤ 20 kW (DC)* ≤ 40 kW (DC)***	**August 2014 – May 2018 June 2018 – May 2019**
Solar*Rewards (Third Generation)	**≤ 40 kW (AC)**	**June 2019 - 2024**
Solar*Rewards for Schools	**≤ 40 kW (AC) >40 kW – 1 MW**	**May 2022 – June 2027**
Made in Minnesota	**≤40 kW**	**2014 – 2017**

*Energy produced in DC goes through an inverter to get converted to AC. In this process there is energy loss, meaning that DC output results in a lower AC output.

Graph 1 below represents our current projection for SREC compliance with the 10 percent small solar carve out. This chart shows the Company may be in compliance with the small solar carve out through 2034. However, this representation uses program assumptions, discussed below, and thus has embedded risk that the actual results could be significantly different than the forecast. The Company cannot predict what the installation rate will be for small rooftop solar.

Graph 1
Small SREC Production with Solar*Rewards
Program Extension through 2024[1]



The chart above assumes 100 percent of Solar*Rewards funds are allocated based on estimated solar system performance and that of these projects, 75 percent of them are completed each year for the Solar*Rewards program through 2024. If actual solar installations are lower than forecasted levels, the Company may not be able to meet the small solar carve-out requirements through 2034 as projected in the chart above.

With the new legislation extending the Solar*Rewards program to future years[2], the Company believes it will have sufficient small solar RECs to meet our obligations without a buy-back option. If, at some time, it appears that the Company will not have sufficient RECs to meet its obligations, we may revisit the REC buy-back option.

[1] Following a technology transition in mid-2019, the Company REC reports to M-RETS erroneously excluded generation from new small-solar resources. The Company has rectified the issue and filed the missing RECs with M-RETs. Previously omitted RECs are included in this report.
[2] On May 24, 2023, Governor Walz signed a bill that revised Minn. Stat. § 116C.7792 to change the 2024 incentive from $5 million to $11.25 million and created a 2025 incentive in the amount of $6.25 million.

Also, the above analysis is based on the understanding that the nameplate capacity for purposes of this statute is measured in alternating current (AC). This is consistent with the definition of capacity in Minn. Stat. § 216B.164, Subd. 2a.(c), as well as how capacity is used or interpreted under the following statutes: Minn. Stat. §§ 216B.1611, Subd.2(a), and Subd.3a(a)(1); 216B.1613; 216B.164, and Subd. 4c; 216B.1641 (b).

F. Discussion on the utilities' efforts to reach, by 2030, the energy goal that ten percent of the retail electric sales in Minnesota be generated by solar energy[3]

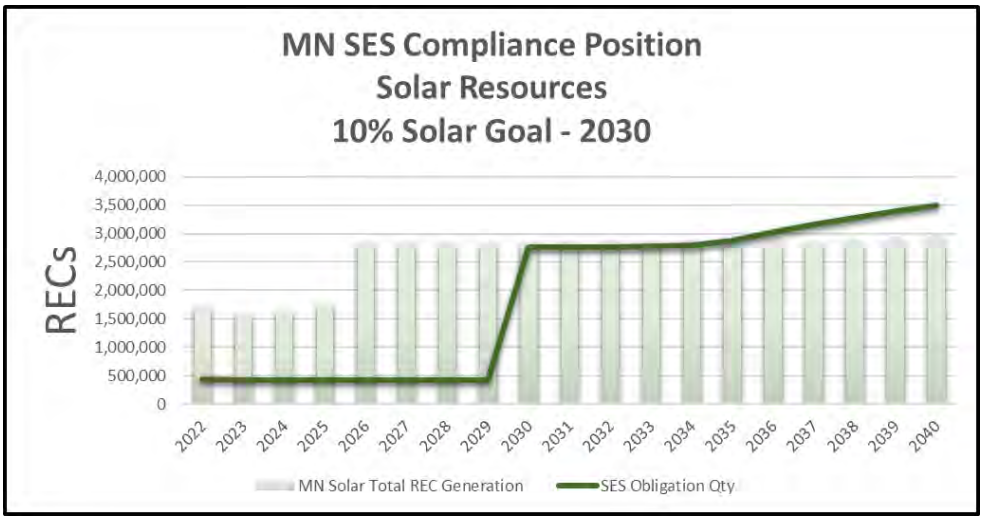
The 10 percent by 2030 goal is an energy goal of the state of Minnesota. We understand this question to be evaluating our current efforts to reach our proportional share of the state's energy goal.

As shown in Graph 2 below, the Company forecasts that the currently approved and proposed/planned solar resources will be sufficient to meet the 10 percent by 2030 goal and will furthermore be sufficient to satisfy the SES requirements through year 2035 without the use of banked RECs. However, the Company has also proposed to add substantial amounts of solar generation to our portfolio in the coming years in our recently approved 2020-2034 Integrated Resource Plan.[4] The Commission's Order approving the plan authorized the Company to procure approximately 900 MW of solar capacity coming online by the end of 2025, incremental to the recently approved Sherco Solar 1 and 2 460 MW solar generating facility near the Company's current Sherburne County coal generating facility site.[5] We recently completed an RFP that yielded 350 MW of that target, pending Commission approval, for an additional project at the Sherco site (Sherco Solar 3) and a PPA project (Apple River Solar).[6] Sherco Solar 3 – when combined with Sherco Solar 1 and 2 – will fulfill the Company's need to procure capacity to reutilize the interconnection rights made available when Sherco coal Unit 2 retires later this year. We will continue progress toward the Integrated Resource Plan's authorized solar procurement in the coming months. In total, this capacity will provide substantial solar generation to our system and would contribute toward meeting the 10 percent SES goal into the future; in fact, by 2030, we expect over 10 percent of our generation to come from solar resources. As always, we will continually review the need for additional solar resources in our future resource plans in order to achieve the goal long-term.

[3] Impacts of the changes to Minn. Stat. §§ 216B.1691, Subd. 2h. and 216B.2425, Subd. 9 will be discussed in the Company's November 1, 2023 IDP filing.
[4] Docket No. E002/RP-19-368.
[5] Docket No. E002/M-20-891.
[6] Docket No. E002/M-22-403.

We note that the solar market is currently facing significant challenges resulting from residual disruption around the U.S. Department of Commerce anti-dumping circumvention investigation of solar components imported from four southeast Asian countries, an increase in price exacerbated by inflation and increased underlying demand resulting from the passage of the Inflation Reduction Act. These issues are further discussed in our May 5, 2023 Solar Portfolio Petition filing.[7] However, at this time, we do not expect these challenges to negatively impact our long-term goals to add solar capacity to our system.

Graph 2[8]



Attachment A contains certain portions that have been designated as Trade Secret information pursuant to Minnesota Statute § 13.37, subd. 1(b). In particular, the information designated as Trade Secret relates to specific Purchase Power Agreements (PPAs). The terms of the Commission-approved PPAs require that this information be non-public. Other information marked as trade secret relates to specific production from specific customer facilities. Further, this is considered to be "non-public data" pursuant to Minn. Stat. §13.02, Subd.9, and is also "Trade Secret" information pursuant to Minn. Stat. §13.37, subd. 1(b) as it derives independent economic value, actual or potential, from not being generally known to, and not being readily

[7] *Id.*

[8] We note that Graph 2 does not show benefits from banked RECs; however, even with this conservative approach, it shows compliance through 2035. If we were to show benefits of banked RECs, we would show compliance through 2045.

ascertainable by proper means by other persons who can obtain economic value from its disclosure or use. In general, we publicly show the names of the Renewable*Connect resources because they are already publicly disclosed and therefore their identity is public, but their actual production is non-public. The names of the Windsource facilities have similarly already been publicly identified along with their capacities, but the actual production from each is not public. The smaller wind facilities generally are our retail customers and Minnesota regulations prohibit us from disclosing a customer name alone; therefore, we have treated as non-public the customer names along with their M-RETS ID that would otherwise identify them. Where we have biomass plants, because we have fewer than 15, we have treated as non-public the name and RECs of each. We note that the number of RECs retired from specific solar gardens is publicly provided because our solar garden tariff at Sheet No. 9-78 specifically authorizes us to make solar garden generation data public for each. Other REC retirement data for smaller facilities has been aggregated and de-identified.

We have electronically filed this document with the Minnesota Public Utilities Commission, and copies have been served on the parties on the attached service lists. Please contact me at rebecca.d.eilers@xcelenergy.com or 612-330-5570, or Pamela Gibbs at pamela.k.gibbs@xcelenergy.com or (612) 330-2889 if you have any questions regarding this filing.

Sincerely,

/s/

REBECCA EILERS
REGULATORY MANAGER

Attachment
cc: Service Lists

PUBLIC DOCUMENT
NOT PUBLIC DATA HAS BEEN EXCISED

Docket Nos. E999/PR-02-1240; E999/PR-23-12
Attachment A; Page 1 of 15

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

Minnesota Public Utilities Commission: Docket No. E999/PR-23-12 and Docket No. E999/M-23-85 **Attachment 1**
Minnesota Department of Commerce: Docket No. E999/PR-02-1240 Reporting Period: **January 1, 2022 - December 31, 2022**

Renewable Energy Certificate Retirement Report for Renewable Energy Standards and Green Pricing Programs

Report Year	2022	Date Submitted	June 1, 2023

FILING UTILITY INFORMATION		CONTACT INFORMATION	
Company ID #	85	Contact Name	Pamela Gibbs
Company Name	Xcel Energy	Contact Title	Regulatory Case Specialist
Street Address Line 1	414 Nicollet Mall	Contact Telephone	612-330-2889
Street Address Line 2		Contact E-Mail	pamela.k.gibbs@xcelenergy.com
City	Minneapolis	COMMENTS/NOTES	
State	MN		
Zip Code	55401		

Filing for **RENEWABLE ENERGY STANDARDS** on behalf of:

Utility Name	Utility Name	Utility Name	Utility Name
Northern States Power Company - Minnesota			

Filing for **GREEN PRICING PROGRAMS** on behalf of:

Utility Name	Utility Name	Utility Name	Utility Name
Northern States Power Company - Minnesota			

Filing for **SOLAR ENERGY STANDARD** on behalf of:

Utility Name	Utility Name	Utility Name	Utility Name
Northern States Power Company - Minnesota			

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

Minnesota Public Utilities Commission: Docket No. E999/PR-23-12 and Docket No. E999/M-23-85 **Attachment 2**
Minnesota Department of Commerce: Docket No. E999/PR-02-1240 Reporting Period: **January 1, 2022 - December 31, 2022**

Total Retail Sales to Minnesota Customers and
Renewable Energy Certificates Required to be Retired for RENEWABLE ENERGY STANDARD Compliance

Retail Sales Total	28,990,173
RES Percentage Obligation	30%
RECs Required to be Retired	8,697,052
Actual RECs Retired	8,697,052

Enter current reporting year data.

Utility ID #	Utility	Retail Sales Amount (MWh)	Notes
85	Xcel Energy (NSP-MN)	28,990,173	

PUBLIC DOCUMENT
NOT PUBLIC DATA HAS BEEN EXCISED

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

Minnesota Public Utilities Commission: Docket No. E999/PR-23-12 and Docket No. E999/M-23-85 **Attachment 3**
Minnesota Department of Commerce: Docket No. E999/PR-02-1240 Reporting Period: **January 1, 2022 - December 31, 2022**

GREEN PRICING Program Sales

TOTAL **GREEN PRICING** Sales (MWh)	676,508
RECS retired for **GREEN PRICING** programs	0

List the cumulative retail sales of green pricing electricity, including utility-managed community solar, and the number of customers as of December 31, 2022.

Utility ID # (on Worksheet 1)	Utility Name	Program Name	No. of Program Customers	Program Sales (MWh)	Retail Rate ($/kWh)	Notes
85	Xcel Energy (NSP-MN)	Windsource Minnesota	72,274	493,277	$0.03530	Windsource rate per kWh
85	Xcel Energy (NSP-MN)	Renewable * Connect	1,518	11,060	$0.03647	2022 Month-to-Month Rate
85	Xcel Energy (NSP-MN)	Renewable * Connect	1,116	58,573	$0.03345	2022 5-year rate
85	Xcel Energy (NSP-MN)	Renewable * Connect	642	102,101	$0.03295	2022 10-year rate
85	Xcel Energy (NSP-MN)	Renewable * Connect Government	1	11,497	$0.03295	2022 Rate
85	Xcel Energy (NSP-MN)	Community Solar Gardens				No sales because company receives all RECs and subscribers do not get CSG energy

Minnesota Public Utilities Commission: Docket No. E999/PR-23-12 and Docket No. E999/M-23-85 **Attachment 2**
Minnesota Department of Commerce: Docket No. E999/PR-02-1240 Reporting Period: **January 1, 2022 - December 31, 2022**

SES Retail Sales and Solar Renewable Energy Certificates Required to be Retired for SOLAR ENERGY STANDARD Compliance

Retail Sales Total	28,990,173
SES Excluded Retail Sales	200,264
SES Retail Sales Obligation	28,789,909
SES Total Percentage Obligation	1.50%
SES Small Scale obligation	0.15%
Non-Small Scale obligation	1.35%
Total SRECs Required to be Retired	431,849
Small SRECs to be retired	43,185
Non-Small Scale to be retired	388,664
Total Actual RECs Retired	431,849
Total actual small SRECs retired	43,185
Total actual non-Small Scale retired	388,664

Additional SES Reporting

Projected SES compliance for the current plus three (3) upcoming years. Include banked RECs.

Year	Actual/Projected MN retail sales (MWh) minus SES exempt sales	SES Total Req (MWh)	SES Small Scale Req (MWh)	SES Non-Small Scale Req (MWh)	Projected Total SRECs (MWh)	Projected SRECs less than 40kW (MWh)	Projected SRECs greater than 40kW (MWh)	Projected Total Surplus/ (Deficit) (MWh)	Projected SREC Surplus/(Deficit) less than 40 kW (MWh)	Projected SREC Surplus/(Deficit) greater than 40 kW (MWh)
2022	28,990,173	434,853	43,485	391,367	1,814,471	83,119	1,731,352	1,379,618	39,634	1,339,985
2023	28,453,409	426,801	42,680	384,121	2,060,332	108,635	1,951,697	1,633,531	65,955	1,567,576
2024	28,189,103	422,837	42,284	380,553	2,084,604	117,427	1,967,177	1,661,767	75,143	1,586,624
2025	28,052,547	420,788	42,079	378,709	2,239,624	118,416	2,121,208	1,818,836	76,337	1,742,499

Annual solar generation on the utilities' system for the previous calendar year

	Number of Facilities on Utility System	Capacity	Number registered in M-RETS	Capacity registered in M-RETS	SRECs Generated
Less than 40kW	8698	84.9	111	54	83,608
Generation from eligible CSG subscriptions	917	860	917	860	1,401,119
Greater than 40kW	70	4.8	39	271	495,282

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

Minnesota Public Utilities Commission: Docket No. E999/PR-23-12 and Docket No. E999/M-23-85 — **Attachment 4**
Minnesota Department of Commerce: Docket No. E999/PR-02-1240 — Reporting Period: **January 1, 2022 - December 31, 2022**

Renewable Energy Certificate Retirements for Renewable Energy Standards and Green Pricing Programs

Renewable Energy Standard REC Retirement Account Name:	NSP-MN RES Retirement-2022 / 4741350A-A44A
Renewable Energy Standard REC Retirement Account Name:	NSP-MN SES Small Solar Retirement-2022 / 50084C28-50A9
Renewable Energy Standard REC Retirement Account Name:	NSP-MN SES Retirement-2022 / 91418AEB-E255
Green Pricing REC Retirement Account Name:	MN Renewable Connect 2022 / E2274CE8-D471
Green Pricing REC Retirement Account Name:	NSP-MN Windsource Retirement-2022 / C335B9CF-84A3

Total RECs or SRECs		8,697,052	0	43,185	388,664	1 REC = 1 MWh
MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
[NOT PUBLIC DATA BEGINS				**[NOT PUBLIC DATA BEGINS**			
	North Star Solar PV - North Star Solar PV	Solar					MN Renewable*Connect 2022
	Odell Wind Farm - Odell Wind Farm	Wind					MN Renewable*Connect 2022
	North Star Solar PV - North Star Solar PV	Solar					MN Renewable*Connect Government 2022
	Odell Wind Farm - Odell Wind Farm	Wind					MN Renewable*Connect Government 2022
	Boeve Windfarm - Boeve Windfarm	Wind					MN Windsource
	Cedar Hills Wind Farm - Cedar Hills Wind Farm	Wind					MN Windsource
	Cisco Wind Energy - Cisco Wind Energy	Wind					MN Windsource
	JJN Windfarm - JJN Windfarm	Wind					MN Windsource
	K-Brink Wind Farm - K-Brink Wind Farm	Wind					MN Windsource
	McNeilus Group - McNeilus Group	Wind					MN Windsource
	Moraine II - Moraine II	Wind					MN Windsource
	NextEra Energy Baldwin Wind Project - Baldwin Wind Project	Wind					MN Windsource
	Thunder Spirit Wind Farm - Thunder Spirit Wind	Wind					MN Windsource
	West Ridge - West Ridge	Wind					MN Windsource
	Windcurrent Farms - Windcurrent Farms	Wind					MN Windsource
PUBLIC DATA				**NOT PUBLIC DATA ENDS]**			
M627	SRMN2010-J-01 - SRMN2010-J-01	Solar			1,143		Public
M714	SRMN2011-01 - SRMN2011-01	Solar			467		
M737	SRMN2011-02 - SRMN2011-02	Solar			1,451		
M882	SRMN2011-03 - SRMN2011-03	Solar			40		
M766	SRMN2012-01 - SRMN2012-01	Solar			567		
M786	SRMN2012-02 - SRMN2012-02	Solar			717		
M797	SRMN2012-03 - SRMN2012-03	Solar			941		
M836	SRMN2012-04 - SRMN2012-04	Solar			73		
M881	SRMN2013-01 - SRMN2013-01	Solar			946		
M883	SRMN2013-02 - SRMN2013-02	Solar			713		
M931	SRMN2013-I-01 - SRMN2013-I-01	Solar			198		
M934	SRMN2013-J-01 - SRMN2013-J-01	Solar			40		
M936	SRMN2014-01 - SRMN2014-01	Solar			322		
M937	SRMN2014-I-01 - SRMN2014-I-01	Solar			665		
M938	SRMN2014-I-02 - SRMN2014-I-02	Solar			669		
M988	SRMN2014-I-03 - SRMN2014-I-03	Solar			306		
M939	SRMN2014-J-01 - SRMN2014-J-01	Solar			788		
M940	SRMN2014-J-02 - SRMN2014-J-02	Solar			702		
M949	SRMN2014-J-03 - SRMN2014-J-03	Solar			797		
M1061	SRMN2014-J-04 - SRMN2014-J-04	Solar			29		
M968	SRMN2015-I-01 - SRMN2015-I-01	Solar			817		
M1060	SRMN2015-I-02 - SRMN2015-I-02	Solar			640		
M1405	SRMN2015-I-03	Solar			248		
M969	SRMN2015-J-01 - SRMN2015-J-01	Solar			835		
M989	SRMN2015-J-02 - SRMN2015-J-02	Solar			844		
M1000	SRMN2015-J-03 - SRMN2015-J-03	Solar			908		
M1058	SRMN2015-J-04 - SRMN2015-J-04	Solar			820		
M1059	SRMN2016-I-01 - SRMN2016-I-01	Solar			658		
M1224	SRMN2016-I-02 - SRMN2016-I-02	Solar			980		
M1536	SRMN2016-I-03	Solar			170		
M1062	SRMN2016-J-01 - SRMN2016-J-01	Solar			911		
M1067	SRMN2016-J-02 - SRMN2016-J-02	Solar			890		
M1068	SRMN2016-J-03 - SRMN2016-J-03	Solar			901		
M1194	SRMN2016-J-04 - SRMN2016-J-04	Solar			893		
M1406	SRMN2016-J-05	Solar			391		
M1488	SRMN2017-I-01	Solar			793		
M1537	SRMN2017-I-02	Solar			359		
M4342	SRMN2017-I-03	Solar			1,116		
M4343	SRMN2017-I-04	Solar			270		
M1223	SRMN2017-J-01 - SRMN2017-J-01	Solar			954		
M1408	SRMN2017-J-02	Solar			922		
M1409	SRMN2017-J-03	Solar			968		
M1410	SRMN2017-J-04	Solar			906		
M1539	SRMN2017-J-05	Solar			971		
M1540	SRMN2017-J-06	Solar			145		
M4344	SRMN2017-J-07	Solar			683		
M2025	SRMN2018-I-02	Solar			37		
M4345	SRMN2018-I-03	Solar			669		
M4346	SRMN2018-I-04	Solar			594		
M1541	SRMN2018-J-01	Solar			579		
M1955	SRMN2018-J-03	Solar			4		
M4347	SRMN2018-J-04	Solar			1,689		
M2026	SRMN2018-J-05	Solar			9		
M4348	SRMN2018-J-06	Solar			1,009		
M4349	SRMN2018-J-08	Solar			1,077		
M4350	SRMN2018-J-09	Solar			946		
M4351	SRMN2018-J-10	Solar			288		
M4352	SRMN2019-I-01	Solar			429		
M4353	SRMN2019-I-02	Solar			299		
M4354	SRMN2019-I-03	Solar			26		

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
M4356	SRMN2019-J-01	Solar			888		
M4357	SRMN2019-J-02	Solar			724		
M4358	SRMN2019-J-03	Solar			660		
M4359	SRMN2019-J-04	Solar			526		
M4360	SRMN2019-J-05	Solar			631		
M4361	SRMN2019-J-06	Solar			402		
M4362	SRMN2019-J-07	Solar			197		
M4363	SRMN2019-J-08	Solar			7		
M4366	SRMN2020-J-02	Solar			1		
[NOT PUBLIC DATA BEGINS							
		Solar			35		
		Solar			246		
		Solar			66		
		Solar			334		
		Solar			246		
		Solar				2,003	
		Solar				10,077	
		Solar				6,771	
		Solar				9,194	
		Solar				10,285	
		Solar				8,813	
		Solar				7,081	
		Solar				7,594	
		Solar				11,964	
		Solar				5,121	
		Solar				5,791	
		Solar				17,658	
		Solar				6,320	
		Solar				16,747	
		Solar				8,388	
		Solar				12,896	
		Solar				1,308	
		Solar				95	
		Solar				1,534	
		Solar				872	
		Solar				11	
		Solar				185	
		Solar				294	
		Solar				96,572	
		Solar				614	
		Solar				93	
		Solar				89	
		Solar				134,250	
		Solar				137	
		Solar				968	
		Solar				2,155	
		Solar				715	
		Solar				433	
		Solar				376	
		Solar				1,260	
		NOT PUBLIC DATA ENDS]					
M1919	58th Ave Solar Project 1	Solar	1,235				
M1920	58th Ave Solar Project 2	Solar	1,053				
M1921	58th Ave Solar Project 3	Solar	1,257				
M1922	58th Ave Solar Project 4	Solar	1,319				
M1923	58th Ave Solar Project 5	Solar	1,268				
M1932	Arcturus Community Solar Garden, LLC	Solar	1,645				
M1930	Auriga Community Solar Garden, LLC	Solar	1,745				
M1984	Edison Gym	Solar	188				
M1929	Leo Community Solar, LLC	Solar	1,802				
M1934	Montevideo Solar LLC (CSG B)	Solar	807				
M1935	Montevideo Solar LLC (CSG C)	Solar	905				
M1936	Montevideo Solar LLC (CSG D)	Solar	849				
M1937	Montevideo Solar LLC (CSG E)	Solar	967				
M1933	Montevideo Solar LLC (CSG)	Solar	638				
M1925	River Road Solar Project 2	Solar	1,236				
M1926	River Road Solar Project 3	Solar	1,277				
M1927	River Road Solar Project 4	Solar	1,276				
M1928	River Road Solar Project 5	Solar	896				
M1931	Sagitta Community Solar Garden, LLC	Solar	1,667				
M1914	USS Brockway Solar	Solar	1,594				
M1915	USS JJ Solar	Solar	1,826				
M1916	USS Norelius Solar	Solar	1,778				
M1917	USS Solar Rapids	Solar	1,712				
M1918	USS Walrus Solar	Solar	878				
M1985	Edison High School	Solar	104				
M2312	Kaus Community Solar Garden, LLC	Solar	1,618				
M2319	Meyer	Solar	381				
M1924	River Road Solar Project 1	Solar	1,185				
M2318	Sagittarius Community Solar Gardens, LLC	Solar	1,265				
M2313	SRC 2.01	Solar	1,384				
M2314	SRC 2.02	Solar	1,346				
M2315	SRC 2.03	Solar	1,331				
M2316	SRC 2.04	Solar	1,325				
M2317	SRC 2.05	Solar	1,351				
M2320	Altair Community Solar Garden, LLC	Solar	1,569				
M1080	Aurora - Albany Solar - Aurora Distributed Solar - Albany Solar	Solar	15,612				
M2311	Carpenter's Union	Solar	614				
M2322	Lindstrom Solar LLC	Solar	1,449				
M2321	Lindstrom Solar LLC	Solar	1,457				
M2333	Aquila Community Solar Gardens, LLC	Solar	1,453				
M2323	Canopus Community Solar Garden, LLC	Solar	1,457				
M2330	Capricornus Community Solar Garden, LLC	Solar	1,394				
M2331	Cassiopeia Community Solar Garden, LLC	Solar	1,456				

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
M2339	Crux Community Solar Gardens, LLC	Solar	1,364				
M2325	Fredrichs	Solar	291				
M2329	MSC-GreyCloud01, LLC	Solar	1,391				
M2324	Pisces Community Solar Garden, LLC	Solar	1,032				
M2338	Saint Cloud Solar LLC	Solar	1,104				
M2337	Saint Cloud Solar LLC	Solar	1,103				
M2336	Saint Cloud Solar LLC	Solar	1,085				
M2335	Saint Cloud Solar LLC	Solar	1,079				
M2334	Saint Cloud Solar LLC	Solar	1,098				
M2332	Vision01	Solar	1,123				
M2328	Winsted Solar LLC	Solar	1,286				
M2327	Winsted Solar LLC	Solar	1,275				
M2326	Winsted Solar LLC	Solar	1,268				
M1359	Andromeda CSG1, LLC	Solar	1,107				
M1360	Andromeda CSG2, LLC	Solar	1,124				
M1361	Andromeda CSG3, LLC	Solar	1,126				
M1363	Andromeda CSG5, LLC	Solar	1,050				
M1340	B.R. Corcoran - Hennepin Kaat 2 - MINNESOTA SOLAR CSG 19, LLC	Solar	1,115				
M1341	B.R. Corcoran - Hennepin Kaat 3 - MINNESOTA SOLAR CSG 19, LLC	Solar	1,101				
M1342	B.R. Corcoran - Hennepin Kaat 4 - MINNESOTA SOLAR CSG 19, LLC	Solar	1,114				
M1343	B.R. Corcoran - Hennepin Kaat 5 - MINNESOTA SOLAR CSG 19, LLC	Solar	1,113				
M1100	Blue Lake 1 - Blue Lake 1	Solar	1,114				
M1101	Blue Lake 2 - Blue Lake 2	Solar	1,030				
M1102	Blue Lake 3 - Blue Lake 3	Solar	1,078				
M1053	Buhl Family CSG - Buhl Family CSG	Solar	208				
M1370	Capella CSG2, LLC	Solar	1,129				
M1371	Capella CSG3, LLC	Solar	1,173				
M1372	Capella CSG4, LLC	Solar	1,004				
M1373	Capella CSG5, LLC	Solar	1,179				
M1103	Chisago Community Solar 1, LLC - Chisago Community Solar 1	Solar	888				
M1104	Chisago Community Solar 2, LLC - Chisago Community Solar 2	Solar	1,009				
M1105	Chisago Community Solar 3, LLC - Chisago Community Solar 3	Solar	969				
M1106	Chisago Community Solar 4, LLC - Chisago Community Solar 4	Solar	962				
M2347	Chisago Holdco LLC (Unit 1)	Solar	1,068				
M2348	Chisago Holdco LLC (Unit 2)	Solar	1,029				
M2349	Chisago Holdco LLC (Unit 3)	Solar	1,030				
M1374	Crater CSG1, LLC	Solar	1,123				
M1375	Crater CSG2, LLC	Solar	1,117				
M1376	Crater CSG3, LLC	Solar	996				
M1230	Dodge Holdco LLC #1 - Dodge Holdco LLC #1	Solar	943				
M1231	Dodge Holdco LLC #2 - Dodge Holdco LLC #2	Solar	953				
M1232	Dodge Holdco LLC #3 - Dodge Holdco LLC #3	Solar	925				
M1233	Dodge Holdco LLC #4 - Dodge Holdco LLC #4	Solar	949				
M1234	Dodge Holdco LLC #5 - Dodge Holdco LLC #5	Solar	970				
M1107	Eichtens - Eichtens 039467	Solar	993				
M1108	Eichtens - Eichtens 040717	Solar	989				
M1109	Eichtens - Eichtens 040718	Solar	990				
M1110	Eichtens - Eichtens 040841	Solar	995				
M1111	Empire 1 - Empire 1	Solar	1,092				
M1112	Empire 2 - Empire 2	Solar	1,139				
M1113	Empire 3 - Empire 3	Solar	1,183				
M1114	Empire 4 - Empire 4	Solar	1,177				
M1115	Empire 5 - Empire 5	Solar	1,165				
M1235	Farmington Holdco, LLC #1 - Farmington Holdco, LLC #1	Solar	805				
M1236	Farmington Holdco, LLC #2 - Farmington Holdco, LLC #2	Solar	1,044				
M1237	Farmington Holdco, LLC #3 - Farmington Holdco, LLC #3	Solar	1,043				
M1238	Farmington Holdco, LLC #4 - Farmington Holdco, LLC #4	Solar	1,012				
M1239	Farmington Holdco, LLC #5 - Farmington Holdco, LLC #5	Solar	1,042				
M2340	Frontenac Holdco LLC (Unit 1)	Solar	1,172				
M2341	Frontenac Holdco LLC (Unit 2)	Solar	1,199				
M2342	Frontenac Holdco LLC (Unit 3)	Solar	1,199				
M2343	Frontenac Holdco LLC (Unit 4)	Solar	1,189				
M2344	Frontenac Holdco LLC (Unit 5)	Solar	1,143				
M2351	Golf01	Solar	1,011				
M2352	Golf02	Solar	1,032				
M2353	Golf03	Solar	1,039				
M2345	Golf04	Solar	1,087				
M2354	Golf05	Solar	1,076				
M1386	Hauer Unit 1	Solar	1,067				
M1388	Hauer Unit 3	Solar	933				
M1116	Lake Calhoun 17 - Lake Calhoun 17	Solar	1,145				
M1117	Lake Calhoun 18 - Lake Calhoun 18	Solar	1,112				
M1118	Lake Calhoun 19 - Lake Calhoun 19	Solar	1,110				
M1119	Lake Calhoun 20 - Lake Calhoun 20	Solar	1,124				
M1120	Lake Calhoun 21 - Lake Calhoun 21	Solar	1,134				
M1121	Lake Calhoun 27 - Lake Calhoun 27	Solar	1,127				
M1122	Lake Calhoun 28 - Lake Calhoun 28	Solar	1,140				
M1123	Lake Calhoun 29 - Lake Calhoun 29	Solar	1,111				
M1188	Lind 1 - Lind SRC 041230	Solar	1,018				
M1191	Lind 4 - Lind SRC 041233	Solar	1,038				
M1192	Lind 5 - Lind SRC 041234	Solar	1,044				
M1198	Mapleton CSG1 - Mapleton CSG1, LLC	Solar	1,116				
M1199	Mapleton CSG2 - Mapleton CSG2, LLC	Solar	1,122				
M1200	Mapleton CSG3 - Mapleton CSG3, LLC	Solar	1,027				
M1385	MINNESOTA SOLAR CSG 21, LLC	Solar	994				
M1384	MINNESOTA SOLAR CSG 21, LLC	Solar	990				
M1383	MINNESOTA SOLAR CSG 21, LLC	Solar	953				
M1368	MINNESOTA SOLAR CSG 9, LLC	Solar	1,129				
M1367	MINNESOTA SOLAR CSG 9, LLC	Solar	1,121				
M1366	MINNESOTA SOLAR CSG 9, LLC	Solar	1,122				
M1365	MINNESOTA SOLAR CSG 9, LLC	Solar	1,115				
M1364	MINNESOTA SOLAR CSG 9, LLC	Solar	1,115				
M1344	Montgomery W - Highlander 1 - MINNESOTA SOLAR CSG 4, LLC	Solar	1,115				
M1345	Montgomery W - Highlander 2 - MINNESOTA SOLAR CSG 4, LLC	Solar	1,129				

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
M1346	Montgomery W - Highlander 3 - MINNESOTA SOLAR CSG 4, LLC	Solar	1,132				
M1252	Morgan CSG3, LLC - Morgan CSG3, LLC	Solar	1,147				
M1124	Northfield CSG1 - Northfield CSG1	Solar	834				
M1125	Northfield CSG2 - Northfield CSG2	Solar	966				
M1126	Northfield CSG3 - Northfield CSG3	Solar	795				
M1127	Northfield CSG4 - Northfield CSG4	Solar	1,024				
M1128	Northfield CSG5 - Northfield CSG5	Solar	1,005				
M2346	Novel CSG of Imholte	Solar	1,028				
M1129	Orion CSG1 - Orion CSG1	Solar	1,025				
M1130	Orion CSG2 - Orion CSG2	Solar	1,032				
M1131	Orion CSG3 - Orion CSG3	Solar	1,018				
M1135	Paynesville CSG 4 - Paynesville CSG 4	Solar	996				
M1136	Paynesville CSG 5 - Paynesville CSG 5	Solar	1,062				
M1132	Paynesville CSG1 - Paynesville CSG1	Solar	1,027				
M1253	Pine Island Holdco, LLC #1 - Pine Island Holdco, LLC #1	Solar	959				
M1255	Pine Island Holdco, LLC #3 - Pine Island Holdco, LLC #3	Solar	967				
M1377	Pollux CSG1, LLC	Solar	776				
M1137	Red Wing SD - Red Wing SD 42423	Solar	999				
M1138	Red Wing SD - Red Wing SD 42425	Solar	1,002				
M1139	Red Wing SD - Red Wing SD 42426	Solar	1,009				
M1140	Red Wing SD - Red Wing SD 42427	Solar	1,007				
M1141	Red Wing SD - Red Wing SD 42428	Solar	1,014				
M1142	Rosemount CSG1 - Rosemount CSG1	Solar	974				
M1143	Rosemount CSG2 - Rosemount CSG2	Solar	1,058				
M1144	Rosemount CSG3 - Rosemount CSG3	Solar	1,058				
M1145	Rosemount CSG4 - Rosemount CSG4	Solar	1,068				
M1146	Rosemount CSG5 - Rosemount CSG5	Solar	1,007				
M1305	Spica CSG1, LLC - Spica CSG1, LLC	Solar	1,139				
M1394	SunE Koppelman 4, LLC	Solar	1,138				
M1378	SunE Rengstorf 1, LLC	Solar	1,203				
M1379	SunE Rengstorf 2, LLC	Solar	1,214				
M1380	SunE Rengstorf 3, LLC	Solar	1,216				
M1381	SunE Rengstorf 4, LLC	Solar	1,205				
M1382	SunE Rengstorf 5, LLC	Solar	1,214				
M1148	Sunrise CSG 2 - Sunrise CSG 2	Solar	1,033				
M1149	Sunrise CSG 3 - Sunrise CSG 3	Solar	958				
M1150	Sunrise CSG 4 - Sunrise CSG 4	Solar	876				
M1151	Sunrise CSG 5 - Sunrise CSG 5	Solar	1,028				
M1152	Ursa CSG1 - Ursa CSG1	Solar	963				
M1153	Ursa CSG2 - Ursa CSG2	Solar	995				
M1154	Ursa CSG3 - Ursa CSG3	Solar	1,041				
M1155	Ursa CSG4 - Ursa CSG4	Solar	1,076				
M1156	Ursa CSG5 - Ursa CSG5	Solar	960				
M1910	USS Nillie Corn Solar LLC	Solar	1,315				
M1908	USS Rockpoint Solar LLC	Solar	1,267				
M1909	USS Solar Dawn LLC	Solar	1,296				
M2498	USS Webster Solar	Solar	1,376				
M1258	Wabasha Holdco LLC #1 - Wabasha Holdco LLC #1	Solar	1,018				
M1259	Wabasha Holdco LLC #2 - Wabasha Holdco LLC #2	Solar	1,013				
M1260	Wabasha Holdco LLC #3 - Wabasha Holdco LLC #3	Solar	1,011				
M1261	Webster Holdco LLC #1 - Webster Holdco LLC #1	Solar	1,085				
M1263	Webster Holdco LLC #4 - Webster Holdco LLC #4	Solar	1,067				
M1621	330th Street West Solar Project 1	Solar	861				
M1622	330th Street West Solar Project 2	Solar	868				
M1623	330th Street West Solar Project 3	Solar	908				
M1624	330th Street West Solar Project 4	Solar	864				
M1625	330th Street West Solar Project 5	Solar	860				
M1362	Andromeda CSG4, LLC	Solar	884				
M1831	Antares CSG1, LLC	Solar	1,049				
M1832	Antares CSG2, LLC	Solar	1,075				
M1833	Antares CSG3, LLC	Solar	1,065				
M1299	Antila CSG1, LLC - Antila CSG1, LLC	Solar	1,017				
M1300	Antila CSG2, LLC - Antila CSG2, LLC	Solar	882				
M2355	Aquarius Community Solar Gardens, LLC	Solar	1,106				
M1880	Argo Navis CSG 3	Solar	861				
M1636	Argo Navis CSG1, LLC	Solar	674				
M1663	Argo Navis CSG2, LLC	Solar	876				
M1301	Aries CSG1, LLC - Aries CSG1, LLC	Solar	887				
M1302	Aries CSG2, LLC - Aries CSG2, LLC	Solar	891				
M1303	Aries CSG3, LLC - Aries CSG3, LLC	Solar	864				
M1304	Aries CSG4, LLC - Aries CSG4, LLC	Solar	889				
M1637	Armstrong Unit 1	Solar	909				
M1638	Armstrong Unit 2	Solar	923				
M1639	Armstrong Unit 3	Solar	913				
M1412	Aspen01	Solar	998				
M1413	Aspen02	Solar	985				
M1414	Aspen03	Solar	982				
M1415	Aspen04	Solar	985				
M1416	Aspen05	Solar	983				
M1339	B.R. Corcoran - Hennepin Kaat 1 - MINNESOTA SOLAR CSG 19, LLC	Solar	923				
M1616	Bartlett Unit 1	Solar	1,007				
M1617	Bartlett Unit 2	Solar	1,023				
M1618	Bartlett Unit 3	Solar	990				
M1619	Bartlett Unit 4	Solar	1,003				
M1620	Bartlett Unit 5	Solar	976				
M1905	Betcher CSG LLC	Solar	1,007				
M1054	Bethel ELCA - Bethel ELCA	Solar	17				
M1321	Big Lake Holdco LLC #1 - Big Lake Holdco LLC #1	Solar	887				
M1322	Big Lake Holdco LLC #2 - Big Lake Holdco LLC #2	Solar	944				
M1323	Big Lake Holdco LLC #3 - Big Lake Holdco LLC #3	Solar	941				
M1324	Big Lake Holdco LLC #4 - Big Lake Holdco LLC #4	Solar	946				
M1325	Big Lake Holdco LLC #5 - Big Lake Holdco LLC #5	Solar	936				
M1761	Big Lake Solar Project 1	Solar	1,089				
M1769	Big Lake Solar Project 2	Solar	1,086				

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
M1770	Big Lake Solar Project 3	Solar	1,096				
M1772	Big Lake Solar Project 4	Solar	1,090				
M1773	Big Lake Solar Project 5	Solar	1,066				
M1598	Brase Unit 1	Solar	1,007				
M1599	Brase Unit 2	Solar	1,022				
M1600	Brase Unit 3	Solar	1,012				
M1601	Brase Unit 4	Solar	410				
M1896	Butterfield CSG LLC	Solar	241				
M1290	Caelum CSG1, LLC - Caelum CSG1, LLC	Solar	711				
M1291	Caelum CSG2, LLC - Caelum CSG2, LLC	Solar	869				
M1369	Capella CSG1, LLC	Solar	968				
M1555	Carina CSG1, LLC	Solar	885				
M1556	Carina CSG2, LLC	Solar	913				
M1557	Carina CSG3, LLC	Solar	892				
M1558	Carina CSG4, LLC	Solar	881				
M1602	Carver Gladden Unit 1	Solar	927				
M1603	Carver Gladden Unit 2	Solar	921				
M1604	Carver Gladden Unit 3	Solar	925				
M1881	CEF Edina Community Solar, LLC	Solar	419				
M1838	CEF Shiloh Community Solar, LLC	Solar	127				
M1292	Centaurus CSG1, LLC - Centaurus CSG1, LLC	Solar	894				
M1293	Centaurus CSG2, LLC - Centaurus CSG2, LLC	Solar	896				
M1549	CF GM NES of Porter Way CSG A	Solar	891				
M1550	CF GM NES of Porter Way CSG B	Solar	897				
M1551	CF GM NES of Porter Way CSG C	Solar	892				
M1890	Clara City CSG 1, LLC	Solar	810				
M1781	Corvus CSG1, LLC	Solar	934				
M1780	Corvus CSG2, LLC	Solar	943				
M1779	Corvus CSG3, LLC	Solar	918				
M1778	Corvus CSG4, LLC	Solar	933				
M1777	Corvus CSG5, LLC	Solar	908				
M1640	Cottage Grove PV1	Solar	767				
M1641	Cottage Grove PV2	Solar	764				
M1642	Cottage Grove PV3	Solar	771				
M1643	Cottage Grove PV4	Solar	776				
M1644	Cottage Grove PV5	Solar	764				
M1628	Delphinus CSG1, LLC	Solar	841				
M1629	Delphinus CSG2, LLC	Solar	915				
M2363	Deneb Community Solar Garden, LLC	Solar	1,055				
M1879	DG Minnesota CSG 1, LLC	Solar	917				
M1878	DG Minnesota CSG 1, LLC	Solar	927				
M1877	DG Minnesota CSG 1, LLC	Solar	911				
M1876	DG Minnesota CSG 1, LLC	Solar	926				
M1875	DG Minnesota CSG 1, LLC	Solar	915				
M1826	DG Minnesota CSG, LLC	Solar	859				
M1825	DG Minnesota CSG, LLC	Solar	878				
M1824	DG Minnesota CSG, LLC	Solar	739				
M1823	DG Minnesota CSG, LLC	Solar	751				
M1822	DG Minnesota CSG, LLC	Solar	835				
M1821	DG Minnesota CSG, LLC	Solar	761				
M1820	DG Minnesota CSG, LLC	Solar	879				
M1874	DG Minnesota CSG, LLC	Solar	537				
M1873	DG Minnesota CSG, LLC	Solar	829				
M1819	DG Minnesota CSG, LLC	Solar	884				
M1818	DG Minnesota CSG, LLC	Solar	700				
M1817	DG Minnesota CSG, LLC	Solar	675				
M2361	Dodge I	Solar	1,028				
M2362	Dodge II	Solar	412				
M1417	DodgeSun CSG 1	Solar	1,028				
M1418	DodgeSun CSG 2	Solar	1,058				
M1419	DodgeSun CSG 3	Solar	1,052				
M1420	DodgeSun CSG 4	Solar	1,056				
M1421	DodgeSun CSG 5	Solar	1,048				
M1590	Dundas Solar Farm 1	Solar	741				
M1591	Dundas Solar Farm 2	Solar	768				
M1592	Dundas Solar Farm 3	Solar	801				
M1593	Dundas Solar Farm 4	Solar	787				
M1594	Dundas Solar Farm 5	Solar	769				
M1312	Equuleus Community Solar Gardens #1 - Equuleus Community Solar Gardens #1	Solar	800				
M1313	Equuleus Community Solar Gardens #2 - Equuleus Community Solar Gardens #2	Solar	811				
M1315	Equuleus Community Solar Gardens #4 - Equuleus Community Solar Gardens #4	Solar	816				
M1316	Equuleus Community Solar Gardens #5 - Equuleus Community Solar Gardens #5	Solar	813				
M1813	Foreman's Hill CSG LLC	Solar	867				
M1812	Foreman's Hill CSG LLC	Solar	901				
M1811	Foreman's Hill CSG LLC	Solar	912				
M1810	Foreman's Hill CSG LLC	Solar	888				
M1809	Foreman's Hill CSG LLC	Solar	870				
M1240	Forest Lake Holdco #1 - Forest Lake Holdco #1	Solar	798				
M1241	Forest Lake Holdco #2 - Forest Lake Holdco #2	Solar	786				
M1242	Forest Lake Holdco #3 - Forest Lake Holdco #3	Solar	718				
M1243	Forest Lake Holdco #4 - Forest Lake Holdco #4	Solar	836				
M1872	Fox CSG 1, LLC	Solar	865				
M1871	Fox CSG 1, LLC	Solar	875				
M1870	Fox CSG 1, LLC	Solar	880				
M1869	Fox CSG 1, LLC	Solar	882				
M1868	Fox CSG 1, LLC	Solar	884				
M1294	Gemini CSG1, LLC - Gemini CSG1, LLC	Solar	884				
M1295	Gemini CSG2, LLC - Gemini CSG2, LLC	Solar	901				
M1296	Gemini CSG3, LLC - Gemini CSG3, LLC	Solar	885				
M1422	Gopher 1	Solar	880				
M1423	Gopher 2	Solar	887				
M1424	Gopher 3	Solar	876				
M1425	Gopher 4	Solar	935				
M1426	Gopher 5	Solar	912				

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
M1907	Greenway Solar, LLC	Solar	266				
M1658	Grimm 049571	Solar	1,022				
M1387	Hauer Unit 2	Solar	879				
M1389	Hauer Unit 4	Solar	728				
M1390	Hauer Unit 5	Solar	634				
M1904	Heyer CSG LLC	Solar	986				
M1427	Hickory01	Solar	962				
M1428	Hickory02	Solar	995				
M1429	Hickory03	Solar	914				
M1430	Hickory05	Solar	981				
M1431	Hickory06	Solar	994				
M1659	Huneke I 049242	Solar	1,012				
M1245	Hwy 14 Holdco LLC #1 - Hwy 14 Holdco LLC #1	Solar	914				
M1246	Hwy 14 Holdco LLC #2 - Hwy 14 Holdco LLC #2	Solar	917				
M1247	Hwy 14 Holdco LLC #3 - Hwy 14 Holdco LLC #3	Solar	951				
M1248	Hwy 14 Holdco LLC #4 - Hwy 14 Holdco LLC #4	Solar	944				
M1249	Hwy 14 Holdco LLC #5 - Hwy 14 Holdco LLC #5	Solar	952				
M1326	IMS #1 - IMS #1	Solar	754				
M1327	IMS #2 - IMS #2	Solar	771				
M1328	IMS #3 - IMS #3	Solar	789				
M1329	IMS #4 - IMS #4	Solar	775				
M1330	IMS #5 - IMS #5	Solar	764				
M1559	Johnson CSG 1	Solar	1,024				
M1560	Johnson CSG 2	Solar	1,037				
M1561	Johnson CSG 3	Solar	1,006				
M1562	Johnson CSG 4	Solar	838				
M1563	Johnson CSG 5	Solar	693				
M1886	Johnson I CSG LLC	Solar	873				
M1887	Johnson II CSG LLC	Solar	879				
M1432	Kramer CSG 1	Solar	1,056				
M1433	Kramer CSG 2	Solar	1,052				
M1434	Kramer CSG 3	Solar	1,055				
M1660	Krause 049570	Solar	1,050				
M1840	Kreye01 CSG A	Solar	276				
M1841	Kreye01 CSG B	Solar	278				
M1843	Kreye01 CSG D	Solar	276				
M1844	Kreye02 CSG A	Solar	273				
M1845	Kreye02 CSG B	Solar	266				
M1846	Kreye02 CSG C	Solar	264				
M1847	Kreye02 CSG D	Solar	263				
M1842	Kreyer01 CSG C	Solar	269				
M1435	Lahr 1	Solar	810				
M1436	Lahr 2	Solar	815				
M1437	Lahr 3	Solar	865				
M1438	Lahr 4	Solar	854				
M1439	Lahr 5	Solar	859				
M1766	Lake Calhoun 43 LLC	Solar	909				
M1765	Lake Calhoun 44 LLC	Solar	871				
M1764	Lake Calhoun 45 LLC	Solar	907				
M1763	Lake Calhoun 47 LLC	Solar	923				
M1762	Lake Calhoun 49 LLC	Solar	862				
M1582	Lake Waconia Solar Garden	Solar	933				
M1583	Lake Waconia Solar IV Garden	Solar	728				
M1440	Lenzen Unit 1	Solar	807				
M1441	Lenzen Unit 2	Solar	809				
M1442	Lenzen Unit 3	Solar	786				
M1443	Lenzen Unit 4	Solar	320				
M1444	Lenzen Unit 5	Solar	830				
M1786	LeSun, LLC	Solar	929				
M1785	LeSun, LLC	Solar	915				
M1784	LeSun, LLC	Solar	946				
M1783	LeSun, LLC	Solar	962				
M1782	LeSun, LLC	Solar	958				
M1900	Libra Community Solar Garden, LLC	Solar	1,037				
M1189	Lind 2 - Lind SRC 041231	Solar	877				
M1190	Lind 3 - Lind SRC 041232	Solar	876				
M1650	Lindstrom CSG 1, LLC	Solar	1,026				
M1651	Lindstrom CSG 2, LLC	Solar	1,008				
M1652	Lindstrom CSG 3, LLC	Solar	1,005				
M1552	Lyra CSG1, LLC	Solar	568				
M1553	Lyra CSG2, LLC	Solar	610				
M1554	Lyra CSG3, LLC	Solar	574				
M1830	Mapleton Solar LLC	Solar	532				
M1829	Mapleton Solar LLC	Solar	1,004				
M1828	Mapleton Solar LLC	Solar	997				
M1827	Mapleton Solar LLC	Solar	1,002				
M1646	Marmas CSG 1	Solar	934				
M1647	Marmas CSG 2	Solar	946				
M1648	Marmas CSG 3	Solar	956				
M1649	Marmas CSG 4	Solar	943				
M1584	McHattie Unit 1	Solar	926				
M1585	McHattie Unit 2	Solar	915				
M1586	McHattie Unit 3	Solar	909				
M1587	McHattie Unit 4	Solar	901				
M1445	Menke Unit 1	Solar	843				
M1446	Menke Unit 2	Solar	944				
M1447	Menke Unit 3	Solar	967				
M1396	Michael 1	Solar	1,024				
M1397	Michael 2	Solar	1,021				
M1398	Michael 3	Solar	1,015				
M1399	Michael 4	Solar	955				
M1837	Minnesota Solar CSG 1, LLC	Solar	943				
M1836	Minnesota Solar CSG 1, LLC	Solar	973				
M1835	Minnesota Solar CSG 1, LLC	Solar	952				

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
M1834	Minnesota Solar CSG 1, LLC	Solar	967				
M1588	MN Lake Unit 1	Solar	990				
M1589	MN Lake Unit 2	Solar	855				
M1792	MN Solar Community, LLC	Solar	904				
M1791	MN Solar Community, LLC	Solar	797				
M1790	MN Solar Community, LLC	Solar	766				
M1794	MN Solar Community, LLC	Solar	829				
M1793	MN Solar Community, LLC	Solar	853				
M1250	Morgan CSG1, LLC - Morgan CSG1, LLC	Solar	937				
M1251	Morgan CSG2, LLC - Morgan CSG2, LLC	Solar	949				
M1800	MSC Carver01, LLC	Solar	292				
M1799	MSC Carver01, LLC	Solar	289				
M1798	MSC Carver01, LLC	Solar	229				
M1797	MSC Carver01, LLC	Solar	274				
M1804	MSC Carver02, LLC	Solar	286				
M1803	MSC Carver02, LLC	Solar	291				
M1802	MSC Carver02, LLC	Solar	290				
M1801	MSC Carver02, LLC	Solar	289				
M1849	MSC-Wash01, LLC	Solar	286				
M1848	MSC-Wash02, LLC	Solar	292				
M1850	MSC-Wash03, LLC	Solar	292				
M1851	MSC-Wash04, LLC	Solar	283				
M1852	MSC-Wash05, LLC	Solar	283				
M1853	MSC-Wash06, LLC	Solar	292				
M1854	MSC-Wash07, LLC	Solar	289				
M1855	MSC-Wash08, LLC	Solar	243				
M1856	MSC-Wash09, LLC	Solar	279				
M1857	MSC-Wash10, LLC	Solar	288				
M1858	MSC-Wash11, LLC	Solar	287				
M1859	MSC-Wash12, LLC	Solar	286				
M1860	MSC-Wash13, LLC	Solar	285				
M1861	MSC-Wash14, LLC	Solar	288				
M1862	MSC-Wash15, LLC	Solar	288				
M1863	MSC-Wash16, LLC	Solar	284				
M1864	MSC-Wash17, LLC	Solar	290				
M1865	MSC-Wash18, LLC	Solar	291				
M1866	MSC-Wash19, LLC	Solar	289				
M1867	MSC-Wash20, LLC	Solar	292				
M1317	NES - CF of Tyler CSG A - NES - CF of Tyler CSG A	Solar	196				
M1448	Nesvold 1 - 1	Solar	937				
M1449	Nesvold 1 - 2	Solar	890				
M1450	Nesvold 1 - 3	Solar	968				
M1451	Nesvold 1 - 4	Solar	929				
M1452	Nesvold 1 - 5	Solar	970				
M1610	New Germany Solar Garden	Solar	1,087				
M1453	Northfield Holdco LLC Unit 1	Solar	972				
M1454	Northfield Holdco LLC Unit 2	Solar	889				
M1455	Northfield Holdco LLC Unit 3	Solar	968				
M1456	Northfield Holdco LLC Unit 4	Solar	1,000				
M1457	Northfield Holdco LLC Unit 5	Solar	990				
M1052	Novel CSG of Faircon - Novel CSG of Faircon	Solar	43				
M1257	Novel CSG of Twin Pine Farm - Novel CSG of Twin Pine Farm	Solar	26				
M1548	Novel CSG of Vetter Farms B	Solar	23				
M1265	Novel CSG of Winona A - Novel CSG of Winona A	Solar	194				
M1898	Novel Solar Eight LLC	Solar	182				
M1897	Novel Solar Eight LLC	Solar	147				
M1891	Novel Solar Eight LLC	Solar	192				
M1635	Nystuen	Solar	784				
M1899	Oak Leaf Solar XI LLC	Solar	687				
M1759	Osakis Solar LLC	Solar	940				
M1816	Osakis Solar LLC	Solar	966				
M1815	Osakis Solar LLC	Solar	965				
M1814	Osakis Solar LLC	Solar	981				
M1805	Osakis Solar LLC	Solar	969				
M1297	Pegasus CSG1, LLC - Pegasus CSG1, LLC	Solar	861				
M1298	Pegasus CSG2, LLC - Pegasus CSG2, LLC	Solar	848				
M1254	Pine Island Holdco, LLC #2 - Pine Island Holdco, LLC #2	Solar	736				
M1256	Pine Island Holdco, LLC #4 - Pine Island Holdco, LLC #4	Solar	820				
M1888	Prinsburg CSG 1, LLC	Solar	766				
M1400	Richmond 1	Solar	969				
M1401	Richmond 2	Solar	966				
M1402	Richmond 3	Solar	919				
M1403	Richmond 4	Solar	970				
M1404	Richmond 5	Solar	997				
M1889	RJC I CSG LLC	Solar	820				
M1894	RJC II CSG LLC	Solar	829				
M2356	Sartell Solar LLC (CSG A)	Solar	811				
M2357	Sartell Solar LLC (CSG B)	Solar	818				
M2358	Sartell Solar LLC (CSG C)	Solar	799				
M2359	Sartell Solar LLC (CSG D)	Solar	830				
M2360	Sartell Solar LLC (CSG E)	Solar	743				
M1808	Scandia CSG LLC	Solar	859				
M1807	Scandia CSG LLC	Solar	882				
M1806	Scandia CSG LLC	Solar	434				
M1458	Scandia Trail Unit 1	Solar	1,064				
M1459	Scandia Trail Unit 2	Solar	1,031				
M1460	Scandia Trail Unit 3	Solar	1,056				
M1461	Scandia Trail Unit 4	Solar	1,007				
M1462	Scandia Trail Unit 5	Solar	952				
M1662	School Sisters 051877	Solar	960				
M1614	Sherburne Community Solar Garden 1	Solar	842				
M1615	Sherburne Community Solar Garden 2	Solar	843				
M1613	Sherburne Community Solar Garden 3	Solar	840				
M1612	Sherburne Community Solar Garden 4	Solar	841				

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
M1611	Sherburne Community Solar Garden 5	Solar	839				
M1630	South Street West Solar Project 1	Solar	897				
M1631	South Street West Solar Project 2	Solar	858				
M1632	South Street West Solar Project 3	Solar	876				
M1633	South Street West Solar Project 4	Solar	880				
M1634	South Street West Solar Project 5	Solar	874				
M1306	Spica CSG2, LLC - Spica CSG2, LLC	Solar	937				
M1776	SunE Feely 1, LLC	Solar	931				
M1775	SunE Feely 1, LLC	Solar	928				
M1774	SunE Feely 1, LLC	Solar	927				
M1771	SunE Feely 1, LLC	Solar	937				
M1768	SunE Feely 1, LLC	Solar	946				
M1391	SunE Koppelman 1, LLC	Solar	1,038				
M1392	SunE Koppelman 2, LLC	Solar	1,044				
M1393	SunE Koppelman 3, LLC	Solar	1,038				
M1395	SunE Koppelman 5, LLC	Solar	1,038				
M1653	SunE St. Cloud 1, LLC Unit 1	Solar	838				
M1654	SunE St. Cloud 1, LLC Unit 2	Solar	846				
M1655	SunE St. Cloud 1, LLC Unit 3	Solar	829				
M1656	SunE St. Cloud 1, LLC Unit 4	Solar	829				
M1657	SunE St. Cloud 1, LLC Unit 5	Solar	840				
M1595	SunE Stolee PV1	Solar	950				
M1596	SunE Stolee PV2	Solar	954				
M1597	SunE Stolee PV3	Solar	961				
M1147	Sunrise CSG 1 - Sunrise CSG 1	Solar	840				
M1795	Taurus CSG 1, LLC	Solar	1,011				
M1796	Taurus CSG 2, LLC	Solar	911				
M1626	Taurus CSG3, LLC	Solar	1,025				
M1627	Taurus CSG4, LLC	Solar	994				
M1463	Taylors Falls 1	Solar	860				
M1464	Taylors Falls 2	Solar	857				
M1465	Taylors Falls 3	Solar	345				
M1466	Taylors Falls 4	Solar	880				
M1467	Taylors Falls 5	Solar	898				
M1569	TJ Farms Unit 1	Solar	772				
M1570	TJ Farms Unit 2	Solar	785				
M1571	TJ Farms Unit 3	Solar	801				
M1572	TJ Farms Unit 4	Solar	202				
M1903	USS Big Lake 1 LLC	Solar	1,143				
M1901	USS Dubhe Solar LLC	Solar	1,111				
M2499	USS Eggo Solar	Solar	1,044				
M1906	USS Good Solar LLC	Solar	1,090				
M1902	USS Kasch Solar LLC	Solar	1,159				
M2364	USS Kost Trail Solar	Solar	1,070				
M1307	Vega CSG1, LLC - Vega CSG1, LLC	Solar	963				
M1308	Vega CSG2, LLC - Vega CSG2, LLC	Solar	937				
M1309	Vega CSG3, LLC - Vega CSG3, LLC	Solar	955				
M1310	Vega CSG4, LLC - Vega CSG4, LLC	Solar	963				
M1311	Vega CSG5, LLC - Vega CSG5, LLC	Solar	974				
M1573	Veseli Solar Garden	Solar	1,040				
M1574	Vetter Estate Unit 1	Solar	952				
M1575	Vetter Estate Unit 2	Solar	984				
M1576	Vetter Estate Unit 3	Solar	916				
M1318	Walz #1 - Walz #1	Solar	206				
M1319	Walz #2 - Walz #2	Solar	816				
M1320	Walz #3 - Walz #3	Solar	801				
M1577	WasecaSun, LLC Unit 1	Solar	1,040				
M1578	WasecaSun, LLC Unit 2	Solar	1,033				
M1579	WasecaSun, LLC Unit 3	Solar	1,043				
M1580	WasecaSun, LLC Unit 4	Solar	1,054				
M1581	WasecaSun, LLC Unit 5	Solar	1,054				
M1468	Waterford Holdco LLC Unit 3	Solar	670				
M1469	Waterford Holdco LLC Unit 4	Solar	996				
M1470	Waterford Holdco LLC Unit 5	Solar	965				
M1564	Waterville Community Solar Farm 1	Solar	916				
M1565	Waterville Community Solar Farm 2	Solar	893				
M1566	Waterville Community Solar Farm 3	Solar	880				
M1567	Waterville Community Solar Farm 4	Solar	908				
M1568	Waterville Community Solar Farm 5	Solar	902				
M1661	Webster 049585	Solar	689				
M1262	Webster Holdco LLC #2 - Webster Holdco LLC #2	Solar	912				
M1267	Webster Holdco LLC #3 - Webster Holdco LLC #3	Solar	896				
M1264	Webster Holdco LLC #5 - Webster Holdco LLC #5	Solar	904				
M1839	WGL Solar Anderson, LLC	Solar	942				
M1882	WGL Solar Barone, LLC	Solar	1,017				
M1883	WGL Solar Bolduan, LLC	Solar	983				
M1895	WGL Solar Cornille, LLC	Solar	910				
M1892	WGL Solar Eichtens II, LLC	Solar	942				
M1767	WGL Solar Goodhue 1, LLC	Solar	968				
M1760	WGL Solar Goodhue 1, LLC	Solar	959				
M1893	WGL Solar Guse, LLC	Solar	991				
M1885	WGL Solar Huneke II, LLC	Solar	934				
M1789	WGL Solar Red Maple 1, LLC	Solar	963				
M1788	WGL Solar Red Maple 1, LLC	Solar	991				
M1787	WGL Solar Red Maple 1, LLC	Solar	953				
M1884	WGL Solar Winegar, LLC	Solar	842				
M2365	Wright Kirby 1	Solar	914				
M2366	Wright Kirby 2	Solar	946				
M2367	Wright Kirby 3	Solar	961				
M2368	Wright Kirby 4	Solar	967				
M2369	Wright Kirby 5	Solar	924				
M1605	Wyoming 2 PV1	Solar	902				
M1606	Wyoming 2 PV2	Solar	901				
M1607	Wyoming 2 PV3	Solar	900				

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
M1608	Wyoming 2 PV4	Solar	907				
M1609	Wyoming 2 PV5	Solar	870				
M1645	Zumbro Solar Garden	Solar	963				
M2389	CEF Clarks Grove Community Solar	Solar	193				
M2375	Felton PV1	Solar	586				
M2376	Felton PV2	Solar	589				
M2377	Felton PV3	Solar	590				
M2378	Felton PV4	Solar	587				
M2379	Felton PV5	Solar	592				
M2508	MNCS Solar Garden of Held, CSG A	Solar	673				
M2509	MNCS Solar Garden of Held, CSG B	Solar	681				
M2510	MNCS Solar Garden of Held, CSG C	Solar	688				
M2385	NES CSG of Gibbon CSG A	Solar	798				
M2386	NES CSG of Gibbon CSG B	Solar	795				
M2387	NES CSG of Gibbon CSG C	Solar	780				
M2388	NES CSG of Gibbon CSG D	Solar	205				
M2370	Novel - Oya CSG of Held Farms C	Solar	667				
M2371	Novel - Oya CSG of Held Farms D	Solar	704				
M2372	Novel - Oya CSG of Held Farms E	Solar	582				
M2373	Novel - Oya CSG of Held Farms F	Solar	356				
M2374	Novel - Oya CSG of Held Farms G	Solar	579				
M2380	Randolph PV1	Solar	317				
M2381	Randolph PV2	Solar	523				
M2382	Randolph PV3	Solar	522				
M2383	Randolph PV4	Solar	467				
M2384	Randolph PV5	Solar	519				
M2396	CEF Haven Community Solar	Solar	435				
M2512	CEF Pax Christi Community Solar	Solar	62				
M2393	Haven Solar Project 1	Solar	370				
M2394	Haven Solar Project 2	Solar	350				
M2395	Haven Solar Project 3	Solar	348				
M2390	MSC-Chisago01, LLC	Solar	602				
M2511	USS East Hauer Watt Solar	Solar	402				
M2391	USS King 2	Solar	683				
M2392	USS Lake Patterson Solar	Solar	696				
M2549	Clara City	Solar	354				
M1244	Forest Lake Holdco #5 - Forest Lake Holdco #5	Solar	179				
M2397	MSC-Empire01, LLC	Solar	384				
M2398	MSC-Rice01, LLC	Solar	430				
M2399	MSC-Scott01, LLC	Solar	247				
M2400	New Munich Solar LLC	Solar	399				
M2411	Novel Martin Solar One LLC	Solar	305				
M2401	Olinda Trail Solar	Solar	360				
M2404	Rollingstone Unit 1	Solar	40				
M2405	Rollingstone Unit 2	Solar	48				
M2406	Rollingstone Unit 3	Solar	34				
M2407	Rollingstone Unit 4	Solar	56				
M2408	Rollingstone Unit 5	Solar	53				
M2402	Stearns Solar I LLC	Solar	371				
M2410	USS DVL Solar	Solar	396				
M2513	Wabasha Solar II	Solar	357				
M2514	Wabasha Solar III	Solar	353				
M2403	Wabasha Solar LLC	Solar	373				
M2409	Winona Solar I LLC	Solar	363				
M2515	Winona Solar II	Solar	420				
M2500	CEF Minneapolis Ramp Community Solar, LLC	Solar	152				
M2517	Lady Slipper Unit 1	Solar	120				
M2518	Lady Slipper Unit 2	Solar	137				
M2519	Lady Slipper Unit 3	Solar	140				
M2520	Lady Slipper Unit 4	Solar	137				
M2521	Lady Slipper Unit 5	Solar	53				
M2550	Malmedal Garden LLC	Solar	158				
M2516	MSC-Chisago02, LLC	Solar	126				
M2502	USS Brude Solar	Solar	154				
M2501	USS Rapidan Solar	Solar	153				
M2551	Wollan Garden LLC	Solar	157				
M2506	Novel Brooten Solar LLC	Solar	138				
M2526	Novel Solar Two LLC	Solar	75				
M2525	Novel Solar Two LLC	Solar	75				
M2524	Novel Solar Two LLC	Solar	72				
M2523	Novel Solar Two LLC	Solar	68				
M2522	Novel Solar Two LLC	Solar	76				
M1133	Paynesville CSG 2 - Paynesville CSG 2	Solar	96				
M1134	Paynesville CSG 3 - Paynesville CSG 3	Solar	96				
M2503	USS Centerfield Solar	Solar	117				
M2505	USS Haven Solar	Solar	42				
M2504	USS Hockey Pad Solar	Solar	44				
M2548	CEF Waseca Community Solar	Solar	75				
M2507	USS White Cloud Solar	Solar	21				
{NOT PUBLIC DATA BEGINS							
		Wind	61,886				
		Wind	85,201				
		Wind	3,785				
		Wind	118,492				
		Wind	108,662				
		Wind	29,225				
		Wind	27,283				
		Wind	460,239				
		Wind	796,668				
		Wind	57,217				
		Wind	45,688				
		Wind	4,132				
		Wind	615,342				
		Wind	198,869				

PUBLIC DOCUMENT
NOT PUBLIC DATA HAS BEEN EXCISED

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

MRETS ID	MRETS Generator Facility Name	Generator Fuel Type	RECs retired for **RENEWABLE ENERGY STANDARD** compliance	RECs retired for **GREEN PRICING** programs	SRECs retired for Small Scale **SOLAR ENERGY STANDARD** compliance	SRECs retired for Non-small scale **SOLAR ENERGY STANDARD** compliance	NOTES
		Wind	441,706				
		Wind	224,107				
		Wind	52,148				
		Wind	4,429				
		Wind	99,640				
		Wind	3,352				
		Wind	262,082				
		Wind	243,159				
		Wind	61,858				
		Wind	730				
		Wind	144,900				
		Wind	139,246				
		Wind	141,597				
		Wind	400,976				
		Wind	147,408				
		Wind	81,750				
		Wind	52,329				
		Wind	37,402				
		Wind	2,264				
		Wind	18,849				
		Wind	238,279				
		Wind	85,849				
		Wind	6,380				
		Wind	5,174				
		Wind	6,533				
		Wind	25,624				
		Wind	16,122				
		Wind	12,294				
		Wind	28,427				
		Wind	30,211				
		Wind	8,284				
		Wind	6,414				
		Wind	38,625				
		Wind	1,977				
		Wind	29,901				
		Wind	42,023				
		Wind	4,400				
		Wind	247,790				
		Wind	552,353				
		Wind	191,600				
		Wind	34,670				
		Wind	25				
		Wind	146,215				
		Wind	165,503				
		Wind	37,442				
		Hydroelectr	11,144				
		Hydroelectr	33,070				
		Hydroelectr	30,281				
		Hydroelectr	7,987				
		Hydroelectr	11,062				
		Hydroelectr	14,958				
		Hydroelectr	10,618				
		Hydroelectr	11,081				
		Hydroelectr	71,049				
		Hydroelectr	39,409				
		Biogas	4,353				
		Biogas	10,826				
		Hydroelectr	1,316				
		Municipal s	135,635				
		Hydroelectr	32,459				
		Hydroelectr	33,345				
		Hydroelectr	28,752				
		Hydroelectr	60,255				
		Hydroelectr	4,169				
		Hydroelectr	61,973				
		Hydroelectr	9,826				
		Hydroelectr	22,987				
		Hydroelectr	2,744				
		Hydroelectr	9,048				
		Hydroelectr	59,027				
		Hydroelectr	93,259				
		Hydroelectr	8,745				
		Hydroelectr	6,430				
		Hydroelectr	7,201				
		Hydroelectr	802				
		Hydroelectr	3,912				
		Hydroelectr	83,629				
		Hydroelectr	42,137				
		Hydroelectr	4,977				

NOT PUBLIC DATA ENDS]

PUBLIC DOCUMENT
NOT PUBLIC DATA HAS BEEN EXCISED

Docket Nos. E999/PR-02-1240; E999/PR-23-12
Attachment A; Page 15 of 15

Renewable Energy Certificate Retirement Report for
RENEWABLE ENERGY STANDARDS and GREEN PRICING PROGRAMS

Minnesota Public Utilities Commission: Docket No. E999/PR-23-12 and Docket No. E999/M-23-85 **Attachment 6**
Minnesota Department of Commerce: Docket No. E999/PR-02-1240 Reporting Period: **January 1, 2022 - December 31, 2022**

M-RETS RECs Bought and Sold

Ordering pt. 4C requires reporting REC sales & purchases for the 2 preceding calendar years

REC Purchases Total	330,000
REC Sales Total	0

Enter REC data for the 2 preceding calendar years.

Wholesale REC Purchases	Wholesale REC Sales	PRICE	Type of purchase	NOTES
		[NOT PUBLIC DATA BEGINS		
58,115			For Green Pricing	MN Windsource REC Purchase
271,885			For Green Pricing	MN Windsource REC Purchase
		NOT PUBLIC DATA ENDS]		

CERTIFICATE OF SERVICE

I, Christine Schwartz, hereby certify that I have this day served copies or summaries of the foregoing document on the attached list of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States Mail at Minneapolis, Minnesota

xx electronic filing

DOCKET NOS. E999/PR-02-1240
E999/PR-23-12

Dated this 1st day of June 2023

/s/

_____

Christine Schwartz
Regulatory Administrator

APPENDIX O – 2023 WORKFORCE TRANSITION PLAN SUMMARY

Order Point 24 of the Commission's April 15, 2022, Order in Docket No. E002/RP-19-368 states:

The Commission authorizes the Executive Secretary to open a new docket regarding workers at retiring generating facilities in Minnesota, including Sherco and King.

A. *Xcel—working with the Minnesota Department of Employment and Economic Development and the Energy Transition Office; the International Brotherhood of Electrical Workers, Locals 23, 160, and 949; the Minnesota Building Trades; and the Center for Energy and Environment—shall develop a comprehensive plan for supporting transitioning workers. The plan shall consider the measures outlined in the IBEW comments dated March 17, 2020, and March 21, 2021, including skills inventories, training and education, worker placement and potential early retirement buy-out scenarios. Xcel shall file the plan with the Commission no later than December 31, 2022. The plan shall include an estimated budget for each measure, timeline for implementation, and a description of additional funding needed by DEED or the Energy Transition Office, if applicable, to implement the plan.*
B. *Beginning on December 31, 2023, and annually thereafter, Xcel shall file a detailed update on its efforts to implement the plan in coordination with CEE, DEED and the Energy Transition Office, and IBEW.*

The Company originally filed the Workforce Transition Plan as part of the Performance Based Rates Annual Report, pursuant to the Commission's February 9, 2022, Order Accepting Reporting and Setting Additional Requirements in Docket No. E002/CI-17-401. The Commission recently approved removing the Workforce Transition Plan reporting requirement from Performance Based Ratemaking at its November 2, 2023, hearing. The 2023 Workforce Transition Plan was filed with the Minnesota Public Utilities Commission in Docket Nos. E002/RP-19-368 and E002/M-22-265 on December 21, 2023, and has been included in this IRP as Attachment O1: 2023 Workforce Transition Plan.

Xcel Energy has a long and successful history of performing strategic workforce planning to support workers through a transition, creating and executing upon workforce plans, and enabling a smooth transition of our workforce. We have a highly skilled workforce, and it is our desire and intent to retain these skilled workers to the greatest extent feasible. While transition plans for impacted employees at the Sherburne County Generating Station (Sherco) and Allen S. King Generating Plant (King) facilities are still evolving, Xcel Energy continues to engage in significant and deliberate workforce transition planning efforts. The Company communicates regularly with plant

employees, IBEW local unions, and building trades unions to ensure transparency and to maintain engagement. Outlined in the Plan are planning, headcount, and cost estimates with respect to workforce transitions that will occur because of the proposed retirement of electric generating facilities. The Plan also discusses what work is being done to facilitate the workforce transition in Minnesota – including the opportunity for workers to upskill and reskill – and the employment opportunities we anticipate being available to plant workers around the time of plant closures.

414 Nicollet Mall
Minneapolis, MN 55401

December 21, 2023

—Via Electronic Filing—

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

RE: WORKFORCE TRANSITION PLAN – ANNUAL REPORT
IN THE MATTER OF WORKFORCE TRANSITION RELATED TO RETIRING ELECTRICITY GENERATING FACILITIES
DOCKET NO. E002/M-22-265, E002/RP-19-368

Dear Mr. Seuffert:

Northern States Power Company, doing business as Xcel Energy, files this Annual Report on workforce transition related to our retiring electricity generating facilities.

Order Point 24 in the Commission's April 15, 2022, Order approving the Company's Integrated Resource Plan reads as follows:

A. *Xcel—working with the Minnesota Department of Employment and Economic Development and the Energy Transition Office; the International Brotherhood of Electrical Workers, Locals 23, 160, and 949; the Minnesota Building Trades; and the Center for Energy and Environment—shall develop a comprehensive plan for supporting transitioning workers. The plan shall consider the measures outlined in the IBEW comments dated March 17, 2020, and March 21, 2021, including skills inventories, training and education, worker placement and potential early retirement buy-out scenarios. Xcel shall file the plan with the Commission no later than December 31, 2022. The plan shall include an estimated budget for each measure, timeline for implementation, and a description of additional funding needed by DEED or the Energy Transition Office, if applicable, to implement the plan.*
B. *Beginning on December 31, 2023, and annually thereafter, Xcel shall file a detailed update on its efforts to implement the plan in coordination with CEE, DEED, and the Energy Transition Office, and IBEW*

The Company is committed to ensuring a just transition for our workforce. We have a long and successful history of performing strategic workforce planning to support workers through a transition, creating and implementing workforce plans, and enabling a smooth transition of our workforce. We have a highly skilled workforce,

and it is our desire and intent to retain these skilled workers to the greatest extent feasible. Our Workforce Transition Plan (the Plan) reflects that intent.

The Company continues to engage in significant and deliberate workforce transition planning efforts. We have been communicating regularly with plant employees, IBEW local unions, and building trades unions to ensure transparency and to maintain engagement. This workforce transition plan highlights each step of the planning and transition process. The outcomes of each phase will be updated as workforce transition planning progresses, when plant retirement dates near, as future jobs and skills become more apparent, and as the Company evaluates existing opportunities for impacted workers across the organization.

The Plan includes cost estimates that we intend to update and refine over time, and which may inform future budgets. We will continue to work with DEED and the Energy Transition Office to explore additional funding. The Plan also includes an updated methodology for evaluating the future opportunities for impacted workers, which will more accurately reflect opportunities during the relevant transition timeframe. We look forward to continuing discussions with stakeholders and our employees in the coming years.

We have electronically filed this document with the Minnesota Public Utilities Commission, and copies have been served on the parties on the attached service list. Please contact Ashley Kehoe at ashley.r.kehoe@xcelenergy.com or me at bridget.dockter@xcelenergy.comif you have any questions regarding this filing.

Sincerely,

/s/

BRIDGET DOCKTER
MANAGER, POLICY, AND OUTREACH

Enclosures
cc: Service Lists

WORKFORCE TRANSITION PLAN

MINNESOTA

DECEMBER 21, 2023

XCEL ENERGY MINNESOTA WORKFORCE TRANSITION PLAN

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INTRODUCTION

BACKGROUND

Leading the clean energy transition is one of Xcel Energy's corporate priorities. We were the first major US electricity provider with a vision to serve customers with 100% carbon-free electricity by 2050 and to reduce carbon emissions company-wide by 80% from 2005 levels by 2030.

Figure 1. Building our carbon-free future.

To achieve our carbon-free future goal in Minnesota, we plan to retire our existing coal plants by 2030, expand our use of wind, solar, and battery storage systems, build on our successful energy efficiency programs and demand response options, and add new transmission infrastructure to connect more clean energy to the grid. We have a highly skilled and experienced workforce that we plan to transition to new and existing jobs across Xcel Energy. Our workforce is an important part of our clean energy vision.

WORKFORCE TRANSITION

Outlined in this Workforce Transition Plan (Plan) are planning, headcount, and cost estimates with respect to workforce transitions that will occur because of the proposed retirement of electric generating facilities. This Plan, including its information and assumptions will continue to be updated as plant transitions evolve.

The Plan was originally filed as part of the Performance Based Rates Annual Report, pursuant to the Minnesota Public Utilities Commission's (the Commission) February 9, 2022, Order Accepting Report and Setting Additional Requirements in Docket No. E002/CI-17-401 and later added to this docket for reporting through our Integrated Resource Plan (IRP). The Commission recently approved removing the Workforce Transition reporting requirement from Performance Based Ratemaking at its November 2, 2023, hearing with the understanding we will continue to report our Plan in the instant docket. At the time of this filing, a formal Order in the Performance Based Ratemaking proceeding is pending.

Xcel Energy has a long and successful history of performing strategic workforce planning to support workers through a transition, creating and executing upon workforce plans, and enabling a smooth transition of our workforce. We have a highly skilled workforce, and it is our desire and intent to retain these skilled workers to the greatest extent feasible. While transition plans for impacted employees at the Sherburne County Generating Station (Sherco) and Allen S. King Generating Plant (King) facilities are still evolving, Xcel Energy continues to engage in significant and deliberate workforce transition planning efforts. The Company communicates regularly with plant employees, IBEW local unions, and building trades unions to ensure transparency and to maintain engagement. This Plan highlights each step of the planning and transition process. The outcomes of each phase will be updated as workforce transition planning progresses, when plant retirement dates near, as future jobs and skills become more apparent, and as the Company evaluates existing opportunities for impacted workers across the organization.

STRATEGIC WORKFORCE PLANNING DEPARTMENT

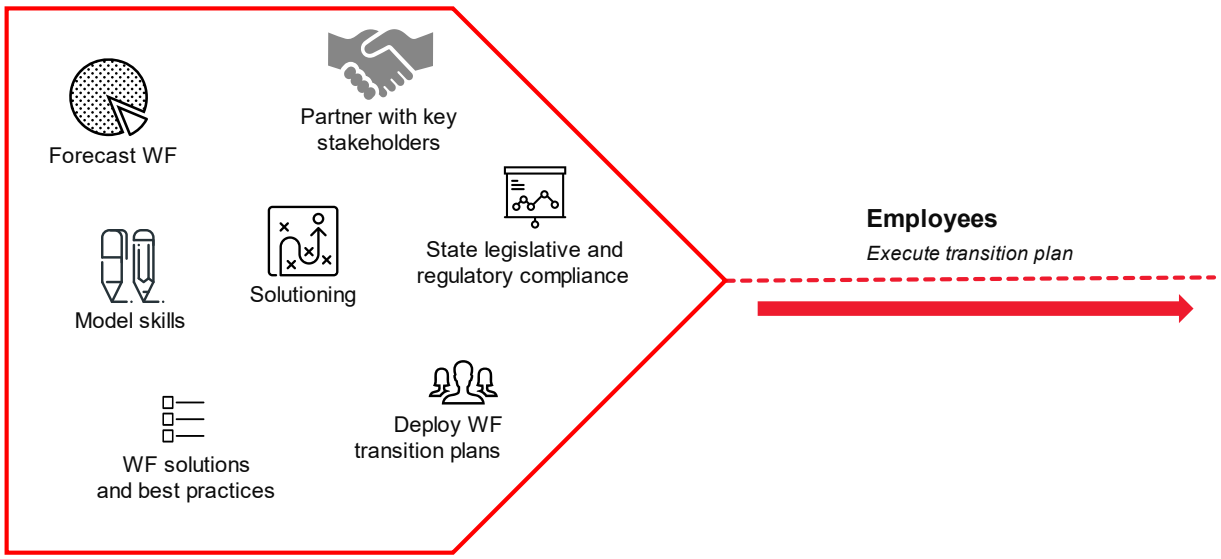
The Strategic Workforce Planning (SWP) department is housed within the Human Resource and Employee Services business area at Xcel Energy. The SWP department routinely performs workforce modeling to forecast headcount and costs, identify risks and opportunities, assess skill profiles across jobs and business areas, align the workforce to strategic priorities, and deploy workforce solutions based on data-driven insights. The SWP department holds the responsibility of creating and executing upon a workforce transition plan, in partnership and collaboration with multiple solution owners and key stakeholders.

The SWP department consists of workforce analytics consultants and analysts with a data science background and leadership consulting skills.

WORKFORCE TRANSITION PLANNING COLLABORATION

The SWP department at Xcel Energy works closely with both internal and external key stakeholders and partners to model, plan, design, and facilitate workforce transition.

Figure 2. Workforce transition planning collaboration.



Key internal partners and stakeholders include, but are not limited to:

- Human Resources and Employee Services Departments
    - Strategic Workforce Planning (SWP)
    - Workforce Relations (WFR)
    - Human Resources Business Partners (HRBPs)
    - Enterprise Learning Organization (ELO)
    - Workforce Analytics (WFA)
- Operations business areas
    - Energy Supply - Generation

    - Distribution
    - Transmission
    - Gas
- Northern States Power Minnesota (NSPM) operating company
    - Resource Planning
    - State Government Affairs
    - Community Relations

Key external partners and stakeholders include, but are not limited to:

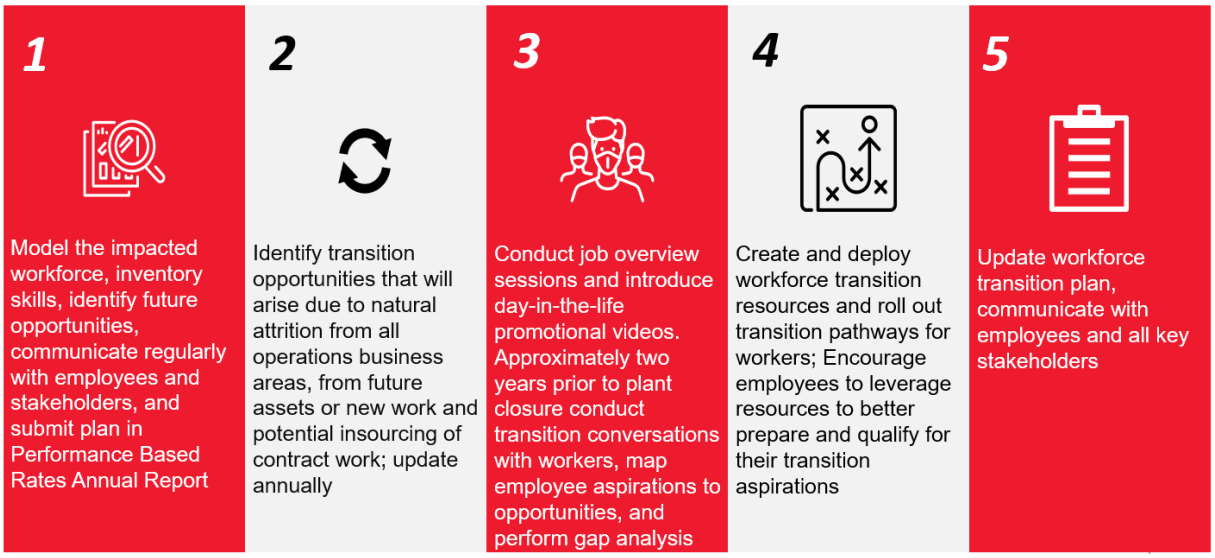
- IBEW local unions representing Xcel Energy employees,
- Minnesota building trades labor unions whose members work for Xcel Energy and its contractors,
- Center for Energy Workforce Development (CEWD),
- Minnesota State Energy Center of Excellence,
- Energy Providers Coalition for Education (EPCE) and their education partners,
- Local education partners, community colleges and universities across the state, and
- All local workforce centers across the state of Minnesota.

XCEL ENERGY MINNESOTA WORKFORCE TRANSITION PLAN

WORKFORCE TRANSITION PLANNING PROCESS PHASES

To facilitate workforce transition in Minnesota, the SWP department continues to adopt the multifaceted approach described above to enable a smooth transition at coal plants. The process of planning for workforce transition is as follows:

Figure 3. Transition workforce planning process.



PHASE 1

WORKFORCE TRANSITION PLANNING MODELING

The following estimates were derived and updated as of **September 30, 2023,** and will continue to be updated as more refined input becomes available with respect to plant retirement, future opportunities that become available, and employees' aspirations and skills.

Furthermore, both the headcount and cost estimates will be refined once each employee participates in the transition conversations (which occur approximately two years prior to plant closure) and we are able to gain greater insight into the aspirations of our workers, their skills, available local opportunities, and programs we need to build or deploy to enable a smooth transition.

WORKFORCE HEADCOUNT MODELS

Detailed workforce analysis was conducted to estimate the number of potential impacted employees at each plant and identify the solutions required to transition these employees. This analysis is completed within the SWP department and in collaboration with other data analysts within Xcel Energy's Energy Supply and Resource Planning business areas.

Table 1. Projected headcount and number of employees to transition at Sherco

Plant	**Sherco**		
Event	*2023 EOY Unit 2 Closure*	*2026 EOY Unit 1 Closure*	*2030 EOY Unit 3 Closure*
Current Headcount as of September 30, 2023	187		
Target Headcount at closure	191	170	134
Projected Headcount Without Backfilling	172	115	35
Understaffed Level Without Backfilling	(19)	(55)	(99)
Projected Headcount With Backfilling	187	170	134
Employees to Transition	0	0	134

*Notes:

- There are 36 non-operations employees and an operations target headcount of 98, totaling 134 employees needed through 2030.

Table 2. Projected headcount and number of employees to transition at King

Plant	King
Event	*2028 EOY Closure*
Current Headcount as of September 30, 2023	84
Target Headcount at Closure	73
Projected Headcount Without Backfilling	1
Understaffed Level Without Backfilling	(69)
Projected Headcount With Backfilling	72
Employees to Transition	73
Number of Employees with Retention Agreements	(11)
Remaining Employees to Transition	62

*Notes:

- The Company and the union have already reached an agreement with 11 Operators to secure their employment at the King plant up until closure. The agreement includes transfer to Operator positions at other nearby plants.
- There are five non-operations employees and an operations target headcount of 68, totaling 73 employees needed through 2028.

Definition of workforce variables used in Tables 1 & 2:

- **Event**
  Proposed early retirement dates.

- **Current Headcount**
  Number of Xcel Energy benefitted employees working at the plant as of September 30, 2023. These numbers do not include supplemental building trade workers who are employed by either Xcel Energy or by contractors.

- **Target Headcount**
  The number of employees needed to run the remaining units. Through continued collaboration with the Company's Energy Supply team, we estimated the number of Xcel Energy employees that would, at a minimum, be needed to operate the plant up to and at the time of closure.

- **Projected Headcount (without back-filling)**
  Current Headcount less projected retirement and non-retirement attrition and transfers from September 30, 2023, up to the early retirement date. "Without back-filling" assumes employees who retire or leave the organization and who are not replaced.

- **Understaffed Level (without back-filling)**
  Target Headcount less Projected Headcount; to calculate the number of employees (understaffed)/overstaffed to the minimum Target Headcount of employees needed to operate a unit if employees who retire or leave the organization are not replaced.

- **Projected Headcount (with back-filling)**
  Current Headcount less projected retirements and non-retirement attrition and transfers from September 30, 2023, up to the Event date. In our projection with back-filling, employees who retire or leave the organization are replaced up to, but not exceeding, the Target Headcount.

- **Employees to Transition**
  This is the number of employees to be retained through transfer within the plant, within other generating units, or within other business areas across the organization. This number represents the number of employees who will be transitioned due to the retirement of a facility. To the extent feasible, we do not anticipate any layoffs. Our intent is to retain our employees and redeploy them across the organization. Opportunities for these workers are outlined below in the *Phase 2, Future Opportunities for Impacted Workers* section of this report.

    - *Sherco Unit 2 Closure*
      Employees to Transition is equal to Projected Headcount (with backfilling) less Target Headcount at closure. Previously backfilled workers will flow to positions at the remaining operating units (i.e., Unit 1 and Unit 3).

  - *Sherco Unit 1 Closure*
    Employees to Transition is equal to Projected Headcount (with backfilling) less Target Headcount at closure. Previously backfilled workers will flow to positions at the remaining operating unit (i.e., Unit 3).

  - *Sherco Unit 3 Closure*
    Employees to Transition is equal to Target Headcount at closure. There is no Projected Headcount beyond 2030, which is the final unit closure date; as more information becomes available, these estimates will be updated accordingly.

  - *King Closure*
    Employees to Transition is equal to Projected Headcount (with backfilling) minus the number of employees with retention agreements.

- **Number of Employees with Retention Agreements**
  This number represents the number of employees with agreements to remain at the King Plant through closure along with transfer to nearby plants.

- **Remaining Employees to Transition**
  This number represents the number of Employees to Transition minus the number of Employees with Retention Agreements. We will need to retain some employees for demolition after closure.

The SWP department uses target headcount and attrition forecasts in the workforce planning models to estimate the number of impacted employees at each plant. Energy Supply provides the target headcount in resource planning models and Workforce Analytics provides the retirement and non-retirement attrition projection data. These estimates are early projections and will continue to be updated annually and leading up to the retirement of each unit.

- Workforce Analytics at Xcel Energy uses an actuarial-based attrition simulator to forecast company turnover, both retirement and non-retirement.

  - Non-retirement attrition percentages are based on historical Xcel Energy experience.

  - Retirement attrition percentages are based on inputs such as the employee's age, service, and selected retirement plan.

Target headcounts for the plants were derived by the plant directors at each plant location in Energy Supply. The plant directors created a workforce plan to identify the number of people they need in each job to continue safe operation of the remaining

units. These projections are estimates and may be updated as we approach retirement of these units and when resource needs are more easily identifiable.

The above tables and calculations do not include supplemental workers that the Company uses on an as-needed basis or for major overhauls of the units. Supplemental workers are provided either directly by the building trade unions or by the contractors through which we source to execute on these activities.

WORKFORCE COST MODELS

Cost models of potential transition resources have been developed that include, but are not limited to, internal technical training, internal enterprise-wide learning courses, external educational assistance, relocation, and voluntary severance/early-exit.

Based on similar transitions of other coal plants across our service territory, primary transition resources needed to transition a workforce were identified and high-level cost projections associated with the anticipated closure of our remaining coal units in Minnesota were conducted.

Table 3. Estimated cost of potential transition resources

Plant	Sherco Unit 2	Sherco Unit 1	Sherco Unit 3	King
Event	Closure	Closure	Closure	Closure
Internal Tech Training	$0	$0	$6,150,000	$1,650,000
ELO Training			$150,000	$150,000
External Industry Training	$0	$0	$160,200	$44,500
On-the-Job Training				
Tuition Reimbursement	$0	$0	$189,000	$47,250

Relocation	$0	$0	$60,000	$20,000
Severance				
Subtotal	**$0**	**$0**	**$6,709,200**	**$1,911,750**
Grand Total	**$8,620,950**			

We estimate employee transition costs of approximately $8,620,950, as reflected in Table 3. This estimate is dependent upon final closure date and is based on the total cost of the combined transition resources applied to the total number of potentially affected workers for Sherco and King, which is reported as “Employees to Transition” in Tables 1 & 2. The costs are early estimates and will continue to evolve as we learn the aspirations of our workers, as attrition projections materialize, and as we learn of new opportunities within the communities these plants reside.

The assumptions used in each transition resource line item in Table 3 are listed below:

- **Event**
  Proposed early retirement date.

- **Internal Tech Training**
  An annual cost estimate of $25,000 per worker is provided by the Internal Technical Training team and is based on existing technical training infrastructure to provide ongoing training. The duration of technical training ranges from two to four years, with an average of three years used in the cost model. The percent of employees leveraging this resource is an estimate derived from the assessment of upskilling/reskilling needs and the historical transfers during prior plant retirements in which internal technical training was leveraged to move to positions at other Xcel Energy locations. The cost estimate does not include employee wages.

- **Enterprise Learning Organization (ELO) Training**
  The cost estimate for enterprise-wide transition resources by ELO is independent of the number of impacted employees who choose to leverage the resources. The ELO cost estimate of approximately $300,000 ($150,000 per plant) is derived based on the assessment of upskilling/reskilling needs. ELO may collaborate with local education partners to build and deploy training courses.

- **External Industry Training**
  The cost estimates for external industry training (e.g., certifications, micro credentials, individual courses) are calculated based on the certificate offerings at Bismarck State College (BSC), an EPCE education partner. There are five electric- and energy-related certificates that on average require 56.4 credit hours to complete each certificate. Since some employees will choose to complete all courses in the certificate while others will elect to take several individual classes to upskill and/or reskill, we halve the average number of credit hours used in our cost modelling, rounded to 28 credit hours. Additionally, we use $300 as the approximate per-credit-hour cost for the BSC certificates, consistent with the EPCE member tuition rate at BSC. The percent of employees leveraging this resource is an estimate derived from the assessment of upskilling/reskilling needs.

- **On-the-Job Training**
  Costs are expected to be incurred for on-the-job training in remaining units or at locations to which employees transfer. The cost estimate for on-the-job training has yet to be determined and will be estimated as we near the retirement of each unit and after gathering employee aspirations through transition conversations.

- **Tuition Reimbursement**
  We use $5,250 in our tuition reimbursement cost estimates, consistent with the United States Code, Title 26 Internal Revenue Code, §127 Educational Assistance Programs. An average of three years is used in the cost model. The percent of employees leveraging this resource is an estimate derived from the assessment of upskilling/reskilling needs.

- **Relocation**
  The relocation cost of $10,000 per worker is based on prior coal unit closures. The percent of employees leveraging this resource is an estimate derived from historical relocation during prior plant retirements.

- **Severance**
  Though we do not anticipate layoffs and we are committed to transitioning and retaining our workforce, some employees may not execute upon the transition pathways; severance costs will be estimated as we near retirement of each unit. Cost estimates for severance are derived based on the collective bargaining agreements.

Sherco Unit 2: There are no costs of transition because Projected Headcount (with backfilling) does not exceed Target Headcount, as outlined in Table 1, “Employees to Transition.” Employees may need additional training related to any uniqueness of units

1 and 3, which would result in on-the-job training costs that are to be determined but will be provided as part of future updates to the workforce transition plan.

Sherco Unit 1: There are no costs of transition because Projected Headcount (with backfilling) does not exceed Target Headcount, as outlined in Table 1, "Employees to Transition." Employees may need additional training related to any uniqueness of unit 3, which would result in on-the-job training costs that are to be determined but will be provided as part of future updates to the workforce transition plan.

Cost estimates will be refined in future updates to the workforce transition plan and after transition conversations with each employee take place and we are able to gather employee transition preferences, skill gaps, and the transition supports leveraged. Transition conversations with employees will take place approximately two years prior to closure.

PHASE 2

FUTURE OPPORTUNITIES FOR IMPACTED WORKERS

The Strategic Workforce Planning (SWP) Department anticipates that many of the transition opportunities for plant employees at Sherco and King will be in the form of transfers to nearby locations. Some of these transfers will require upskilling or reskilling, while others will be parallel job transfers and not require additional training. Prior versions of this plan utilized estimates of future opportunities that spanned from current year to year of closure. This has been updated to estimating future opportunities for the two years prior to closure through two years after closure in order to more accurately reflect opportunities during the relevant transition time frame. Unlike plant closures in more remote areas of our service territories, Sherco and King are located near large metropolitan areas, which include a high number of service centers and other Xcel Energy facilities which may offer opportunities to transitioning workers.

Using natural attrition forecasts as a proxy to determine the number of opportunities that will come available across all operations areas within 50 miles of the Sherco and King plants, the following estimates are provided:

Table 4. Projected future opportunities within Xcel Energy at locations near Sherco based on attrition and retirement forecast across all operations areas for 2028-2032.

Sherco Plant		
	Total Projected Jobs 2028-2032	Average Number of Jobs Per Year
Non-Bargaining	**1,122**	**224**
Bargaining	**137**	**27**
Nearby Locations: Riverside Gen Plant, 401 Nicollet Mall, 414 Nicollet Mall, Monticello Nuclear Plant, Monticello Service Center, Albany Service Center, Montrose Service Center, Maple Grove Service Center, St Cloud Service Center		

Table 5. Projected future opportunities within Xcel Energy at locations near King based on attrition and retirement forecast across all operations areas for 2026-2030.

King Plant		
	Total Projected Jobs 2026-2030	Average Number of Jobs Per Year
Non-Bargaining	**1,342**	**268**
Bargaining	**307**	**61**
Nearby Locations: 401 Nicollet Mall, 414 Nicollet Mall, Black Dog Gen Plant, High Bridge Combined Cycle, Inver Hills Gen Plant, Maple Grove Service Center, Monticello Nuclear Plant, Monticello Service Center, Prairie Is Training Center, Prairie Is Nuclear Plant, Rice Street Service Center, Riverside Gen Plant, Wescott Lng Plant, Hydro Maintenance Bldg Wissota, Wissota Hydro Plant, Wheaton Plant		

Similar analysis is conducted for all operations business areas across the state of Minnesota:

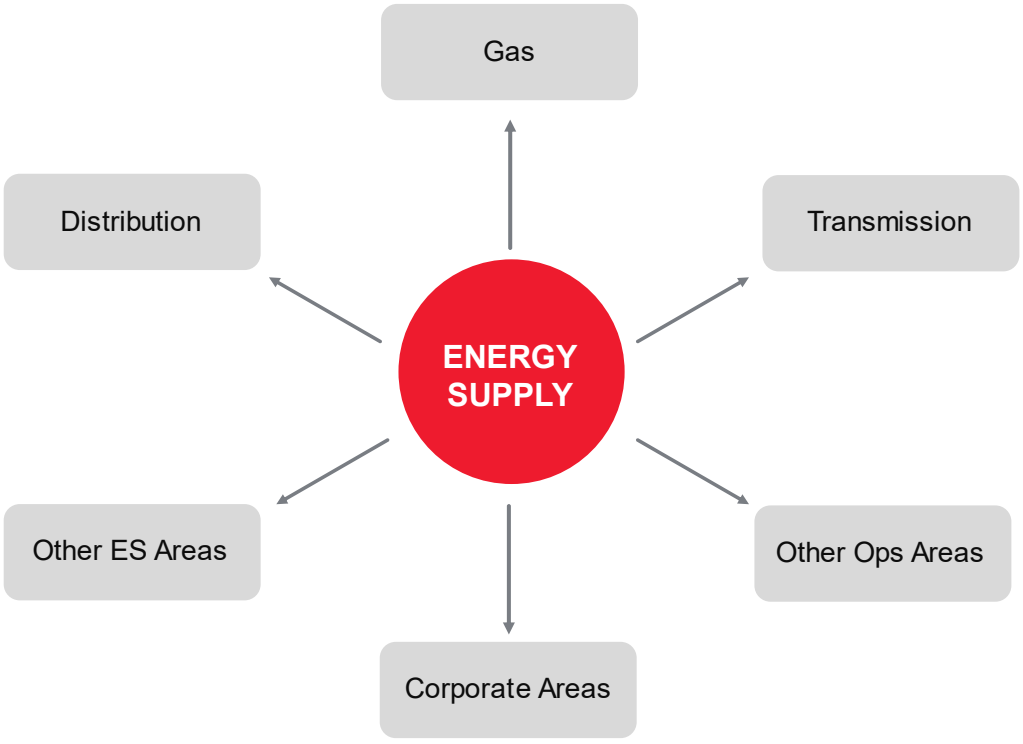
Table 6. Projected future opportunities within Xcel Energy across Minnesota based on attrition and retirement forecast for 2026-2032.

	Total Projected Jobs 2026-2032	Average Number of Jobs Per Year
Non-Bargaining	**2,415**	**345**
Bargaining	**756**	**108**

Many skills our employees at our coal generating facilities possess are transferrable to other positions across the Company. We will provide employees with information about available positions so they can identify the jobs in which they are most interested, and the skills those jobs require. Leaders across all operations business areas will welcome these skilled workers transitioning from the King and Sherco generating facilities into their organization.

Transition pathways will be created in partnership with each employee to retain, redeploy, or relocate workers based on their aspirations, availability, and in accordance with the collective bargaining agreements. Impacted workers will be able to leverage internal and external resources to upskill or reskill to transition into other positions within the Company.

Figure 4. Transition across operations.



The above tables are the greater portion of the opportunities that may be available to workers impacted by the early retirement of our coal plants. The Company continues to evaluate our resource mix and has proposed several solar projects near or on the plant sites that, if approved, may provide workers with future renewable energy jobs. The Company continues to work in partnership with our communities to draw new business and new jobs to the areas.

Providing insight to our employees about potential new jobs so they are aware of the different opportunities available is an important part of our transition efforts. To ensure employees are aware of and informed about different pathways, SWP plans in-person informational job overview sessions presented by employees who are in the positions that will become available. The goal of these sessions is to advertise potential job paths and show day-in-the-life promotional videos of jobs to explore.

To the extent practicable, Xcel Energy does not anticipate any layoffs. We have a strong track record in transitioning plant workers without layoffs. We are committed to a smooth transition as we continue the journey to achieve our clean energy goals.

We will continue to refine all opportunities and worker outcomes in future updates leading up to all retirement or conversion dates. In addition, we will build transparency and demonstrate the commitment to our workforce through updates to our employees, labor unions, and key external stakeholders impacted by these closures.

Our Employees with The Minnesota Building Trades

In recognition of the work performed at the Sherco and King Plants by workers from the Minnesota Building Trades Unions, we will continue to evaluate transition options and support the transition of long-tenured workers in partnership with key stakeholders, including trade union leadership, and leveraging resources available to impacted workers through local workforce centers and the MN Department of Employment and Economic Development (DEED). The Company will continue to identify options available to this workforce and will continue to adjust the workforce transition plan over time, gathering stakeholder feedback and providing updates to the Commission through the annual filing of this workforce transition plan.

To create a diverse pipeline of talent into energy jobs and continue supporting the building trades from whom we have long sourced temporary, contract, and construction work, Xcel Energy has partnered with the DEED to develop the Power-Up Workforce Development Program. This program will provide workforce training for clean energy-related construction work and help bring diverse candidates into the building trades. The program represents an investment in developing a diverse community of workers in the building trades, sustainable energy related construction jobs, and communities across our Minnesota service territory.

PHASE 3

TRANSITION CONVERSATIONS

Approximately two years prior to a unit retirement, transition conversations will be conducted with all employees at the impacted plant. The purpose of the transition conversation is to (1) provide greater insight into all the opportunities available to workers; (2) gather employee aspirations or transition preferences, including the jobs in which they are most interested; (3) evaluate the employee's current skills and their appetite for upskilling or reskilling; (4) determine whether they desire to relocate; and (5) address their questions or concerns about transition.

The SWP department will work collaboratively with teams across Human Resources and Employee Services to facilitate transition conversations with workers so that the Company can work in partnership with our employees and the unions on more detailed transition planning. The SWP department created a data template to capture transition preferences from transition conversations with workers and designed a real-time online form that will compile and aggregate data on the backend for further analysis.

SKILL MODELLING AND SKILL GAP ANALYSIS

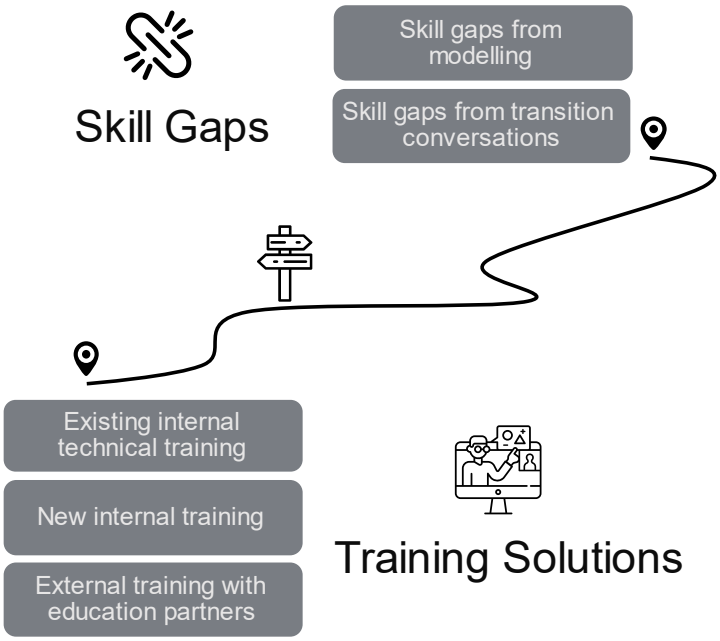
To assist in the transition of our coal plant employees by identifying skill gaps, the SWP department piloted skill inventorying and modeling for jobs at Sherco and King to help identify the skills within the positions at the plant and the skills needed to move into positions across Operations. The results of skill gap analysis will inform and guide SWP in recommending and deploying the appropriate reskilling/upskilling programs for the workers to leverage, which will enable their transition.

SWP developed bargaining job skill profiles using the Center for Energy Workforce Development (CEWD) Energy Industry Competency framework as the foundation and modified it to better fit and represent the skills and competencies of Xcel Energy jobs. The skill modelling is primarily focused on the core foundational skills that are transferable and applicable to a wide array of skilled technician jobs. With the CEWD framework used for soft skills and some technical skills, we then layered in the Xcel Energy Individual Contributor competencies to represent and capture the skills associated with each position, which aids in identifying where these skills are transferrable across Xcel Energy. Once the framework was complete, we consulted closely with job subject matter experts in Workforce Relations to go through each of the jobs to assess and rank the skills by position for both impacted positions at the coal plants and positions into which workers could potentially transition across the

organization. The outcomes were then reviewed with plant leadership for feedback and/or adjustments.

SWP has developed additional quantitative models that map skill profiles from existing plant jobs to skill profiles of potential future jobs. These models assess the degree to which existing skills match skills needed in potential future jobs, shedding light on reskilling, upskilling, and other possible training pathways for Xcel Energy employees. Using text network analysis, SWP has also developed models for assessing how suitable existing plant jobs are with potential new jobs in renewable energy as well as with existing Xcel Energy jobs.

Figure 5. Skill mapping



After transition conversations take place, we aggregate and analyze the results to identify skill gaps based on a full skill profile of the worker, the skills they brought to the position, and the skills required for the position(s) to which they prefer to transfer to. Once skill gaps are identified, solutions that currently exist in upskilling/reskilling that we might be able to leverage internally or externally are gathered. This helps identify what we may want to modify, or what we may consider if new upskilling/reskilling solutions need to be created to bridge the skill gap. We will look for the most cost-effective solutions for the benefit of the greatest population of our workforce. We may leverage our internal training organization or external education partners in doing so.

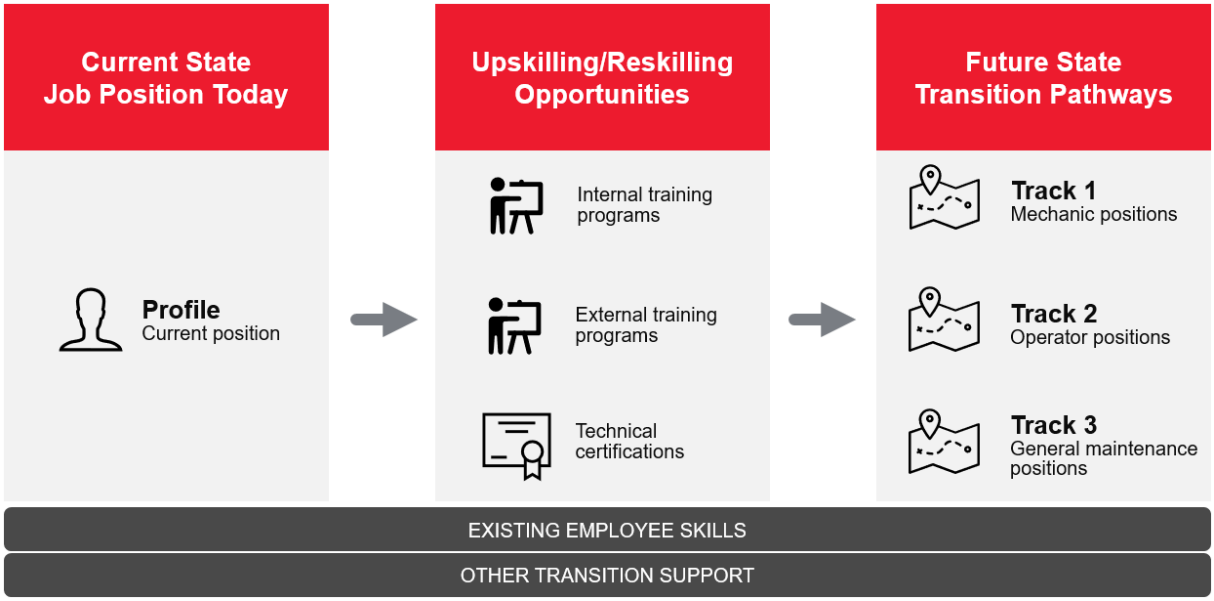
PHASE 4

TRANSITION PATHWAYS

Once skill gaps and solutions are identified, transition pathways are created for employees by leveraging existing upskilling/reskilling programs and building new upskilling/reskilling solutions with our internal and external training partners.

Transition pathways provide potential tracks for employees with the corresponding and recommended menu of options available for workers to transition, which would include upskilling/reskilling opportunities available plus other transition supports. The upskilling/reskilling opportunities include all internal training programs, external training programs, and technical certifications provided by external education institutions. The pathway will outline the resources available, and, in some cases, the timing/schedule of these trainings (if applicable). A transition track is a collection of similar future job opportunities that likely require similar skills and training. A supervisor will provide an overview of these transition tracks to each employee, offering support as their leader, answers to FAQs, and any other tools or information that may be helpful to the employee. Supervisors will receive training on how best to support their employees through the transition process itself and in providing effective coaching and feedback. It will then be up to the employee to take initiative and leverage the support offered.

Figure 6. Transition pathways.



Xcel Energy is an equal opportunity employer and will continue to operate in compliance with our collective bargaining agreements throughout this transition process. The Company endeavors to create and provide feasible workforce transition solutions to impacted workers.

For workers who may consider relocation to another position within the Company, we will work with them by looking at necessary training, the hiring process, relocation benefits, and other support, while maintaining compliance with our collective bargaining agreements. For workers who are eligible for retirement and decide to exercise that option, the HR retirement team will provide support and guidance through the retirement process.

Navigating uncertainty and change can be difficult. Xcel Energy provides numerous free resources to all employees and their family members at any time via our Employee Assistance Program (EAP), regardless of the employee's enrollment in a Company medical plan.

EAP offers information and guidance on topics including, but not limited to, managing change, handling personal crises, career counselling, educational support services, financial management and emotional well-being. Information on EAP is available to employees on the Company's intranet site, XpressNET.

PHASE 5

UPDATE WORKFORCE TRANSITION PLAN

In future annual Workforce Transition Plan filings, and leading up to the retirement of our plants, we will provide updates that use the latest information and assumptions in the headcount and cost models. Information gathered from the workforce transition conversations will be used to create the transition pathways based on the results of our skill gap analysis.

Additionally, we will continue to provide regular updates to key stakeholders, including our workforce, the IBEW Locals and other external stakeholders to continue to build upon the transparency of the phases and outcomes, commitment to our workforce, and our progress as we work to transition our Sherco and King coal plants.

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CERTIFICATE OF SERVICE

I, Joshua DePauw, hereby certify that I have this day served copies of the foregoing document on the attached list of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States mail at Minneapolis, Minnesota

xx electronic filing

DOCKET NOS. E002/M-22-265
E002/RP-19-368

Dated this 21st day of December 2023

/s/
_____
Joshua DePauw
Regulatory Administrator

APPENDIX P – 2023 SHERCO REMEDIATION REPORT SUMMARY

Order Point 20 of the most recent IRP Order[1] states:

Regarding remediation plans for the Sherco site:

A. The Commission authorizes the Executive Secretary to open a new docket on this topic.

B. Xcel shall conduct stakeholder meetings regarding the site with interested parties including the city of Becker; adjacent cities and townships including Becker Township and the city of Monticello; Sherburne and Wright counties; the Minnesota Department of Commerce, the Minnesota Department of Natural Resources, the Minnesota Pollution Control Agency, the Center for Energy and Environment, the Clean Energy Organizations, the Minnesota Energy Transition Office [footnote omitted], and labor unions. By January 1, 2023, Xcel shall file in the new docket details describing updates on the site and the stakeholder outreach and meetings.

C. Following these stakeholder meetings, by December 31, 2023, or in its next resource plan if earlier- and annually thereafter- Xcel shall submit to the Commission and to the city of Becker a detailed report describing the company's plans for the disposition of the Sherco site, equipment, and buffer property. The report shall include at least the following items:

1) A detailed description and timeline of any demolition, environmental clean-up, or similar work that will be required by the impending retirement of Sherco Unit 2.

2) To the extent possible, a description of the company's plans and a detailed timeline to decommission and demolish electric generating equipment related to Sherco Units 1 and 3.

3) A detailed description of the timeline, estimated costs, and steps necessary to remediate pollution at the Sherco site.

4) A section detailing how the company is working to ensure that plans for site remediation, economic development, or future development and maintenance of power generation, transmission, or distribution infrastructure are consistent with the community's long-range planning and vision.

5) A description of any ongoing efforts by the company to evaluate future uses for the plant site, any buffer property owned by the company, or any adjacent property, including a description of how the company is involving interested stakeholders in those efforts.

[1] ORDER APPROVING PLAN WITH MODIFICATIONS AND ESTABLISHING REQUIREMENTS FOR FUTURE FILINGS, Docket No. E002/RP-19-368, April 15, 2022 (IRP Order).

6) *An update to the Commission on the status of efforts to support the city's and regions' economic development efforts, including – to the extent possible – specific projects and investments the company is assisting the city and region in attracting.*
7) *A description of the company's efforts to work with local governments and other stakeholders to assess and account for local land use and planning impacts. Before starting any additional regulatory process to determine the final length and route of the Sherco gen-tie line, Xcel shall consult with stakeholders to discuss the plans.*
8) *Any other items the Commission or the company sees fit to include.*

If Xcel cannot obtain the necessary information at the time of each filing, the company shall submit a detailed timeline on which it anticipates it will be able to provide the city and stakeholders with additional information.

The IRP Order requires the Company to conduct stakeholder meetings and to submit to the Commission and the City of Becker an annual detailed report including a description and timeline of demolition, environmental cleanup or similar work required by the retirement of Sherburne County Generating Station (Sherco) Units 1, 2 and 3 and how those efforts are consistent with the community's long-range planning and visions; an update to the Commission on the status of efforts to support the city's and region's economic development efforts, including—to the extent possible— specific projects and investments the Company is assisting the city and region in attracting; and a description of the Company's efforts to work with local governments and other stakeholders to assess and account for local land use and planning impacts.

The report was filed with the Commission in Docket Nos. E002/RP-19-368 and E002/M-22-263 and provided to the City of Becker and interested stakeholders on December 28, 2023. A copy of the report is provided as Appendix P1: 2023 Sherco Remediation Report.

Xcel Energy®

414 Nicollet Mall
Minneapolis, MN 55401

December 28, 2023

—Via Electronic Filing—

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

RE: COMPLIANCE FILING
IN THE MATTER OF XCEL ENERGY'S SITE REMEDIATION PLANS FOR DECOMMISSIONING THE SHERBURNE COUNTY GENERATING STATION
DOCKET NOS. E002/M-22-263, E002/RP-19-368

Dear Mr. Seuffert:

Northern States Power Company, doing business as Xcel Energy, files this detailed annual report on Sherburne County Generating Plant (Sherco) stakeholder outreach efforts and our plans for decommissioning, remediation and demolition for the site. We have appreciated the opportunity to work with interested stakeholders in these efforts and their participation in our quarterly stakeholder outreach meetings. This report was also shared with the City of Becker and interested stakeholders.

Order Point 20 in the Commission's April 15, 2022 Order approving the Company's Integrated Resource Plan reads as follows:

> B. *Xcel shall conduct stakeholder meetings regarding the site with interested parties including the city of Becker; adjacent cities and townships including Becker Township and the city of Monticello; Sherburne and Wright counties; the Minnesota Department of Commerce, the Minnesota Department of Natural Resources, the Minnesota Pollution Control Agency, the Center for Energy and Environment, the Clean Energy Organizations, the Minnesota Energy Transition Office, 41 and labor unions. By January 1, 2023, Xcel shall file in the new docket details describing updates on the site and the stakeholder outreach and meetings.*
> C. *Following these stakeholder meetings, by December 31, 2023, or in its next resource plan if earlier- and annually thereafter- Xcel shall submit to the Commission and to*

the city of Becker a detailed report describing the company's plans for the disposition of the Sherco site, equipment, and buffer property. The report shall include at least the following items:

1) *A detailed description and timeline of any demolition, environmental clean-up, or similar work that will be required by the impending retirement of Sherco Unit 2.*
2) *To the extent possible, a description of the company's plans and a detailed timeline to decommission and demolish electric generating equipment related to Sherco Units 1 and 3.*
3) *A detailed description of the timeline, estimated costs, and steps necessary to remediate pollution at the Sherco site.*
4) *A section detailing how the company is working to ensure that plans for site remediation, economic development, or future development and maintenance of power generation, transmission, or distribution infrastructure are consistent with the community's long-range planning and vision.*
5) *A description of any ongoing efforts by the company to evaluate future uses for the plant site, any buffer property owned by the company, or any adjacent property, including a description of how the company is involving interested stakeholders in those efforts.*
6) *An update to the Commission on the status of efforts to support the city's and regions' economic development efforts, including – to the extent possible – specific projects and investments the company is assisting the city and region in attracting.*
7) *A description of the company's efforts to work with local governments and other stakeholders to assess and account for local land use and planning impacts. Before starting any additional regulatory process to determine the final length and route of the Sherco gen-tie line, Xcel shall consult with stakeholders to discuss the plans.*
8) *Any other items the Commission or the company sees fit to include.*

If Xcel cannot obtain the necessary information at the time of each filing, the company shall submit a detailed timeline on which it anticipates it will be able to provide the city and stakeholders with additional information.

Pursuant to the Order, we have included details describing our stakeholder outreach efforts; remediation, decommissioning and demolitions plans and costs; and economic development efforts in the attached report.

We have electronically filed this document with the Minnesota Public Utilities Commission, and copies have been served on the parties on the attached service list. Please contact me at monsherra.s.blank@xcelenergy.com or Patti Leaf at patricia.b.leaf@xcelenergy.com if you have any questions regarding this filing.

Sincerely,

/s/

MONSHERRA BLANK
DIRECTOR, REGULATORY AND STRATEGIC ANALYSIS

Enclosures
cc: Service Lists

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

Katie J. Sieben	Chair
Valerie Means	Commissioner
Matthew Schuerger	Commissioner
Joseph K. Sullivan	Commissioner
John A. Tuma	Commissioner

IN THE MATTER OF XCEL ENERGY'S SITE REMEDIATION PLANS FOR DECOMMISSIONING THE SHERBURNE COUNTY GENERATING STATION

IN THE MATTER OF XCEL ENERGY'S 2020-2034 UPPER MIDWEST INTEGRATED RESOURCE PLAN

DOCKET NOS. E002/M-22-263
E002/RP-19-368

COMPLIANCE REPORT

INTRODUCTION

Northern States Power Company, doing business as Xcel Energy, submits this Annual Report on Site Remediation Plans for Decommissioning the Sherburne County Generating Plant (Sherco) in compliance with the Minnesota Public Utility Commission's (Commission) April 15, 2022, Order approving the Company's Integrated Resource Plan. (IRP Orders)[1].

Order Point 20 of the most recent IRP Order states:

Regarding remediation plans for the Sherco site:

A. The Commission authorizes the Executive Secretary to open a new docket on this topic.
B. Xcel shall conduct stakeholder meetings regarding the site with interested parties including the city of Becker; adjacent cities and townships including Becker Township and the city of Monticello; Sherburne and Wright counties; the Minnesota Department of Commerce, the Minnesota Department of Natural Resources, the Minnesota

[1] ORDER APPROVING PLAN WITH MODIFICATIONS AND ESTABLISHING REQUIREMENTS FOR FUTURE FILINGS, Docket No. E002/RP-19-368, April 15, 2022 (IRP Order).

Pollution Control Agency, the Center for Energy and Environment, the Clean Energy Organizations, the Minnesota Energy Transition Office [footnote omitted], and labor unions. By January 1, 2023, Xcel shall file in the new docket details describing updates on the site and the stakeholder outreach and meetings.

C. *Following these stakeholder meetings, by December 31, 2023, or in its next resource plan if earlier- and annually thereafter- Xcel shall submit to the Commission and to the city of Becker a detailed report describing the company's plans for the disposition of the Sherco site, equipment, and buffer property. The report shall include at least the following items:*
    1) *A detailed description and timeline of any demolition, environmental clean-up, or similar work that will be required by the impending retirement of Sherco Unit 2.*
    2) *To the extent possible, a description of the company's plans and a detailed timeline to decommission and demolish electric generating equipment related to Sherco Units 1 and 3.*
    3) *A detailed description of the timeline estimated costs, and steps necessary to remediate pollution at the Sherco site.*
    4) *A section detailing how the company is working to ensure that plans for site remediation, economic development, or future development and maintenance of power generation, transmission, or distribution infrastructure are consistent with the community's long-range planning and vision.*
    5) *A description of any ongoing efforts by the company to evaluate future uses for the plant site, any buffer property owned by the company, or any adjacent property, including a description of how the company is involving interested stakeholders in those efforts.*
    6) *An update to the Commission on the status of efforts to support the city's and regions' economic development efforts, including – to the extent possible – specific projects and investments the company is assisting the city and region in attracting.*
    7) *A description of the company's efforts to work with local governments and other stakeholders to assess and account for local land use and planning impacts. Before starting any additional regulatory process to determine the final length and route of the Sherco gen-tie line, Xcel shall consult with stakeholders to discuss the plans.*
    8) *Any other items the Commission or the company sees fit to include.*

If Xcel cannot obtain the necessary information at the time of each filing, the company shall submit a detailed timeline on which it anticipates it will be able to provide the city and stakeholders with additional information.

The IRP Order requires the Company to conduct stakeholder meetings and submit to the Commission, City of Becker, and interested stakeholders a detailed report describing the Company's plans for the disposition of the Sherco site, equipment, and buffer property.

This report is filed with the Commission in Docket Nos. E002/RP-19-368 and E002/M-22-263 and provided to the City of Becker and interested stakeholders. The report follows.

I. QUARTERLY STAKEHOLDER OUTREACH EFFORTS

As required by the Commission's 2019 IRP Order, the Company has held quarterly meetings with Sherco community stakeholders. Though no cadence was dictated in the 2019 IRP Order for these meetings, they were held quarterly to be consistent with the Allen S. King Plant Stakeholder Outreach Efforts discussed in Appendix Q which required a quarterly cadence by the IRP Order. We have invited all stakeholders noted in the IRP Order. In addition, the Company has also extended invitations to the following agencies and community groups: the Becker, Big Lake, and Monticello Chambers; Minnesota Public Utilities Commission staff; business neighbors of the Sherco Plant; legislative representatives; the Southern Minnesota Municipal Power Agency; the University of Minnesota; and the Coalition of Utility Cities. The meetings have been held virtually or as hybrid meetings and have been well attended. The meetings have provided an overview of plans and known requirements associated with the retirement of the Sherco Plant and information about future efforts and have included significant opportunity for stakeholders to provide input and ask questions regarding information presented. Stakeholders have indicated their appreciation of the meetings and for the information shared. All presentation materials have been filed in the above-noted dockets. An overview of meetings conducted in 2023 follows.

A. First Quarter 2023

The first quarter 2023 Sherco Community Stakeholder Outreach meeting was held March 3, 2023, and focused on environmental remediation requirements associated with the retirement of the facility. Representatives from the Minnesota Pollution Control Agency (MPCA) participated in this meeting and provided an overview to stakeholders on environmental regulations pertaining to industrial wastewater, solid waste, and remediation requirements including remediation and reuse projects at other sites in the state.

The Company provided an overview on other historical remediation efforts undertaken at the Riverside Combined Cycle Generating Plant, the High Bridge Combined Cycle Plant, and the Black Dog Generating Plant when each of these facilities transitioned from coal fired facilities to natural gas fired units. The Company reviewed specific remediation requirements related to the existing coal yard and holding ponds.

B. Second Quarter 2023

The second quarter outreach meeting was held June 14, 2023. An update on the construction of the Sherco Solar 1 and 2 projects was provided including timelines and site progress. As well, a progress update on Sherco Solar 3 was given, outlining the approval process and timelines and interconnection with Sherco Solar 1 and 2.

C. Third Quarter 2023

The third quarter Sherco Community Stakeholder Outreach meeting was held September 28, 2023. The Minnesota Department of Employment and Economic Development (DEED) presented a recap of the Energy Transition Summit coordinated by DEED and held in Becker on June 26, 2023.

The Company provided an update on the Minnesota Energy Connection (MNEC) Transmission Project and the Alexandria to Big Oaks Transmission Line Project. These presentations included project descriptions and timelines and other vital information.

This was followed with an update on the Sherco Solar project detailing project location, permitting requirements, and construction progress.

A plant update was provided by plant management, which was followed by a stakeholder roundtable.

D. Fourth Quarter 2023

This stakeholder meeting was held December 8, 2023, and focused on providing information regarding recent federal Infrastructure Investment Jobs Act (IIJA) grants. Details pertaining to the Form Energy long-duration energy storage pilot project at Sherco, the Heartland Hydrogen Hub, and the Sherco Hydrogen Project were shared with stakeholders. In addition, we shared information pertaining to the upcoming formation of the Company's Environmental Justice Advisory Board (EJAB).

II. DEMOLITION AND ENVIRONMENTAL REMEDIATION PLANS

At this time, the main focus of the Sherco Plant is on the continued operation of Unit 2 until the end of 2023, Unit 1 until the end of 2026, and Unit 3 until the end of 2030, when each of the units will be respectively retired. Demolition and remediation planning efforts associated with the retirement of these units are underway but are still in a formative stage, with many decisions regarding future operations at the site needing to be determined due to the retirement of Unit 3 being more than six years out. The Company is in the process of developing a Site Decommissioning Plan for all three units, which is expected to be complete by the end of first quarter 2024. We will share those plan details in a future annual report filing when they are available. This Decommissioning Plan will address any potential demolition plans across all three units. While detailed plans and timelines are currently not available to share at this time, the following information is known.

A. Unit 2 Plans

In general, remediation and demolition activities will not begin at the site until all. three units have been retired in 2030. All three units share systems that will need to be maintained for the continued operation of Units 1 and 3 until their retirement in 2026 and 2030, respectively. The Unit 2 boiler may be removed after all three units have been retired at the end of 2030, however the turbine building will remain due to the conversion and operation of the Unit 2 generator as a synchronous condenser. The Unit 1 generator will also be converted to a synchronous condenser. Further investigation is needed to determine if the boilers can safely be removed while the synchronous condensers are in operation. It is expected that the synchronous condenser for Unit 2 could begin operation as early as fourth quarter 2025 with the Unit 1 synchronous condenser expected to begin operation fourth quarter 2027.

Current efforts for the future decommissioning of Sherco Unit 2 includes inventorying materials for removal of components from the unit that will not be needed for maintaining operation of the unit for the future conversion of the Unit 2 generator to a synchronous condenser, or that are not required for the continued operation of Units 1 and 3.

Once Unit 2 has been retired, unit specific systems may be decommissioned, isolated, drained, and left in a safe state which would allow for the demolition of equipment. Systems such as Scrubber Modules, Bottom Ash, and Fly Ash Systems, will be cleaned of ash. Coal will be burned down to empty the feed systems to the unit, and the silo-feeders and coal mills will be washed down to remove coal debris. The Unit 2 cooling towers are currently scheduled for demolition in 2024.

Systems to be left in service include, but are not limited to, the electrical systems for various components, the Thickener System, Building Heat, Auxiliary Steam, Fire Protection, Station Air Service/Potable Water, Closed loop cooling, Ash Water, and other common systems needed for the continued operation of Unit 1.

Other systems are being considered for isolation at this time. Isolation is the act of disconnecting power, or other means taken, which prohibit a system from operating.

Environmental remediation requirements of retired fossil fuel fired electrical generating facilities is prescriptively regulated by local, state, and federal authorities, however, we will not be required to begin remediation efforts on Sherco Unit 2 until Units 1 and 3 have also been retired, as they share common facilities.

As noted above, environmental remediation of the site will not occur until all three units are retired. Units 1 and 2 share common coal piles and ash disposal facilities that will remain in operation until after the retirement of Unit 1 in 2026. Environmental actions which will occur specific to Sherco Unit 2 will include, but are not limited to, notice to the Environmental Protection Agency (EPA) and MPCA of pending retirement and decommissioning.

B. Units 1 and 3 Plans

Steps towards the decommissioning of Units 1 and 3 will be conducted in a path similar to the Unit 2 decommissioning, with Unit 1 retiring December 31, 2026, and Unit 3 retiring December 31, 2030. As noted above, the conversion of the Unit 1 generator to a synchronous condenser is planned and the operation of the unit as a synchronous condenser is expected to begin by the end of 2027. Evaluation of the conversion of Sherco Unit 3 turbine generator to a synchronous condenser for additional grid stabilization is currently underway.

Once Units 1 and 3 have been retired, unit specific systems may be decommissioned, isolated, drained, and left in a safe state which would allow for the demolition of equipment. Systems such as Scrubber Modules, Bottom Ash, and Fly Ash Systems, will be cleaned of ash. Coal will be burned down to empty the feed systems to the units, and the silo-feeders and coal mills will be washed down to remove coal debris.

For safety reasons, the Unit 1 cooling towers are scheduled for demolition in 2027. Aside from the demolition of the Unit 1 and Unit 2 cooling towers, there will be no other large-scale demolition at the site until at least 2031. Detailed decommissioning information will be included in a future annual report filing when it is available.

As noted above, environmental remediation requirements of retired fossil fuel fired electrical generating facilities are prescriptively regulated by local, state, and federal authorities. We will not be required to begin environmental remediation efforts at the Sherco site until all three units have been retired. Environmental actions which will occur specific to Sherco Units 1 and 3 will include, but are not limited to, notice to the EPA and MPCA of pending retirement and decommissioning. The costs for these required remediation actions are not fully known at this time as the detailed plans have not been developed. Additionally, once plans are developed, they will require review and approval by the MPCA, which may result in changes to the final closure plans. Actual timelines will be dictated by internal Xcel Energy decisions as well as MPCA review and feedback prior to agency approval under MPCA's Solid Waste and Clean Water Act programs.

C. Units 1, 2, and 3 Plans

Plans for environmental remediation and demolition at the Sherco Plant are still in development. While the coal-fired generating capacity of the plant will be fully retired by December 31, 2030, plans that potentially reuse equipment within the powerhouse and plant support systems are under consideration. As previously noted, Unit 1 and Unit 2 generators will be reutilized as synchronous condensers and the potential conversion of the Unit 3 generator to a synchronous condenser is being evaluated. The synchronous condensers will require cooling water and other support systems to operate. Also as previously noted, some existing buildings will need to remain for the operation of the synchronous condensers. In addition, the Sherco substation will continue to be utilized. Demolition of the Unit 1 and 2 stack and the Unit 3 stack will not occur until after Unit 3 is retired.

There are six (6) impoundments and one basin at Sherco that contain either ash or ash contact water. The status of these impoundments is as follows:

- Scrubber Solids Pond 1 was closed and capped in 1995 following a plan approved by the MPCA.
- Scrubber Solids Pond 2 was closed and capped in 2014 following a plan approved by the MPCA.
- Scrubber Solids Pond 3 is currently active and will continue to be utilized by Sherco Units 1 and 2 until retirement. This pond is scheduled to be permanently closed in 2035 after the pond is dewatered either by evaporation and/or a permitted discharge of treated water. Costs associated with dewatering have not been estimated but could be significant.
- Pond 4 is currently under construction. It will be used to hold only ash contact

water, not scrubber solids. There is no scheduled closure date for this pond pending site redevelopment planning.

- Bottom Ash Pond 1 ceased receiving ash in October 2020. This pond is scheduled to be permanently closed and capped by October 2025.
- Bottom Ash Pond 2 is currently active but is scheduled to be permanently closed by 2035. It is utilized by all three units.
- Recycle Basin is currently active. There is no scheduled closure date pending site redevelopment planning. The recycle basin is utilized by all three units.

Post-closure monitoring of these impoundments will be controlled by the applicable federal and state requirements.

In addition to these six impoundments and the 3 basins, there is the Unit 3 dry ash landfill on plant property. The Unit 3 dry ash landfill will continue to operate through the retirement of Unit 3 in 2030. Terms of the existing state solid waste permit and current federal rules governing coal combustion residual landfills require that the landfill be closed and permanently capped within prescribed time limits after the Company ceases placing ash in the landfill.

We are required by environmental regulations to address specific portions of the plant process systems such as the Scrubber Solids Ponds and the Unit 3 Landfill. These requirements and their associated timelines do not come into effect until the Unit 3 retirement date of December 31, 2030. The plant's National Pollutant Discharge Elimination System and Solid Waste Permits require us to submit proposed closure plans to the MPCA for review and approval approximately 180 days before the Unit 3 retirement date. The demolition of all other structures onsite including the powerhouse, river intake structure, wastewater treatment system including the river discharge structure, cooling towers, etc., will depend on the Company's plans for future use of the site. The costs for these required actions are not fully known as the plans have not been developed.

The Company is currently evaluating future uses of the electric generating facility structure. Previously submitted information regarding those plans and the estimated costs have been filed under a Remaining Lives and Five-year Depreciation Study (the Study) filed in 2020 to Docket No. E, G-002/M-19-723[2]. The following information, including the information in Table 1, was included in the Study. Please see the full report for additional details.

[2] See *In the Matter of the Petition of Northern States Power Company for Approval of the 2020 Review of Remaining Lives and Five-Year Depreciation Study,* Docket No. E,G002/D-19-723, PETITION (August 18, 2020).

As noted in the Study, when the decision is made to begin physical dismantling of the Sherco Plant, Xcel Energy will begin field dismantling activities, beginning with engineering and planning, and the removal of asbestos and other hazardous materials from the site.

A preliminary planning phase of the program will begin once it has been determined that the plant will be dismantled, and the project has been authorized to proceed. During this phase, the Company will assemble its dismantling management organization, make appropriate decisions regarding the extent of dismantling and the approach to managing the activities, and will accomplish those site preparation activities necessary to transition from a plant shutdown configuration to site dismantling. For purposes of the development of a cost estimate, it is assumed that the intent is to dismantle the entire station as a single project. Costs incurred during this preliminary phase of the program are included in the dismantling costs presented in the Study.

Xcel Energy will prepare Sherco for dismantling by performing the following activities:

- Prepare specifications that identify and describe the objectives and major work activities to be accomplished (establishing the final site configuration)
- Assemble plant documentation that may be relevant to dismantling (drawings, hazardous material reports, environmental studies, etc.)
- Select an asbestos abatement contractor (if required) and Dismantling Contractor
- Assemble and mobilize the management and oversight team responsible for the project
- Document hazardous materials location and inventory

The inventory is an essential element of the cost estimate since dismantling costs are determined by applying unit cost factors against the corresponding inventory quantities. A site-specific inventory of materials to be removed was developed using a combination of methods and can be found in the Study.

In developing an estimate, the cost of labor, equipment and material, credit for scrap, and similar costs influence the results of the estimate. The basis for the significant cost drivers can be found in the Study.

Table 1: Sherburne County Station Summary of Activity Costs (2019 Dollars)

Activities	Unit 1	Unit2	Unit 3	Common	Station	Station Total
Sherburne County Unit Rating (MWe)	680	682	876			2,238
Characterization/Temporary Service	171,000	171,000	190,000	-	604,818	1,136,818
Worker Access	642,334	642,334	703,642	-		1,988,310
Pre-Demolition Cleaning (Boiler/Precipitator/Tanks)	1,081,050	1,081,050	1,081,050	-		3,243,150
Asbestos Remediation	2,508,884	2,508,884	-	500,000		5,517,768
Equipment Removal	5,699,637	5,547,162	6,568,928	4,670,730		22,486,487
Boiler(s)	4,182,168	4,182,168	4,619,900	-		12,984,236
Turbine Generator & Condenser	609,899	609,899	686,634			1,906,432
Exhaust Gas Treatment Equipment and Structures	4,245,955	4,398,430	4,741,985			13,386,370
Structures Demolition	7,038,228	7,038,228	7,657,026	6,378,958		28,112,441
Backfill/Grade/Landscaping/Well Closure	1,656,105	1,656,105	1,814,172	4,761,036	100,000	9,987,445
Coal Yard Closure					8,264,365	8,264,365
Ash Landfills/ Ash Ponds & Landfills Including Evaporation Ponds/Ash Pond Dewatering			3,169,905	20,754,000		23,923,905
Utility Management/Oversight	1,079,289	1,079,289	1,208,276	494,016		3,860,869
Demolition Contractor Management/Supervisory/Safety Staff	1,713,520	1,713,520	1,918,305	784,319		6,129,664
Security	317,316	317,316	355,239	145,243		1,135,113
Property Taxes	-	-	-	-	-	0
Project Expenses:						
Shared Heavy Equipment/Operating Engineers	1,544,579	1,544,579	1,729,174	706,991		5,525,323
Small Tool Allowance	535,084	535,084	539,646	326,216	n/a	1,936,030
Utilities Allowance (Office Equipment etc.)					76,789	76,789
Permits					1,832,569	1,832,569
Demolition Contractors Insurance					4,312,127	4,312,127

Demolition Contractors Fee					18,327,570	18,327,570
Sub-Total						176,073,780
Contingency						26,962,844
Project Total (before scrap credit)						203,036,624
Scrap Credit	(9,982,485)	(9,982,485)	(12,096,244)	(2,619,893)	-	(34,681,107)
Project Total						168,355,517

III. ECONOMIC DEVELOPMENT EFFORTS

Representatives from the Company's Economic Development and Community Relations departments have been working closely with the City of Becker, county representatives and other interested stakeholders on economic development opportunities. Those efforts are summarized here.

The Company spearheaded the Sherco Master Planning Process in conjunction with the City of Becker and community leaders with the Company funding 100 percent of the process. The Master Planning Process is a flexible tool, which presents a vision, framework, principles, and guidelines for the development of approximately 1,800 acres of the Sherco site and adjacent parcels in Becker, MN. These efforts resulted in the development of the adopted Becker Master Plan. The Master Plan Process included representatives from Xcel Energy, City of Becker staff, and community leaders.

In addition, the company participated in the alternative urban areawide review (AUAR) process. As defined by the Minnesota Environmental Quality Board: "The alternative urban areawide review (AUAR) process is a hybrid of the environmental assessment worksheet (EAW) and environmental impact statement (EIS) review processes. Responsible governmental units (RGU) can use an AUAR as a planning tool to understand how different development scenarios will affect the environment of their community before the development occurs."[3]. The Company contributed 100% of the cost for an environmental consultant to complete an AUAR with the City of Becker as the RGU. The AUAR was adopted in February 2023 by the City of Becker.

In addition to the stakeholder outreach identified above, bi-monthly calls are held with the City of Becker, Xcel Energy Community Relations, and Xcel Energy Economic Development to update each other on various economic development projects to ensure alignment and quarterly Xcel Energy advisory meetings are held

[3] https://www.eqb.state.mn.us/content/auar-process

with local city, county, and school district leaders to share updates. These meetings have been occurring for many years and are in addition to the quarterly stakeholder outreach meetings discussed above. Historically, the updates have included plant maintenance activities, city and county construction updates, economic development project updates, and other general updates. These are casual meetings meant to keep open and direct lines of communication amongst the parties.

Annually Xcel Energy leadership invites community leaders and elected officials from Wright and Sherburne Counties and communities to an Annual Community Breakfast to provide an opportunity for attendees to ask questions and provide input on the state of the Company and provide updates and information on the Sherco Plant and Monticello Nuclear Generating Plant, both of which are located within their respective communities.

The Company is working to ensure that plans for site remediation, economic development, future development and maintenance of generation, transmission or distribution infrastructure are consistent with the community's long-range plans and vision. As indicated, the Company is working in close contact with the community about, and understands the importance of, potential economic development opportunities associated with the retirement of the Sherco Plant. Going forward, site remediation efforts will consider Xcel Energy's long-range plan for the property and large remediation projects will be discussed with the city as they arise.

Following is an update on the status of efforts to support the city's and region's economic development efforts, including a listing of specific projects and investments the company is assisting the city and region in attracting.

- As part of the 2019 IRP, transmission system studies were performed to identify any reliability needs associated with coal unit retirements. The outcome of that work was project development to convert the Unit 2 and Unit 1 generators to Synchronous Condensers after the coal units cease operation.

- The 2019 IRP order issued April 2022 confirmed the need for solar generation within the region and the customer value of reusing interconnection rights associated with the retirement of the units. The Company ran Request for Proposals in 2021 and 2022 to acquire Sherco Solar 1, 2 & 3 to reutilize the 710MW of interconnection rights associated with Unit 2. The MISO Generator Replacement application was submitted at the end of 2022 and the solar projects are on schedule to meet commercial operation dates. We are constructing the Sherco Solar Project adjacent to the Sherco site. This will be the largest solar development in the state's history, producing enough clean

energy to power approximately 150,000 homes in the Upper Midwest each year, creating nearly 1,000 union construction jobs and creating more than $350 million in local benefits (including landowner payments and state and local taxes) over the life of the project.

- Specific projects supporting the city's and regions' economic development efforts follow:

    - Joint initiatives by Sherburne County, the City of Becker and the Company have paved the way for the potential construction of a data center on approximately 350 acres of Xcel Energy-owned property. This sale, approved by the Commission in March 2023,[4] has the support of the City of Becker and Sherburne County, as it will bring jobs and much needed tax base to the community. The ultimate tax base impact can be determined once the data center's building permit has been submitted and reviewed by the County Assessor.
    - In addition to the data center project mentioned above, the Company continues to market large parcels of land to interested parties. Additional land in the City of Becker and Becker Township has been marketed for industrial development. The Company has designated approximately 1,300 acres of land surrounding the existing plant for future economic development. The City of Becker, in coordination with the Company, is currently constructing the expanded water and sewer services to much of this area, and the available acreage is being actively marketed by both the Company and the City of Becker. We are discussing these plans in the bi-monthly meetings noted above. At the March 9, 2023, MPUC agenda meeting discussing the Sherco Land Sale, we committed to including in this report the appraised value of remaining land currently being marketed. We note here that the only land currently being marketed is a 286-acre parcel located on the western portion of Sherco property which has a last appraised value of $8,770,000.
    - At the intersection of Liberty Lane and Energy Drive, Xcel Energy sold 78.73 acres to a metal recycling company, which began operations in 2019.[5] Sherburne County Tax Data shows the property had an estimated market value of $8,665,700 in 2023 resulting in annual taxes of more than $250,000.

[4] *Petition for Approval to Sell 348 Acres of Land at Sherco,* Docket No. E002/PA-22-489.
[5] *In the Matter of the Petition of Northern States Power Company for Approval to Sell 365 Acres of Sherco Land,* Docket No. E002/M-17-528.

- Stolt Land Holdings LLC purchased five acres from Xcel Energy in January 2020. According to Sherburne County Tax Data, the property had an estimated market value of $426,300 in 2023 resulting in annual taxes of more than $10,000.
- Xcel Energy is partnering with Form Energy on a long duration energy storage pilot project. This will involve the installation of an iron air 10 MW/1,000 MWh, 100-hour duration battery that is expected to be in operation by the end of 2025. This project will increase system reliability and play a role in meeting our Company-wide vision to provide our customers in all the states we operate in with 100 percent carbon-free electricity by 2050.
- Xcel Energy and the City of Becker have an agreement that the Company will pay assessments totaling $10.9 million for the benefit received from the City of Becker's sewer and infrastructure improvement projects to land owned by the company. The sewer and water projects increase the value of the land and Xcel Energy expects to recoup these costs as property is sold for economic development.

In addition, Order Point 21.C.4 requires us to discuss how we are working to ensure that our power generation, transmission, or distribution infrastructure plans are consistent with the community's long-range planning and vision. We note that there will be no impacts on the distribution infrastructure due to retirement of the units. While economic development efforts could require transmission and even distribution investments, we will incorporate anticipated load requirements into the forecast as appropriate.

IV. MN ENERGY CONNECTION

On March 9, 2023, Xcel Energy filed a Certificate of Need (CON) in Docket No. E002/CN-22-131 for an approximately 160- to 180-mile 345 kilovolt double-circuit transmission line to connect renewable energy in southwest Minnesota with the existing grid connection at the Sherco Plant. A Route Permit Application was filed in Docket No. E002/TL-22-132 on October 30, 2023. Review began on both applications fall 2023 with a decision expected in late 2024 or early 2025. If both applications are approved, we expect to begin construction in late 2025 with the project placed in service in late 2027.

In an effort to share information with the public and local officials about the MNEC Transmission Project, public meetings were held in February 2023 and June 2023.

Invitations were sent to all landowners that could potentially be affected by the route options. Initially, 150,000 landowners were notified of the CON filing, and the same list was used to inform landowners of the February 2023 open houses. In June, we reduced the list to all landowners that could be affected by the revised route options, to a total of nearly 50,000 landowners. The February meetings were held at five locations along the possible route corridor and approximately 550 members of the public attended. The June meetings were held at six different locations along the modified possible route corridor and approximately 750 members of the public attended.

At each open house, we provided to landowners, local governments, and key stakeholders information about the project, potential route options we had identified, and ways for those individuals to provide input on the land use impacts that each route option may have on their property. We also provided information about land use, easements, and right of way considerations near transmission lines as well as information about electric and magnetic fields, how route options are identified, construction practices, the upcoming regulatory proceedings, and other key issues. Xcel Energy staff was on hand at all meetings to answer questions and receive feedback from stakeholders.

Following the February 2023 open houses, the project team reviewed all comments and adjusted route options based on feedback received, as well as additional route review in order to identify route options that would lead to the least impactful route options.

In June 2023, we provided the updated route options to landowners and stakeholders and asked for additional feedback on those route options ahead of filing the Route Permit Application in October 2023. Overall, we received about 2,000 individual comments from landowners, local governments, and other officials.

In addition to public open houses, we have also met with local governments- counties, cities, and townships- throughout the project area to solicit feedback and provide information about the project. We have also met with state and federal agencies who may be involved in some aspect of the permitting process.

V. OTHER EFFORTS

The company was appointed and served on the Energy Transition Advisory Committee (ETAC) which was created in 2021 within the Department of

Employment and Economic Development (DEED). The directive of ETAC was to create a statewide energy transition plan and to advise the Governor, the Commissioner of DEED and the Legislature on energy transition issues, establish transition programs, economic initiatives, and transition policy (Minn. Stat. § 116J.5492). ETAC met through 2022, including site visits to communities impacted by the energy transition, meeting in the City of Becker on May 31, 2022. The Statewide Energy Transition Plan was filed by ETAC in December 2022. In 2023, the Legislature extended the life of ETAC until June 30, 2027, to file annual revisions to the Statewide Energy Transition Plan.

CONCLUSION

The Company takes seriously its responsibility to engage every community where we have major facilities and operations. Our commitment to our host communities and neighbors surrounding the Sherco Plant will outlive our coal operations. While the nature of our operations there will change in the years ahead, the site will continue to be important to the Company's ability to deliver reliable, safe, and affordable energy to our customers. We are glad to demonstrate that our longstanding participation in the social and economic life of the surrounding communities will continue.

We appreciate the opportunity to work with our stakeholders and neighbors and the time and talent given to us by them throughout this past year of community stakeholder meetings. We are committed to ongoing engagement with community stakeholders as the Sherco facility site transitions to cleaner energy generation and transmission.

CERTIFICATE OF SERVICE

I, Marie Horner, hereby certify that I have this day served copies of the foregoing document on the attached list of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States mail at Minneapolis, Minnesota

xx electronic filing

DOCKET NOS. E002/M-22-263
E002/RP-19-368

Dated this 28th day of December 2023

/s/
_____
Marie Horner
Regulatory Administrator

APPENDIX Q – 2023 KING REMEDIATION REPORT SUMMARY

Order Point 21 of the most recent IRP Order[1] states:

Regarding remediation plans for the King site:

A. The Commission authorizes its Executive Secretary to open a new docket on this topic.

B. Xcel shall conduct quarterly stakeholder meetings regarding the King site with interested parties including the city of Oak Park Heights, Washington County, the Department, DNR, the Energy Transition Office, PCA, the National Park Service, CEOs, CEE, the Wild Rivers Conservancy, and labor unions.

C. Following these stakeholder meetings, by December 31, 2023, or in its next resource plan if earlier- and annually thereafter- Xcel shall submit to the Commission, the city of Oak Park Heights, and interested stakeholders a detailed report describing the company's plans for the disposition of the King site, equipment, and buffer property. This report should include the following:

1) *The company's plans, estimated costs, and a detailed timeline to decommission and demolish the electric generation facility.*
2) *A detailed description of the timeline and steps necessary to remediate pollution at the King site.*
3) *A description of any ongoing efforts by the company to evaluate future uses for the plant site, any buffer property owned by the company, or any adjacent property, including a description of coordination with or involvement of the city and stakeholders in those efforts.*
4) *The status of efforts to support the region's and city's economic development efforts, including- to the extent possible- specific projects and investments the company is helping the city to attract.*
5) *An update on conservation efforts to reflect the uniqueness of the site and surrounding property located in and along the St. Croix National Scenic Riverway.*
6) *Any other items the Commission or the company sees fit to include.*

If Xcel cannot obtain the necessary information at the time of each filing, the company shall submit a detailed timeline on which it anticipates it will be able to provide the city and stakeholders with additional information.

[1] ORDER APPROVING PLAN WITH MODIFICATIONS AND ESTABLISHING REQUIREMENTS FOR FUTURE FILINGS, Docket No. E002/RP-19-368, April 15, 2022 (IRP Order).

The IRP Order requires the Company to conduct quarterly stakeholder meetings and submit to the Commission, City of Oak Park Heights, and interested stakeholders a detailed report describing the Company's plans for the disposition of the King site, equipment, and buffer property. A similar requirement was passed by the Minnesota Legislature in 2023 and can be found in Minnesota Statute Chapter 60, Article 12, Section 70 (House File 2310).

The report was filed with the Minnesota Public Utilities Commission in Docket Nos. E002/RP-19-368 and E002/M-22-264 and provided to the City of Oak Park Heights and interested stakeholders on December 28, 2023. A copy of the report is provided as Appendix Q1: 2023 King Remediation Report.

Xcel Energy®

414 Nicollet Mall
Minneapolis, MN 55401

December 28, 2023

—Via Electronic Filing—

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

RE: COMPLIANCE FILING
IN THE MATTER OF XCEL ENERGY'S SITE REMEDIATION PLANS FOR DECOMMISSIONING THE ALLEN S. KING GENERATING STATION
DOCKET NOS. E002/M-22-264, E002/RP-19-368

Dear Mr. Seuffert:

Northern States Power Company, doing business as Xcel Energy, files this detailed annual report on our Allen S. King Generating Plant (King) quarterly stakeholder outreach efforts and our plans for decommissioning, remediation, and demolition for the site. We have appreciated the opportunity to work with interested stakeholders in these efforts and their participation in our quarterly stakeholder outreach meetings. This report was also shared with the City of Oak Park Heights and interested stakeholders.

Order Point 21 in the Commission's April 15, 2022 Order approving the Company's Integrated Resource Plan reads as follows:

B. *Xcel shall conduct quarterly stakeholder meetings regarding the King site with interested parties including the city of Oak Park Heights, Washington County, the Department, DNR, the Energy Transition Office, PCA, the National Park Service, CEOs, CEE, the Wild Rivers Conservancy, and labor unions. Xcel shall file in the new docket by January 1, 2023, details describing the stakeholder outreach and updates for the efficient demolition of the King plant and remediation of the site and impacted land.*
C. *Following these stakeholder meetings, by December 31, 2023, or in its next resource plan if earlier- and annually thereafter- Xcel shall submit to the Commission, the city of Oak Park Heights, and interested stakeholders a detailed report describing the company's plans for the disposition of the King site, equipment, and buffer property. This report should include the following:*

1) *The company's plans, estimated costs, and a detailed timeline to decommission and demolish the electric generation facility.*
2) *A detailed description of the timeline and steps necessary to remediate pollution at the King site.*
3) *A description of any ongoing efforts by the company to evaluate future uses for the plant site, any buffer property owned by the company, or any adjacent property, including a description of coordination with or involvement of the city and stakeholders in those efforts.*
4) *The status of efforts to support the region's and city's economic development efforts, including- to the extent possible- specific projects and investments the company is helping the city to attract.*
5) *An update on conservation efforts to reflect the uniqueness of the site and surrounding property located in and along the St. Croix National Scenic Riverway.*
6) *Any other items the Commission or the company sees fit to include.*

If Xcel cannot obtain the necessary information at the time of each filing, the company shall submit a detailed timeline on which it anticipates it will be able to provide the city and stakeholders with additional information.

Pursuant to the Order, we have included details describing our quarterly stakeholder outreach efforts; remediation, decommissioning and demolition plans and costs; and economic development efforts in the attached report.

We have electronically filed this document with the Minnesota Public Utilities Commission, and copies have been served on the parties on the attached service list. Please contact me at monsherra.s.blank@xcelenergy.com or Patti Leaf at patricia.b.leaf@xcelenergy.com if you have any questions regarding this filing.

Sincerely,

/s/

MONSHERRA BLANK
DIRECTOR, REGULATORY AND STRATEGIC ANALYSIS

Enclosures
cc: Service Lists

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

Katie J. Sieben	Chair
Valerie Means	Commissioner
Matthew Schuerger	Commissioner
Joseph K. Sullivan	Commissioner
John A. Tuma	Commissioner

IN THE MATTER OF XCEL ENERGY'S SITE REMEDIATION PLANS FOR DECOMMISSIONING THE ALLEN S. KING GENERATING STATION

IN THE MATTER OF XCEL ENERGY'S 2020-2034 UPPER MIDWEST INTEGRATED RESOURCE PLAN

DOCKET NO. E002/M-22-264
E002/RP-19-368

COMPLIANCE REPORT

INTRODUCTION

Northern States Power Company, doing business as Xcel Energy, submits this Annual Report on Site Remediation Plans for Decommissioning the Allen S. King Generating Station (King) in compliance with the Minnesota Public Utilities Commission's (Commission) April 15, 2022 Order approving the Company's Integrated Resource Plan. (IRP Orders)[1].

Order Point 21 of the most recent IRP Order states:

Regarding remediation plans for the King site:

A. The Commission authorizes its Executive Secretary to open a new docket on this topic.

[1] ORDER APPROVING PLAN WITH MODIFICATIONS AND ESTABLISHING REQUIREMENTS FOR FUTURE FILINGS, Docket No. E002/RP-19-368, April 15, 2022 (IRP Order).

B. Xcel shall conduct quarterly stakeholder meetings regarding the King site with interested parties including the city of Oak Park Heights, Washington County, the Department, DNR, the Energy Transition Office, PCA, the National Park Service, CEOs, CEE, the Wild Rivers Conservancy, and labor unions.

C. Following these stakeholder meetings, by December 31, 2023, or in its next resource plan if earlier- and annually thereafter- Xcel shall submit to the Commission, the city of Oak Park Heights, and interested stakeholders a detailed report describing the company's plans for the disposition of the King site, equipment, and buffer property. This report should include the following:

1) The company's plans, estimated costs, and a detailed timeline to decommission and demolish the electric generation facility.

2) A detailed description of the timeline and steps necessary to remediate pollution at the King site.

3) A description of any ongoing efforts by the company to evaluate future uses for the plant site, any buffer property owned by the company, or any adjacent property, including a description of coordination with or involvement of the city and stakeholders in those efforts.

4) The status of efforts to support the region's and city's economic development efforts, including- to the extent possible- specific projects and investments the company is helping the city to attract.

5) An update on conservation efforts to reflect the uniqueness of the site and surrounding property located in and along the St. Croix National Scenic Riverway.

6) Any other items the Commission or the company sees fit to include.

If Xcel cannot obtain the necessary information at the time of each filing, the company shall submit a detailed timeline on which it anticipates it will be able to provide the city and stakeholders with additional information.

The IRP Order requires the Company to conduct quarterly stakeholder meetings and submit to the Commission, City of Oak Park Heights, and interested stakeholders a detailed report describing the Company's plans for the disposition of the King site, equipment, and buffer property. A similar requirement was passed by the Minnesota Legislature in 2023 and can be found in Minnesota Statute Chapter 60, Article 12, Section 70 (House File 2310).

This report is filed with the Commission in Docket Nos. E002/RP-19-368 and E002/M-22-264 and provided to the City of Oak Park Heights and interested stakeholders. The report follows.

I. QUARTERLY STAKEHOLDER OUTREACH EFFORTS

As required by the IRP Order, the Company has held quarterly meetings with King community stakeholders. The Company included all stakeholders noted in the Commission's Order and also extended invitations to the following additional agencies and community groups: Minnesota Department of Transportation; Minnesota Public Utilities Commission staff; business neighbors of the Allen S. King Plant (the King plant); the US Army Corps of Engineers; area state legislators; the Greater Stillwater Chamber of Commerce; St. Croix County, Wisconsin; and the Cities of Stillwater and Bayport. The meetings have been held virtually or as hybrid meetings and have been well attended. The meetings have provided an overview of plans and known requirements associated with the retirement of the King Plant and information about future efforts, and have included significant opportunity for stakeholders to provide input and ask questions regarding information presented. Stakeholders have indicated their appreciation of the meetings and for the information shared. All presentation materials have been filed in the above-noted dockets. An overview of meetings conducted in 2023 follows:

A. First Quarter 2023

The first quarter 2023 King Community Stakeholder Outreach meeting was held February 23, 2023, and focused on environmental remediation requirements associated with the retirement of the facility. Representatives from the Minnesota Pollution Control Agency (MPCA) participated in this meeting and provided an overview to stakeholders on environmental regulations pertaining to industrial wastewater, solid waste, and remediation requirements including remediation and reuse projects at other sites in the state.

The Company provided an overview on other historical remediation efforts undertaken at the Riverside Combined Cycle Generating Plant, the High Bridge Combined Cycle Plant, and the Black Dog Generating Plant when each of these facilities transitioned from coal fired facilities to natural gas fired units. Details were provided regarding remediation efforts for each. In addition, information regarding remediation and present-day use of the King Ash Disposal Facility was provided. We also discussed future King remediation efforts required for the existing coal yard and holding pond.

B. Second Quarter 2023

The second quarter outreach meeting was held May 8, 2023. A tour of the King Plant was provided to interested stakeholders and included an overview of the plant's history, operations, pollution control equipment, and the falcon nesting platform.

C. Third Quarter 2023

The third quarter King Community Stakeholder Outreach meeting was held in-person on September 26, 2023. The meeting provided an overview of the recently released Xcel Energy Request for Proposals (RFP) to build 650 MW of solar generation in western Wisconsin. An overview of how solar projects are typically sited, built, and operated was also given.

This presentation included an update on the King Transmission Line, which will interconnect new solar generation to the grid at the King Substation. Information pertaining to preliminary routes and detailed pictures of the transmission line upgrades were provided.

The discussion also included an update on the King substation, which will remain in use following retirement of the King Plant. It was noted that an expansion of the substation will be necessary to accommodate the new transmission line. The presentation included a discussion regarding permitting requirements associated with these projects.

A plant update was provided by plant management, which was followed by a stakeholder roundtable.

D. Fourth Quarter 2023

This stakeholder meeting was held December 15, 2023, and focused on providing information regarding recent Infrastructure Investment Jobs Act (IIJA) grants. Details pertaining to the Sherco Form Energy Long Duration Energy Storage System, the Heartland Hydrogen Hub and the Sherco Hydrogen Project were shared with stakeholders. In addition, information pertaining to the future formation of the Company's Environmental Justice Advisory Board (EJAB) was shared.

II. DECOMMISSIONING AND DEMOLITION PLANS

At this time, the main focus of the plant is on the continued operation of the King Plant until the end of 2028 when it will be retired. Xcel Energy is currently evaluating future uses of the King electric generating facility structure and property. The preliminary Site Decommissioning Plan for the King Plant is in development and is expected to be completed by December 31, 2025. This plan will address any potential demolition plans for the site and the plan details will be shared in future annual reports once they are available. As reuse of the site continues to be evaluated, the Site Decommissioning Plan will continue to be updated and communicated. While detailed plans and timelines have not yet been developed, the following information can be shared.

Current preparatory efforts for decommissioning of the unit include inventorying materials for removal of components from the unit that will not be needed. The removal of the boiler is not expected until the unit is retired, currently planned for the end of 2028. Use of the existing generator as a synchronous condenser is currently under evaluation by the Company. If the Company proceeds to convert the existing generator to a synchronous condenser, further investigation will be needed to determine if the boiler can safely be removed while a synchronous condenser is in operation. The turbine generator and building would need to remain for the operation

of a synchronous condenser. The potential demolition of all other structures onsite including the powerhouse, river intake structure, circulating water treatment system including the river discharge structure, cooling towers, pollution control buildings, etc., will depend on the Company's plans for future use of the site and, if deemed necessary, would only occur post-retirement of the unit. Stack and any building demolition deemed appropriate will also occur post-retirement. In general, components will not be removed from the site until the unit has been retired in 2028. The King substation will continue to be utilized.

Once the unit has been retired, unit specific systems may be decommissioned, isolated, drained, and left in a safe state, which would allow for the demolition of equipment. Systems such as pollution control equipment, Bottom Ash, and Fly Ash Systems, will be cleaned of ash. Coal will be burned down to empty the feed systems to the unit, and the silo-feeders will be washed down to remove coal debris. The Unit's cooling towers are being considered for demolition shortly after the unit ceases operation if there is no longer a need for cooling. Systems to be left in service could include, but are not limited to, the electrical systems for various components, Building Heat, Auxiliary Steam, Fire Protection, Station Air Service and Potable Water, Ash Water, and other systems.

Previously submitted information on the plans and estimated costs associated with demolition have been filed under a Remaining Lives and Five-year Depreciation Study (the Study) in 2020 in Docket No. E, G002/M-19-723.[2] The following information, including Table 1, was provided in the 2020 Study. Please see the full report for additional details.

A. Demolition Planning and Cost Estimates

As noted in the Study, when the decision is made to begin physical dismantling of the King Plant, Xcel Energy will begin field dismantling activities, beginning with engineering, and planning, and removal of asbestos and other hazardous materials from the station.

[2] See *In the Matter of the Petition of Northern States Power Company for Approval of the 2020 Review of Remaining Lives and Five-Year Depreciation Study,* Docket No. E,G002/D-19-723, PETITION (August 18, 2020).

A preliminary planning phase of the program will begin once it has been determined that the station will be dismantled, and the project has been authorized to proceed. During this phase, the Company will assemble its dismantling management organization, make appropriate decisions regarding the extent of dismantling and the approach to managing the activities, and will accomplish those site preparation activities necessary to transition from a plant shutdown configuration to site dismantling. For purposes of the development of a cost estimate it is assumed that the entire station will be dismantled as a single project. Expected costs to be incurred during this preliminary phase of the program are included in the dismantling costs presented in the Study.

Xcel Energy will prepare the King Plant for dismantling by performing the following activities:

- Prepare specifications that identify and describe the objectives and major work activities to be accomplished (establishing the final site configuration).
- Assemble plant documentation that may be relevant to dismantling (drawings, hazardous material reports, environmental studies, etc.).
- Select an asbestos abatement contractor (if required) and dismantling contractor.
- Assemble and mobilize the management and oversight team responsible for the project.
- Document hazardous materials location and inventory.

The inventory is an essential element of the cost estimate since dismantling costs are determined by applying unit cost factors against the corresponding inventory quantities. For the estimate, a site-specific inventory of materials to be removed was developed using a combination of methods and can be found in the Study.

In developing an estimate, the cost of labor, equipment and material, credit for scrap, and similar costs will influence the results of the estimate. The basis for the significant cost drivers can also be found in the Study.

Table 1: Allen S. King Station Summary of Activity Costs (2019 Dollars)

Activities	Unit 1	Common	Station	Station Total
Allen S. King Unit Rating (MWe)	511			511
Characterization/Temporary Service	150,000	-	201,606	351,606
Worker Access	630,789	-		630,789
Pre-Demolition Cleaning (Boiler/Precipitator/Tanks)	1,000,300	80,000		1,080,300
Asbestos/Lead Paint Remediation	4,284,988	-		4,284,988
Equipment Removal	7,865,365	1,682,890		9,548,255
Boiler(s)	3,460,641	-		3,460,641
Structures Demolition	10,016,294	2,476,372		12,492,666
Backfill/Grade/Landscaping/ Well Closure	2,605,976	977,821	113,991	3,697,788
Coal Yard Closure		10,718,358		10,718,358
Ash Landfills/ Ash Ponds & Landfills Including Evaporation Ponds		950,000		950,000
Utility Management/Oversight			3,027,199	3,027,199
Demolition Contractor Management/Supervisory/ Safety Staff			3,699,644	3,699,644
Security			776,195	776,195
Property Taxes	-	-	-	0
Project Expenses:				
Shared Heavy Equipment/Operating Engineers			3,194,695	3,194,695
Small Tool Allowance	580,281	102,742	n/a	683,023
Utilities Allowance (Office Equipment etc.)			52,508	52,508
Permits			685,566	685,566
Demolition Contractors Insurance			1,613,171	1,613,171

Demolition Contractors Fee			6,680,544	6,680,544
Sub-Total				67,627,939
Contingency				10,572,690
Project Total (before scrap credit)				78,200,628
Scrap Credit	(11,244,369)	(1,201,677)	-	(12,446,046)
Project Total				65,754,582

III. ENVIRONMENTAL REMEDIATION

Environmental remediation requirements of retired fossil fuel fired electrical generating facilities are prescriptively regulated by local, state, and federal authorities. Upon retirement of the facility, the Company will be required by environmental regulations to address specific portions of the plant process systems such as the Upper Holdup and Lower Holdup Ponds and the Coal Yard. These requirements are not triggered, and their associated timelines do not come into effect, until the King Unit retirement date of December 31, 2028. The costs for these required actions are not fully known at this time as the detailed plans have not been developed. Additionally, once plans are developed, they will require review and approval by the MPCA, which may result in changes to the final closure plans. A general timeline for the environmental remediation requirements and activities is noted in Table 2 below, however, the actual timelines will be dictated by internal Xcel Energy decisions and MPCA review and feedback prior to agency approval under MPCA's Solid Waste and Clean Water Act programs.

Table 2. King Plant Environmental Remediation Timeline*

June 30, 2025	Initiate assessment of planned coal inventory and supply/deliveries and pond operations and maintenance activities in relation to forecasted plant operations for the remaining years before unit retirement for planning purposes.
December 31, 2025	Finalize assessment including recommendations to optimize plant operations (including fuel supply and dispatch) for the remaining life of the unit.
June 30, 2026	Initiate development of coal yard burn down plan to facilitate closure work following unit retirement.

December 31, 2026	Finalize coal yard burn down plan.
January 31, 2027	Initiate coal yard burn down plan.
June 30, 2027	Initiate development of a National Pollutant Discharge Elimination System (NPDES) closure plan entailing ponds, coal yard, stormwater, and hold up and the coal yard.
June 30, 2028	File Facility Closure Notice pursuant to NPDES Permit and file recommended NPDES Closure Plan with MPCA for review and approval.
December 31, 2028	Shutdown and retire the electric generating unit to permanently cease the combustion of coal.
January 31, 2029.	Initiate closure activities in accordance with plan approved by MPCA.

* Subject to Change

A. OFFSITE SOLID WASTE LANDFILL

The King Plant Ash Disposal Facility was closed in 2011 and is currently in post-closure care. The site is maintained under a Solid Waste Permit issued by the MPCA with minimal required action including mowing, quarterly inspections, and leachate discharge monitoring. Xcel Energy maintains Financial Assurance to respond to environmental, maintenance, or emergency needs. A Water Quality Monitoring Report, describing both groundwater and leachate quality, is submitted to the MPCA quarterly. A Solid Waste Annual Report, which includes financial status (financial assurance) and a summary of the quarterly Water Quality Monitoring Reports, is provided to the MPCA annually. Continued monitoring will occur at the site, indefinitely.

Under a use agreement with the City of Oak Park Heights, the city uses the land as Oak Park Crossings Park. The Company and city work together to ensure that park uses are consistent with the permit.

IV. ECONOMIC DEVELOPMENT EFFORTS

Xcel Energy's Corporate Economic Development Team has many resources to assist communities and stakeholders with opportunities to increase economic development activity for their region. These resources include a real estate portfolio and marketing initiatives for site development; facilitation between community and prospective projects; as well as continuing work to grow an active pipeline of projects for the Xcel Energy territory. Specific support for the King Plant will be contingent upon further evaluation of future use for the facility and potential remediation efforts. Xcel Energy's Corporate Economic Development Team remains committed to assisting the City of Oak Park Heights on economic development opportunities.

Xcel Energy continues to consider future uses of the King Plant in ongoing coordination with the City of Oak Park Heights. Members of Xcel Energy's Corporate Economic Development Team have met with City of Oak Park Heights officials to discuss the Company's general economic development initiatives and future development opportunities at the plant site. These scenarios will be contingent upon continued evaluation for reuse of the Site and remediation efforts.

V. CONSERVATION EFFORTS - ST. CROIX NATIONAL SCENIC RIVERWAY

Xcel Energy has a long history of supporting conservation efforts in the St. Croix River Valley. In the early 1900s, Northern States Power owned more than 62,000 acres of undeveloped land that had been acquired for potential hydro development. Beginning in the 1960s, Company leaders expressed a desire to preserve those lands in a natural state and began discussions with the federal and state governments. These discussions resulted in the donation of approximately 52,000 acres of land along the St. Croix and Namekagon Rivers to the US Department of the Interior, and to the states of Minnesota and Wisconsin. These lands are now part of the St. Croix National Scenic Riverway. Xcel Energy is also an active supporter of the Wild Rivers Conservancy (WRC), with an Xcel Energy representative serving on the WRC's Board of Directors for the past several decades. The WRC is the nonprofit organization that supports the National Park Service (NPS) mission on the St. Croix and Namekagon Rivers.

The King Plant is located within the Lower St. Croix National Scenic Riverway (Lower St. Croix), designated by Congress due to its scenic, recreational, and geologic values. The Minnesota Department of Natural Resources (MNDNR), Wisconsin Department of Natural Resources (WDNR), and the NPS developed a Cooperative Management Plan (CMP) for the Lower St. Croix. This CMP emphasizes maintaining and enhancing the diverse character of the riverway while allowing limited planned development consistent with the historic character of the communities along the river.

As evaluation regarding decommissioning plans and future site uses for the site continues, we will continue to work with stakeholders from the NPS, the WRC, the US Army Corps of Engineers, MNDNR, WDNR and communities on both sides of the river to understand conservation goals and concerns at the King Plant site, and to ensure that those interests are considered as we determine plans for the future of the site. Xcel Energy will continue to evaluate opportunities to support or enhance the designated values of the riverway as plans develop.

VI. OTHER EFFORTS

A. Leadership in the Valley

As part of our Company's ongoing effort to engage our customers where we have plant locations, the Company regularly hosts local civic, business, and community groups for tours of our facilities. On October 12, 2023, we hosted a half-day presentation and tour of the King Plant as part of "Leadership in the Valley," an annual community leadership series sponsored by the Greater Stillwater Chamber of Commerce. A cohort of about 35 community leaders, drawn from area nonprofits, small businesses and local governments, learned about the Company's plans to decommission the King Plant as part of the Company's commitment to 100 percent carbon-free energy generation.

We discussed historic and current plant operations, reviewed our plans to build solar generation in Western Wisconsin to connect to the King Plant substation, and discussed future engineering and environmental issues that will factor into future reuse of the site. We anticipate further community outreach throughout 2024.

B. Energy Transition Advisory Committee

In addition, the company was appointed and served on the Energy Transition Advisory Committee (ETAC) which was created in 2021 within the Minnesota Department of Employment and Economic Development (DEED). The directive of ETAC was to create a statewide energy transition plan and to advise the Governor, the Commissioner of DEED and the Legislature on energy transition issues, establish transition programs, economic initiatives, and transition policy (Minn. Stat. § 116J.5492). ETAC met through 2022, including site visits to communities impacted by the energy transition. The Statewide Energy Transition Plan was filed by ETAC in December 2022. In 2023, the Legislature extended the life of ETAC until June 30, 2027, to file annual revisions to the Statewide Energy Transition Plan.

CONCLUSION

The Company takes seriously its responsibility to engage every community where we have major facilities and operations. Our commitment to our host communities and neighbors surrounding the King Plant will outlive our coal operations. While the nature of our operations there will change in the years ahead, the site will continue to be important to the Company's ability to deliver reliable, safe, affordable energy to our customers. We are glad to demonstrate that our longstanding participation in the social and economic life of St. Croix Valley communities will continue.

We appreciate the opportunity to work with our stakeholders and neighbors and the time and talent given to us by them throughout this past year of community stakeholder meetings. We are committed to ongoing engagement with community stakeholders as the King Plant site transitions to cleaner energy and transmission.

CERTIFICATE OF SERVICE

I, Marie Horner, hereby certify that I have this day served copies of the foregoing document on the attached list of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States mail at Minneapolis, Minnesota

xx electronic filing

DOCKET NOS. E002/M-22-264
E002/RP-19-368

Dated this 28th day of December 2023

/s/
_____
Marie Horner
Regulatory Administrator

APPENDIX R – EQUITY

Order Point 25 of the most recent IRP Order[1] states:

Xcel shall engage in community outreach and establish a stakeholder group to do the following:

A. *Design for the equitable delivery of electricity services and programs for energy-burdened customers in the company's next Resource Plan.*
B. *Create new options to improve customer access to energy efficiency and renewable energy.*
C. *Draft a plan to be submitted in Xcel's next Resource Plan to bring the racial and gender diversity of the company's workforce in line with the utility's state goals.*
D. *Design incentives to ensure that communities of low-income, Black, Indigenous, and People of Color that have disproportionately borne costs of unjust and inequitable energy decision have equitable access to programs promoting distributed generation.*
E. *Adopt practices in furtherance of procedural justice- including deeper engagement with renters; affordable rental property owners; communities of Black, Indigenous, and People of Color; and under-resources individuals- providing resources for engagement and participation, and providing financial support for impacted individuals to participate in dockets and decision - making processes.*
F. *Form an environmental justice accountability board which shall develop environmental justice-focused initiatives to be incorporated throughout the utility.*

By January 1, 2023 and annually thereafter, Xcel shall file details describing stakeholder outreach and progress in its next resource planning docket, and in a separate docket to be established by the Executive Secretary.

I. INTRODUCTION

The Commission's April 15, 2022 Order in Docket No. E002/RP-19-368 requires the Company to address equity across a broad range of areas and program issues by engaging in community outreach, establishing a stakeholder group, and forming an environmental justice accountability board. An annual report on efforts and progress is required by January 1. This report was filed in Dockets E002/M-22-266 and E002/RP-19-368 on December 29, 2023. Some of the following information is drawn from that filing.

In response to the Order, the Company has taken a number of interrelated actions to enhance equitable outcomes and broaden participation in energy decision-making.

[1] ORDER APPROVING PLAN WITH MODIFICATIONS AND ESTABLISHING REQUIREMENTS FOR FUTURE FILINGS, Docket No. E002/RP-19-368, April 15, 2022 (IRP Order).

In response to the requirement to "establish a stakeholder group," we convened the Equity Stakeholder Advisory Group (ESAG), which has met approximately monthly since September 2022. We are also in the process of convening an Environmental Justice Advisory Board (EJAB) to continue the work of ESAG and to recommend energy and environmental justice (EJ) initiatives for implementation by the Company. In addition, we have incorporated consideration of equity, energy justice, EJ, and greater community participation into a wide range of programs and dockets, including the 2021 electric rate case, this Resource Plan, resource acquisitions and requests for proposals (RFPs), our 2023 Integrated Distribution Plan (IDP), our Energy Conservation and Optimization (ECO) Triennial Plan, Natural Gas Innovation Act plan (NGIA), electric vehicle (EV) programs,[2] workforce diversification programs, social investments and charitable contributions, among others. These efforts are summarized in the sections below.

In 2022, Xcel Energy adopted an EJ Position Statement[3] committing us to consider EJ in our energy, climate, and environmental initiatives, and to strive to provide meaningful opportunities for impacted communities to participate in the process. The position statement also outlines additional Company objectives including collaboratively engaging the communities we serve, maintaining affordability and reliability, and allocating the costs and benefits of the clean energy transition equitably. We have incorporated the consideration of EJ into our strategy, business, and operational plans following the directives of our EJ Position Statement.

Company efforts are guided by the 2023 legislated definition of EJ in Minn. Stat. § 116.065,[4] as well as the definition of "environmental justice area" in that statute and in the Minnesota carbon-free electricity standard,[5] which is also reflected in the Minnesota Pollution Control Agency's (MPCA's) mapping tool.[6]

II. EQUITY STAKEHOLDER ADVISORY GROUP

In September 2022, the Company convened ESAG to advise the Company on the programs identified in the Commission's Order – i.e., equitable delivery of electricity services and programs for energy burdened customers, improved customer access to

[2] Transportation Electrification Plan as filed in the 2023 Intergraded Distribution Plan (November 1, 2023), Docket No. E002/M-23-452.
[3] See Environmental-Justice-Position-Statement.pdf (xcelenergy.com).
[4] See Minn. Stat. 116.065, Subd. 1(d) at Sec. 116.065 MN Statutes.
[5] See Minn. Stat. 216B.1691, Subd. 1(e) at Sec. 216B.1691 MN Statutes.
[6] Understanding environmental justice in Minnesota (arcgis.com).

energy efficiency and renewable energy, incentives to ensure that income-qualified and Black, Indigenous and People of Color (BIPOC) communities have equitable access to distributed generation programs, workforce diversification, and procedural justice in an attempt to broaden the ability of impacted individuals to participate in dockets and decision-making processes.[7] ESAG has met approximately monthly since it was convened. Summaries of each meeting have been filed in Docket Nos. E002/M-22-266 and E002/RP-19-368. The Company also filed in those dockets annual updates on December 22, 2022 and December 29, 2023, identifying progress in equity efforts as required by Integrated Resource Plan (IRP) Orders.[8]

A. Membership

ESAG is composed of representatives of approximately 35 community-based organizations, advocates for low-income households, EJ groups, clean energy advocates and state agencies. In developing the list of members invited to participate in ESAG, the Company worked to achieve representation from the wide diversity of racial, ethnic and cultural communities served by Xcel Energy, focusing particularly on elevating the voices of BIPOC communities. We also sought to include organizations working across the various program areas highlighted in the Commission's Order (energy burden, energy efficiency, renewable energy, and workforce), and to include both intervenor organizations who frequently participate in Commission dockets and many non-intervenors who have rarely or never participated, in order to serve the procedural justice objective of broadening participation in energy decisions.

B. Process

The first 10 ESAG meetings were facilitated by the Center for Economic Inclusion (CEI), an organization "committed to closing racial employment, income, and wealth gaps, and building racially inclusive and equitable regional economies." Founded in 2017, CEI is "dedicated exclusively to equipping public and private sector employers and policy makers to close racial employment, income, and wealth gaps and catalyze inclusive economic growth."[9] CEI led the ESAG through a systematic process that aimed to define the problem(s) to be solved; explore and identify root causes of the problem(s); and identify potential solutions and make recommendations on how Xcel Energy can address root causes of the problem(s).

[7] IRP Order Point 25.
[8] Ibid.
[9] *See* Mission — Center for Economic Inclusion.

C. ESAG Work Streams

In terms of substance, ESAG's work has focused on three core areas:

1. Reducing Energy Burden for Low-income and BIPOC Customers

Work in this area builds on the recognition that, although energy burden (the share of income spent on household energy) may be relatively low for the average Minnesotan, it is unsustainably high for some – in particular, for those Minnesotans living in areas where higher than average energy burden overlaps with high poverty, a high proportion of People of Color, and other equity metrics. ESAG's work to brainstorm and then prioritize solutions, resulted in two leading potential strategies:

a) The first identified strategy would apply an automated discount to bills for low-income customers within identified qualifying areas. Qualifying areas would be chosen based on agreed thresholds for energy burden and/or poverty. The discount would take the form of a bill credit which would be applied automatically each month to electric bills of all households in the qualifying areas. There would be no household-level income checks, so there would be no administrative burden for participating households.

b) The second identified strategy would create a package of energy efficiency program ideas. This concept grew out of a desire to expand participation in energy efficiency programs that can reduce household energy bills in a more permanent way (complementing the short-term bill relief of the automated bill discount). Many community members who qualify for assistance to make their homes more energy efficient and save money face barriers to accessing this assistance – barriers including the complexity of navigating program offerings, not owning their home, the burden of completing applications and documenting income, and sometimes distrust of the utility and/or energy efficiency implementers when the offerings seem "too good to be true." This concept seeks to combine several innovations that could work together to lower these barriers, including block-by-block weatherization/efficiency initiatives, automatic qualification, community-based navigators, and requirements/incentives for efficiency implementers to partner with community-based organizations that may have greater trust in the community.

2. Equitable Access to Renewable Energy and Distributed Generation

Work in this area builds on the recognition that existing programs for solar and other types of renewable energy have tended to benefit wealthier residents, homeowners, and businesses while providing limited access for low-income customers, renters, and BIPOC residents and businesses. ESAG is fortunate to include among its members several organizations, both non-profit and for-profit, that are pioneering new ways for low-income and BIPOC customers to participate in and receive financial, employment and other benefits from the development of solar generation. ESAG met in January 2024 to discuss a consolidated list of potential strategies for more equitable access to renewable energy, and will be prioritizing this list for further discussions in first quarter 2024.

3. Workforce Diversification

Work in this area builds on the recognition that a company's most successful ideas and outcomes result from a collaboration between people with different experiences and perspectives. While progress has been made by the Company in workforce diversification, additional efforts are needed to promote racial and gender equity in the energy workforce – both Xcel Energy's own workforce, and the broader clean energy workforce that Xcel Energy's investments and procurement relies upon. In particular, robust and coordinated efforts by a whole ecosystem of energy and workforce development organizations will be needed to ensure that the clean energy transition currently underway produces new career opportunities for a diverse workforce.

ESAG has worked on brainstorming and prioritizing workforce diversification strategies in the categories of recruitment, retention, training, and supplier diversity in contracting, procurement and RFPs. At the November 12, 2023 ESAG meeting, the Company provided an overview of our current diversity, equity and inclusion (DEI) strategies, including the Company's five pillars of Xcel Energy's strategy:

1. ***Build and maintain a diverse workforce, talent pipeline and leadership bench strength*** that reflects the communities and customers we serve.
2. ***Enhance community involvement and corporate giving programs*** to increase our support of organizations that advance DEI initiatives.
3. ***Increase data transparency, ensuring diverse workforce fair access to information*** and resources for all while striving to identify and eliminate unfair biases, stereotypes or barriers and leadership representation.

4. ***Establish targets to broaden our supplier diversity base,*** encouraging businesses owned by women or veterans or whose owners are ethnically or racially diverse to participate in procurement process.
5. ***Create an environment where employees feel safe, respected and genuinely included and empowered*** to do their best work.

As required by IRP Order,[10] the Company has developed a Workforce Diversification Plan (Plan), included here as Appendix R1: Workforce Diversification Plan. The Plan provides an overview of the Company's stated workforce diversification goals which includes established objectives, timelines and metrics. The Plan was shared with ESAG members for their review and input prior to the January 17, 2024 ESAG meeting. During that meeting, ESAG members provided feedback and recommendations to be considered in the plan. ESAG members feedback from that meeting included, among other comments:

- Encouraging consideration of additional programs such as beneficial electrification training, complementing the training areas delivered via Energy Careers Academy (ECA);
- Establishment of a training facility in the St. Paul area and/or offering transportation accommodations to increase participants' access to the Minneapolis training location for the ECA;
- A request to provide detailed information regarding diversity in various occupation fields such as labor, engineering, Xcel Energy leadership, etc.;
- To consider additional outreach via community-based organizations and workforce development non-profit organizations for recruitment purposes, and additional grant/scholarship funding options for participants not eligible for federal Pell grants.

We appreciate ESAG members' willingness to connect with us to help spread the word about our program offerings to reach a broader audience for recruitment purposes and look forward to working with ESAG members on additional routes of advertisement for these programs. Transportation support is already available for students in the ECA program in the form of bus cards, gas cards and car repairs as needed. Pertaining to additional training for electrification, we do have some program offerings through a partnership with Center for Energy and the Environment providing energy auditor training. This is discussed further below. Regarding detailed diversity information, we will be providing additional information to help address this request in our March 15, 2024 filing required by Minn. Stat. § 216C.51.

[10] IRP Order Point 25.C

Based upon ESAG feedback, we have incorporated additional outreach efforts, evaluating additional means for easing access for student participation in St. Paul, and connecting with organizations that can facilitate access to specific community members. As well, we will evaluate additional training opportunities with local higher level educational institutions to assist the training potential of employees to assist with the clean energy transition. We view our Workforce Diversification Plan as a living document which will be modified over time. Suggestions not incorporated at this time will continue to be evaluated for later inclusion as appropriate. Throughout the process, ESAG has highlighted the need to increase access, awareness, and retention of diverse workforces. Strategies pertaining to these topics are discussed in Appendix R1.

D. Updates to the Commission

In addition to the meeting summaries filed after each meeting and the 2022 and 2023 annual reports, the Company and ESAG members reported on progress to date in a November 21, 2023 Commission planning meeting on equity. Presentations were given by Commission staff, the Department of Commerce, and Xcel Energy. The Company presented an overview and progress update on ESAG work to date, followed by remarks from 11 ESAG members. Presentation materials from this meeting have been filed in Docket Nos. E002/M-22-266 and E002/RP-19-368.

E. Compensation for ESAG participants

The topic of compensation of ESAG members has been raised on several occasions, both during the formation of ESAG and during ESAG meetings. The Company's position to date on compensation is based on our reading of the Commission's order directing the Company to form ESAG, as well as the Commission's statements in approving our IRP. The Order reads,[11] "Adopt practices in furtherance of procedural justice … providing resources for engagement and participation and providing financial support for impacted individuals to participate in dockets and decision-making processes." During the February 2022 IRP hearing, intervenors asked the Commission to order compensation for intervenors participating in the stakeholder group that the Commission directed us to establish – and the Commission explicitly declined to do so. Based upon these two Commission actions – declining to order intervenor compensation when asked, but including language in the Order on financial support for "impacted individuals" – our interpretation has been that we should not compensate active intervenors, but should consider compensating "impacted individuals" who have not previously intervened in Commission dockets,

[11] See footnote 1, Order Point 25 subpart E.

and who would bring a community perspective to the discussion that would be beneficial for the Company and Commission to hear.

Based on this interpretation, when initial invitations were extended to participate in ESAG, the Company requested those invited to let the Company know if they needed compensation in order to participate in ESAG and that a compensation model would be established. This request was repeated in a subsequent email communication as well as at in-person ESAG meetings. Only one ESAG member, who represents an organization that is a frequent intervenor in Commission dockets, requested compensation. We indicated that, based on our interpretation of the Commission's order, we would not provide compensation to intervenors. Since no other members requested compensation, we have not provided compensation to any ESAG member. We also note that all ESAG meetings have taken place during the workday, and to our knowledge all current ESAG members are salaried employees of organizations that they are representing.

We provide this explanation not to suggest that the compensation issue is definitively settled for future community engagement efforts – but rather to explain how it was addressed in ESAG. Notably, the issue of potential compensation for the EJAB is still under evaluation. EJAB members have not yet been chosen but may represent "impacted individuals" who are not intervenors and may bring a crucial under-resourced and/or BIPOC community perspective to our decision-making. We are currently evaluating whether and how to provide compensation to EJAB.

III. ESTABLISHMENT OF ENVIRONMENTAL JUSTICE ADVISORY BOARD

The Commission's Orders in Docket Nos. E002/M-22-266 and E002/RP-19-368 also require the Company to form an EJAB to develop EJ-focused initiatives to be incorporated throughout the utility.[12] Prior to forming the EJAB, the Company conducted research on other organizations – utilities as well as state and federal agencies -- that have established EJ advisory boards. We shared the results of this research with ESAG and asked for their input on several points related to the formation of the EJAB, including purpose, size and composition, the application and selection process, authority and decision-making, logistics, compensation, and Xcel Energy staff and executive participation. Having incorporated the majority of ESAG's recommendations on these decisions into the process, the Company plans to launch an application process to select EJAB members, which will include broad outreach via

[12] See footnote 1, subpart 25.F.

ESAG, EJ and community-based organizations, in the first half of 2024. We will then convene a review committee to evaluate and score applications.

While the Company was ordered to establish the EJAB to focus on EJ-focused initiatives, we do not think that the scope of the EJAB should be limited to just that. We expect that the EJAB will advise the Company on potential initiatives under the broader umbrella of equity and energy justice, including carrying on the work of ESAG to explore programs to reduce energy burden, improve access to energy efficiency and renewable energy, and diversify the energy workforce.

IV. COMMUNITY OUTREACH/LISTENING SESSIONS

The Company discussed – in both our July 1, 2022 letter in Docket Nos. E002/M-22-266 and E002/RP-19-368, and our 2022 Annual Report filed in those same dockets December 22, 2022 – that the Commission's Order requires us to "engage in community outreach" as well as "establish a stakeholder group." Community outreach and the stakeholder group (ESAG) appear to be two distinct efforts in the Order. We agree they are somewhat distinct. ESAG has been a "grass tops" rather than "grass roots" advisory group – engaging mid- to senior-level staff of various community-based organizations, energy implementers, and advocacy groups – to learn from them what they believe are their communities' top priorities and how Xcel Energy could better support those priorities. These leaders' perspectives have been very valuable. Our discussions with these leaders are, however, likely a different type of discussion than might happen in grass roots community meetings where people are representing themselves, their families and friends. We have therefore proposed that another means of community engagement could be to conduct community listening sessions in a variety of under-resourced and/or BIPOC neighborhoods, focusing on hearing from the communities themselves.

We have also heard the frustration community members sometimes voice when organizations ask them to convene with no very concrete "ask" or without a specific program for them to provide their feedback on. We believe that could be the case if we had begun our implementation of the Commission's Order with community listening sessions. The challenge is to strike the right balance – presenting something sufficiently detailed and specific for community members to respond to, but at the same time not "fully baked," so that their feedback can still meaningfully influence the program design. With this in mind, we proposed in our 2022 Annual Report to conduct community listening sessions, but only after investing time in ESAG to develop concrete energy program proposals for community members to react to. At the time of that filing, we thought we would be ready to have community listening

sessions take place in 2023. While we still believe holding community listening sessions is the right approach, work in ESAG has extended beyond what we anticipated and therefore no community listening sessions were held in 2023. In addition, as ideas for the EJ Accountability Board have come into focus it seems the EJAB may itself be a mechanism for grass roots community input.

Considering this, the Company proposes to defer community listening sessions to late 2024, when ESAG's work has turned into concrete proposals for communities to react to, and once EJAB is up and running. We will evaluate at that time whether a third means of community outreach – the listening sessions – or some other means will bring us additional perspectives beyond what we have been able to gather from ESAG and EJAB.

V. OTHER COMPANY EQUITY EFFORTS

A. Distributed Energy Resources and Distribution Planning

Through our engagement with the ESAG we are identifying ways to improve our ability to provide equitable access to renewable energy. Through respective dockets, we will continue to work with stakeholders on ways to enhance our Service Quality Interactive Map, which includes electric reliability data, as well as our Hosting Capacity Map to make it easier for interested parties to access relevant metrics about our distribution system. However, one significant limitation to installing additional distributed solar generation in some areas can be a lack of available hosting capacity. For this reason, we are taking two important steps, as noted in our IDP, toward investing in proactive hosting capacity upgrades in Minnesota. First, we filed with the Department of Commerce (Docket No. E002/M-23-458) a proposed plan for hosting capacity upgrade projects using $10 million of funding, per state legislation.[13] Second, as discussed in our IDP, we have also included capital funds for proactive hosting capacity upgrades in our five-year budget. We recently filed a proposal on how the current distribution interconnection process could be modified to give queue priority to small (≤40 kW) customer-sited solar projects.[14]

[13] See our November 1, 2023, filing to the Department of Commerce (Docket No. E002/M-23-458) regarding the Distribution System Upgrade Program created by Minn. Stat. § 216C.378 as added by Minnesota Session Laws 2023, Chapter 60, Article 12, Section 38.
[14] See our November 1, 2023, filing in Docket No. E999/CI-16-521, IN THE MATTER OF UPDATING THE GENERIC STANDARDS FOR INTERCONNECTION AND OPERATION OF DISTRIBUTED GENERATION FACILITIES ESTABLISHED UNDER MINN. STAT. § 216B.1611.

B. Supplier Diversity

The Company has established an internal goal of achieving 25 percent of sourceable spend diversity with small and diverse suppliers by 2025. The Company has implemented programmatic strategies to support the goal. In addition, the internal resources provide guidance, consultation, and training on supplier diversity matters to effectively maximize the corporate utilization of small, minority, and women-owned businesses.

Utilization of small, minority and women-owned business in supply purchasing is achieved through collaborative strategic relationships with suppliers, customers, stakeholders, and public and community organizations/groups. Our goal is to achieve this by:

- Creating a competitive and quality-focused process for all parties, including a plan of action to monitor, achieve and report program activities.
- Developing new, creative, and innovative opportunities to utilize minority-owned businesses, women-owned businesses and small businesses.
- Establishing qualified supplier relationships that ensure that Xcel Energy, its customers, and shareholders realize the benefits of competitive pricing and quality materials and services.
- Establishing annual targets to increase Xcel Energy's direct and subcontracting spend with small and diverse businesses.
- Maintaining memberships and ongoing engagement with National Minority Supplier Development Council (NMSDC) and its regional affiliates, Women Business Enterprise National Council (WBENC) and its regional affiliates, National Gay & Lesbian Chamber of Commerce (NGLCC), National Veteran Owned Business Association (NaVOBA) and Disability:IN.
- Demonstrating ongoing commitment and support through outreach activities.

It is our goal to continue to drive social and economic benefits to diverse suppliers and local communities through our supply purchasing. An annual Supplier Diversity Economic Impact Report is published and posted to the corporate website.

C. Enhanced Community Involvement and Corporate Giving

Xcel Energy and its Foundation has placed an emphasis on enhanced community involvement and corporate giving programs to increase our support of organizations that advance DEI initiatives. We note below the various internal programs that have been established towards those efforts.

1. Xcel Energy Foundation

In 2022, Xcel Energy Foundation launched a new approach to grantmaking called "Energizing the Future," focusing on aligning business priorities and reflecting our DEI commitments, laying the groundwork for a stronger community impact.

Through this new approach, the Foundation has provided nearly $4 million in funding – coming from Xcel Energy's shareholders and investors, not customers – to support a mix of urban and rural Minnesota 501(c)(3) nonprofits that focus on advancing Science, Technology, Engineering, and Mathematics (STEM) Career Pathways, Environmental Sustainability and Community Vitality.

In 2023, one hundred fifty-three 501(c)(3) nonprofits received $1.96 million through our Xcel Energy Foundation grant program. Of those grants, $1.04 million went to 84 nonprofits that indicate that their mission is explicitly dedicated to advancing DEI; $806,000 was invested in 55 nonprofits that have a BIPOC and/or Multiracial leader; 82 percent of the nonprofits receiving grants have a DEI policy; 74 percent reported that their staff reflect the diversity of the people they serve; and 63 percent of people served by the nonprofits are at or below 150 percent of the federal poverty definition.

Xcel Energy and its Foundation's grantmaking is one of the many ways that we give back to our communities.

2. Xcel Energy Corporate Giving Efforts in the Community

Xcel Energy Corporate community engagement programs enhance support of DEI initiatives. These programs focus on strategic philanthropy, scholarship programs, and pro bono programs.

a. Strategic Philanthropy

- **ReConnect Rondo** (Rondo Land Bridge): $120,000 ($50,000 in 2023 from Xcel Energy/ $70,000 in 2020 from Xcel Energy)
    - Reconnect Rondo's (RCR) mission is the realization of a Rondo Land Bridge (RLB) to reconnect communities proximate to Interstate Highway 94 in the Rondo neighborhood of Saint Paul. RCR is a community development organization established to maximize opportunities for business, economic, and social development. RCR's goal is to persuasively shape policy for the RLB to create opportunities

that uplift the public health, economic, housing, and social conditions of the Rondo communities.

- **Rondo Community Land Trust:** $60,000 ($50,000 in 2023 from Xcel Energy and $10,000 in 2023 from Xcel Energy Foundation)
    - The Rondo Community Land Trust is a local nonprofit with a mission to provide and advocate for permanently affordable, sustainable housing for families and individuals with low to moderate incomes. In 1989, a land trust model was established by the Summit-University Planning Council to keep housing affordable for future generations. It expanded to support affordable commercial space and to serve all of St. Paul, and now serves as an anti-gentrification measure for local businesses.

- **2022 Carbon Offset Investment** ($150,000)
    - **Indian Land Tenure Foundation (ILTF)** ($100,000): ILTF has partnered with the Bois Forte Band of Chippewa to restore to Tribal ownership over 28,000 acres within the reservation that were allotted to individual Indian landowners, then sold to non-Indians, in the late 1800s and early 1900s. The Company's purchase of high-quality carbon offsets will enable ILTF and Bois Forte to continue their work of Tribal land reacquisition and sustainable management.
    - **Green Minneapolis** ($50,000): Green Minneapolis is the lead organization on the Twin Cities Climate Resiliency Initiative (TCCRI), aiming to plant five million urban trees over the next 20 years. One of the project benefits includes planting in underserved communities that have little access to greenspace. Tree planting has been shown to reduce energy costs over time by providing shading (reducing cooling needs), improve local air quality by filtering pollutants, improve stormwater management by intercepting rainfall, and reduce the urban heat island effect in neighborhoods with high poverty and low tree canopy cover.
    - Note that both of these projects, originally funded by a 2022 Strategic Philanthropy investment, have now been incorporated into our proposed portfolio of innovative projects for the Company's first NGIA Plan, filed December 15, 2023. Further details on our NGIA Plan can be found below.

b. Energy Conservation and Optimization Scholarship Program

Xcel Energy provided nearly $1 million in scholarships to 2-year and 4-year colleges and universities within the Company's Minnesota service territory in 2022 and 2023. In 2022, six schools received scholarship funding from Xcel Energy. Funding support was expanded to include 11 schools in 2023.

This is a component of a larger Workforce Development Program, which operates with the objective of providing resources to income qualified persons to bring them into the clean energy workforce. In 2024-2026 this Program will continue to be funded through our Energy Conservation and Optimization (ECO) program as approved by the Department of Commerce on December 1, 2023 in Docket No. E002/CIP-23-92.

The Company's goal of these scholarships is to help develop a diverse workforce by investing in income-qualified students who are enrolled in programs that may lead to careers related to energy efficiency. It is anticipated that as they enter the workforce, their backgrounds will bring unique opportunities to support the expansion of energy efficiency within income qualified and underserved markets.

c. Pro Bono Skills-Based Volunteer Program

As they focus on fulfilling their missions, nonprofit organizations may not have the staff or resources to improve their business operations or advance new initiatives. Xcel Energy employees' personal knowledge and expertise can be a powerful force to help nonprofit organizations achieve their goals and make a deeper impact. That is the premise of Xcel Energy's Pro Bono Skills-Based Volunteer Program. In 2023, 19 employees contributed consulting services to nonprofit organizations in marketing, technology, legal, finance and human resources, volunteering more than 600 hours at three nonprofits and delivering a value of nearly $116,000 to nonprofit organizations through the program.

The volunteer effort began in 2020 and was developed as a way for employees to contribute their skills through pro bono consulting services to nonprofits advancing racial equity and social justice and serving underrepresented groups in the Twin Cities.

Since 2020, this program has supported the capacity building challenges of the following Minnesota-based 501(c)(3) nonprofits focused on advancing equity: The Sanneh Foundation, Project for Pride in Living, Project DIVA, Neighborhood Development Center, WomenVenture, 30,000 Feet, Immigrant Law Center of Minnesota, and Second Harvest Heartland.

d. Employee Board Service

Xcel Energy is intentional about engaging its employees in the communities it serves. One of the many ways we ensure meaningful connection between employees and our community is through board service. In 2023, Xcel Energy employees served on the

board of directors for 39 nonprofit organizations in Minnesota who indicate that their organization is explicitly dedicated to advancing DEI.

e. United Way Contributions

Through Xcel Energy's annual giving campaign supporting local United Way chapters within our 8-state service territory, Xcel Energy employees and retirees, combined with a Company match from the Foundation, contributed $4.1 million in 2023. In Minnesota, $669,532 was raised in support of community organizations, with Company match supporting local United Way chapters. The United Way exists to fuel lasting change that will help achieve the vision of a community where all people thrive regardless of income, race, or place.

D. Request For Proposal Efforts

1. Resource Acquisition RFP Process

The Company is expected to procure a large amount of new generation in coming years through the resource acquisition RFP process as it executes the clean energy transition, and we will factor equity into that process. Many, but not all, of the acquisitions will take place through competitive resource acquisition processes, including RFPs. The Company receives proposals for future electric generation options through the RFP process, often including proposals for resources built, owned, and/or operated by third party developers as well as for resources to be built and/or owned directly by the Company. In many cases, the RFP process considers proposals for generation resources that are 3-6 years away from reaching commercial operation and may be located in any of the five states in which the Company's Upper Midwest service territory is located. These are typically somewhat early-stage procurements run by the Company for long term planning purposes to satisfy regulatory requirements.

Given the timing and breadth of the resource options that can be considered in these resource acquisition RFPs, the Company attempts to ensure that equity, energy justice, and EJ are considered for all project types – those proposed by both third parties and the Company – and all locations. Awareness is given to the details that are available for these projects at the time of RFP submittal, in other words, many of the details we have available at the time for these projects are preliminary. In the RFP process, bidders are required to respond to a set of questions pertaining to equity - such as use of diverse suppliers, use of union labor and/or prevailing wages, siting locations and community engagement, with the list continuing to grow over time.

Currently, the main equity touchpoints in the generation acquisition and resource development processes are as follows:

- Prior to RFP submittal, earlier stage development of resources may occur by developers at specific locations. Part of the development may incorporate energy justice, EJ, and equity in activities such as siting and community engagement.
- The RFP application requests information which must be submitted with the bid documents such as questions pertaining to the use of union labor and/or prevailing wages and requirements to submit information about planned use of diverse suppliers. The Company shares information regarding certified diverse suppliers to inquiring bidders and will send out additional information that developers can use to help understand and conform with equity, EJ, and energy justice requirements in RFPs as well as for their own future resource development efforts. The list of questions posed to bidders will change over time as we learn from these experiences.
- Equity is also taken into consideration during the bid evaluation process. We are currently updating and expanding how equity, energy justice, and EJ factor into the evaluation of proposals during the RFP evaluation period. One example includes the consideration of benefits from a proposed project on the local surrounding area. In recent RFPs, some data points related to local benefits have been collected from bidders in materials submitted with the proposal. However, as new information becomes available about how to define and consider this topic within the resource acquisition framework, the data collected and how it is used in the evaluation process will evolve. We intend to develop additional scoring metrics to include equity in the evaluation process.

  While equity is taken into consideration in the evaluation process, actual bid prices are not modified based upon equity. However, bids prices may be impacted, for example where tax credit adders from the Inflation Reduction Act (IRA) are applied to solar developments in income qualified communities.
- Once the RFP process has closed and projects have received approval, additional opportunities for the incorporation of equity, energy justice, and EJ are likely to arise during the project development stage pertaining to permitting, construction, and sourcing of actual materials used to construct the generation asset. As projects are approved through the required regulatory processes, subsequent sourcing efforts are undertaken by developers of the selected projects to procure specific resource components, additional labor, and other

key elements necessary for the resource to achieve commercial operation. There are additional opportunities throughout the process for equity considerations.

We expect that changes to equity considerations in the RFP process will continue to occur over time as we learn through experience and also based upon the amount and timing of future RFPs. Since the RFP process can take 1.5 to 2 years for a given RFP, followed by years of development of the actual resources selected, we expect that changes to equity considerations in our processes will continue to be implemented gradually over time based upon our experiences.

2. RFP 101 Bidder Workshop

Based on conversations with members of ESAG, it was recognized that there was a need for the sharing of basic information regarding the RFP bidding process with those new to the process. In response, Xcel Energy hosted an RFP 101 Bidder Workshop, held October 12, 2023. The intent of the workshop was to share basic information with potential interested bidders regarding the NSP bidding process for new generation resources. The hybrid workshop generated great interest with over 75 external participants. Participants indicated their appreciation of the workshop and information shared. A copy of the workshop materials was filed to Docket no. E002/M-19-368.

E. Electric Vehicle Equity Efforts

The Company is committed to ensuring that all customers have an equitable opportunity to participate in programs and offerings designed to reap the benefits of transportation electrification. In pursuit of this commitment, the Company has offered and proposed various EV equity initiatives aimed at promoting inclusivity and fostering broader access to EV offerings in Minnesota.

1. Public Charging Pilot

The Company's Public Charging Pilot, approved by the Commission in July 2019,[15] aims to expand the deployment of Level 2 and Direct Current Fast Charging chargers across the Company's service territory. Our equity-driven objectives include deploying public charging and increasing access to charging and mobility services, including access for low-income communities. Key highlights of this initiative involve our

[15] Order Dated July 17, 2019, in Docket No. E002/M-18-643

partnership with HOURCAR to develop the EV Spot Network, which is utilized by the Evie Community Carshare service. The EV Spot Network was planned and implemented through the collaborative efforts of Xcel Energy, HOURCAR, the cities of Saint Paul and Minneapolis, East Metro Strong, and the American Lung Association. Evie Carshare, launched in February 2022, enables one-way trip services that begin within a 35-square mile area of Saint Paul and Minneapolis. Financial support and event contributions have lowered HOURCAR's operational costs, leading to more affordable Evie Carshare pricing for low-income customers. As of January 2024, the Company has 80 active sites, 55 of which are EV Spot Network sites. Between February 2022 and January 2023, Evie Carshare measured 2,637 unique users; 63,145 trips; 676,141 miles traveled; and approximately 2,092 metric tons of greenhouse gas (GHG) emissions reduced. HOURCAR estimates the service saved $5.8 million in transportation costs. Based on total utilization, 38 percent was derived from BIPOC/non-white users, as well as 36 percent from very low-income users and 11 percent from BIPOC/non-white users who are also very low-income.

The Company has also proposed a range of new offerings designed to further promote the equity and accessibility of transportation electrification throughout our service territory in our November 2023 Transportation Electrification Plan (TEP).[16] A detailed summary of those program offerings follows.

2. The Home Wiring Rebate Program

In the TEP, the Company proposed a Home Wiring Rebate Program (Rebate Program) which is aimed at encouraging EV adoption by alleviating the high infrastructure costs associated with residential charging and driving engagement in managed charging programs. For residents living in Disproportionately Impacted Communities (DIC), EJ areas of concern, or those participating in energy assistance programs, the Company proposed an enhanced rebate amount that covers a higher percentage of the average installation cost. Enhanced rebate recipients are eligible for the full $1,200 rebate to cover charging station costs included in the monthly service fee, compared to $500 for a "Market-Rate" rebate. For customers also participating in the Company's EV Accelerate at Home program, any unused portion of the $1,200 can be used to help offset the ongoing monthly residential charging costs. The customer must meet the following criteria to be eligible, as follows:

[16] Transportation Electrification Plan as filed in the 2023 Integrated Distribution Plan (November 1, 2023), Docket No. E002/M-23-452

- Premise is located within a DIC, as defined, and published by the White House Council on Environmental Quality's Justice40 Initiative;[17]
- Premise is located within an EJ Area of Concern (EJ Area), as defined and published by the Minnesota Pollution Control Agency (MPCA);[18]
- Must be a current or previous participant (within the last 5 years) within the State of Minnesota's Weatherization Assistance Program, Affordable Housing Rebate Program, or Minnesota's Low-Income Renter Classification. This program supports our commitment to equity, making EV adoption more accessible and affordable for all, with tangible benefits for underserved communities.

3. Bridge Funding for Fleets and Public Charging

The Company's Bridge Funding for Fleets and Public Charging proposal,[19] included in the TEP, outlines our commitment to responsible fund stewardship, aiming to maximize the impact of projects while ensuring equitable access to transportation electrification. Based on stakeholder feedback, the Company created the Commercial EV Pilot Application Review and Scoring Framework to standardize scoring across commercial EV projects and to align with equity and accessibility priorities. The Company will review and score project applications on a rolling basis across three scoring categories: Project Scope, Customer and Project Readiness, and Equity and Accessibility. Within these reviews, 300 total points are available for each project during the scoring review, with 45 percent of the points allotted to the Project Scope category, 20 percent to Customer and Project Readiness, and 35 percent to Equity and Accessibility. Applications that score 66 percent of the points or higher will qualify to participate and move on to the design and construction phase of the Pilot participation.

The Equity and Accessibility scoring category will include an evaluation of whether the project being considered increases access to electricity as a fuel for all, increases awareness and adoption of EVs, serves disproportionately impacted or underserved customers, including income qualified communities, BIPOC communities, Tribal nations, and rural communities, and is affiliated with or promotes small or underutilized businesses. Such projects that are aligned with stakeholder interests, demonstrate their ability to increase access to electricity as a fuel for all and serve disproportionately impacted or underserved communities will receive more points.

[17] Methodology & data - Climate & Economic Justice Screening Tool (geoplatform.gov)
[18] Understanding environmental justice in Minnesota (arcgis.com)
[19] Transportation Electrification Plan as filed in the 2023 Intergraded Distribution Plan (November 1, 2023), Docket No. E002/M-23-452

This proposed scoring process plays a pivotal role in aligning proposed projects with the Company's commitment to providing equitable access to electrified transportation for customers and communities that stand to benefit the most.

4. Electric School Bus Demonstration

The TEP also included a proposal to support a demonstration to begin to study and address barriers to school bus electrification, school bus bi-directional connection to the grid, and to better understand the costs and benefits of electric school buses as grid resources. Through this demonstration, the Company proposed to partner with the Minnesota State Department of Commerce on its Electric School Bus Deployment Program, to support two V2G capable installations on sites of entities, school districts, or school bus owners and operators. The Company ensured that the proposal for the Electric School Bus Demonstration in its recent TEP was aligned with our equity efforts. One of the primary focuses of this proposed demonstration is on low-income, BIPOC students, who may be disproportionately impacted by vehicular emissions depending upon where they reside and/or due to higher rates of pre-existing health conditions, as well as rural students by ensuring that the demonstration project serves school districts in low-income, BIPOC, and/or rural communities.

To select participants, the Company will use its proposed Application Review and Scoring Process (including the Equity and Accessibility scoring category), mentioned in the above section on Bridge Funding for Fleets and Public Charging. In addition, the Company has proposed to utilize tools and resources such as the MPCA's EJ maps and the US EPA's Environmental Justice Screening Tool to evaluate equity efforts. These tools will help determine if the school district and buses operated by an operator serve a diverse set of school districts, communities, and students within our service territory, ensuring alignment with our objective to support disadvantaged communities, particularly low-income, BIPOC, and/or rural students. Additionally, we considered the proportion of students within a school district or school who receive free or reduced lunch plans to further enhance equity in the program.

5. Residential Advisory Services

The Company has proposed additional funding in the TEP for Residential Advisory Services to expand customer engagement and education opportunities. This proposal is rooted in proven effective efforts and in response to the Commission's recent

Order[20] to focus on "other non-infrastructure related pilots or programs that increase EV deployment, especially in disadvantaged communities." Education and outreach initiatives play a pivotal role in reaching and supporting disadvantaged communities by providing essential resources and information on how they can best participate in and benefit from EV offerings.

6. Partnerships to Promote Access to Transportation Electrification for Tribal Communities

Xcel Energy serves as the energy utility for two Tribes in Minnesota (Lower Sioux Indian Community and Prairie Island Indian Community) and three in Wisconsin (the Lac Courte Oreilles, Red Cliff, and Bad River Bands of Lake Superior Chippewa). We also serve one of the nation's largest urban Native populations, and partner with a broad range of Native-led non-profit organizations and businesses to serve this community's needs.

The Company is currently partnering with Native Sun Community Power Development on two U.S. Department of Energy-funded initiatives to develop EV infrastructure on Tribal Nations and travel corridors. The *Upper Midwest Inter-Tribal EV Charging Community Network* works to reduce EV barriers for Tribal members in the Upper Midwest and build EV-friendly travel corridors connecting Tribal Nations with urban centers. The *Expanding Regional EVSE Access with Tribal Nations based on Community Priorities* project is a Native-led, public-private partnership to promote EV adoption by Tribes and Tribal members in Wisconsin, Minnesota and Michigan by working with Tribes to engage their communities in EV planning and charging infrastructure development. Both projects aim to promote more equitable access to EVs and publicly accessible charging in underserved areas, helping Tribal members to benefit from reduced vehicle operating costs, reduced pollution, and other benefits of electrified transportation.

F. Energy Conservation and Optimization

The Company's 2024-2026 ECO Triennial Plan (Triennial) will provide unprecedented resources to support the underserved markets in Minnesota. It identifies a path forward to doubling the amount of financial resources committed to providing services to the income qualified market and aims to go above the minimum requirements established under Minn. Stat. §216B.241. Our three-year plan, approved in Docket No. E002/CIP-

[20] *See* ORDER ACCEPTING WITHDRAWAL OF CLEAN TRANSPORTATION PORTFOLIO SUBJECT TO CONDITIONS (August 23, 2023), Docket No. E002/M-22-432, Order Point 4C.

23-92 by the Department of Commerce on December 1, 2023, includes five program offerings in our Income-Qualified Market Segment with an energy savings target of 18.7 GWh of electricity and 97,500 dekatherms (Dth) of natural gas, impacting approximately 49,000 customers over the planning years of 2024 through 2026.

To achieve these targets, the Company is working to simplify our participation process and expand eligibility requirements to attributes that are easier for customers to verify. Further we will support our partner organizations through workforce development programming. We will also help customers pursue opportunities to replace electric resistance heating with new technologies, such as heat pumps, along with pre-weatherization support to reduce the number of homes that are deferred for weatherization services.

The design of our Triennial incorporates significant input from stakeholders engaged in serving the income qualified market who are familiar with the barriers faced by this market and provided unique insights into the opportunities to improve our program delivery. We describe the significant impacts of this portfolio below.

1. Expansion of Weatherization

The Triennial Plan expands both the number of rebates and services provided to support weatherization and efficient fuel switching, as well as the delivery channels that will be utilized to reach this market. Program awareness was identified as a barrier to participation. The Company will be incorporating additional outreach to Community Based Organizations (CBOs) to reach more customers with information through CBOs who customers trust and may have an established relationship with. Additional work is also underway to explore opportunities around geographic prequalification and weatherization measures for manufactured homes, a historically underserved market.

2. Rental Properties

Driving conservation in rental units has been a historic struggle caused primarily by the issue of the landlord/owner needing to pay for upgrades that do not necessarily provide them a direct benefit, as often renters are responsible for their own utility bills. Thus, the capital outlay required of the landlord benefits the renters and there is no direct incentive for the landlord to invest in energy efficiency improvements for the property. In properties where utilities are not paid directly by the renter, the cost is frequently incorporated into what the tenant pays for the unit, again removing the incentive to lower energy use. For rental properties with 1-4 units the Triennial

reduces the landlord/owner co-pay to $0 for many efficiency improvement measures for the income qualified rental market, thus removing that barrier. The product that delivers energy optimization support to the multi-family market (5+ units) has been expanded and simplified to better engage property managers and owners for income qualified dwellings. The offering provides a holistic approach, starting with an audit to identify opportunities throughout the building and delivers direct installation of energy efficiency measures into the dwelling units while supporting upgrades to the common spaces with significant rebates.

3. Workforce Training Efforts

The Company has engaged in a multi-faceted program to provide career development training to underserved markets while providing a pipeline of workforce resources to deliver audits and weatherization services. Working not only with our program provider, the Center for Energy and Environment (CEE), but also a multitude of community organizations, we recruit participants into formal classroom training to provide a foundational knowledge on residential energy efficiency. Once the classroom learning is complete there is an opportunity to supplement this with "hands-on" experience with actual field experience through the Company's Home Energy Squad or working with participating insulation installers. In addition to formal training, this program provides resources, including stipends and travel vouchers, to remove barriers that frequently prevent participants from engaging in this type of training. The Company's Work Force Development supported through the Triennial will also deliver the previously described (see section V.C) portfolio of scholarships supporting higher education opportunities for members of underserved markets who are pursuing careers in green energy fields.

Based on data provided by CEE, as of late 2023, 77 participants have successfully completed the four-week training program, of which 89 percent identify as Black, Indigenous, Asia, Latino/Hispanic, or other People of Color. Prior to training, 98 percent of participants had incomes below 80 percent of Area Median Income. On graduation, some participants have entered directly into employment in the sector as Energy Counselors with CEE, while others have gone on to further their training through programs like Xcel Energy's ECA Program. Sixteen participants have completed four-month internships in home energy auditing or home insulation. Several are working as Energy Auditors with CEE or Energy Conservation Specialists with Community Action Partnership of Ramsey and Washington Counties, while others have been hired as insulation installers, construction apprentices or community outreach specialists.

G. Natural Gas Innovation Act Programs

The NGIA, passed in 2021, creates a new framework for gas utilities to promote clean energy, greenhouse gas reductions, job creation and other benefits by bringing forward innovative resources that can decarbonize natural gas use in the building heating, commercial, industrial, and other sectors. The Company filed our first five-year NGIA innovation plan[21] in Minnesota on December 15, 2023. The portfolio of resources included in the plan includes renewable natural gas from a broad range of sources, power-to-hydrogen, carbon capture, a district energy project using networked geothermal ("community ground source heat pumps"), strategic electrification for commercial customers, and a weatherization/strategic electrification project for Tribal housing at Prairie Island Indian Community, as well as several research and development projects. We are working to incorporate equity and low-income considerations into our pilot programs. Five of the proposed projects in our portfolio are designed with equity in mind.

- The Prairie Island Indian Community project will work in a community defined in Minnesota statute as an EJ Area, providing larger incentives than are allowed under ECO in an effort to secure high participation by Tribal members, and helping residents weatherize and electrify housing (mostly manufactured homes) in pursuit of the Tribe's Net Zero vision.
- The Improved Forest Management carbon capture project will work with the Indian Land Tenure Foundation and Bois Forte Band of Chippewa to fund high-quality greenhouse gas reductions while supporting Tribal goals for reacquisition of lands lost to non-Indian owners in the late 1800s and early 1900s.
- The Green Minneapolis carbon capture project will work to plant trees in "urban heat island" areas with low canopy cover in Minneapolis, which tend to be areas with higher poverty and a higher proportion of People of Color. Increasing tree cover in these areas, besides sequestering carbon, will also provide shading and therefore energy savings over time.
- The Advanced Methane Leak Detection carbon capture project will deploy advanced leak detection within low-income or EJ Areas. This project will collect baseline data and enable enhanced repair approaches as applicable.
- The Community Ground Source Heat Pump project will include a site selection process after plan approval that incorporates siting within a low-income or EJ Area as a consideration within the site selection criteria.

[21] Filed in Docket Nos. G002/M-23-518 and G999/CI-21-566.

H. Federal Initiatives Supporting Equity

1. Inflation Reduction Act

The IRA, in addition to other benefits discussed in Appendix Y: Life Cycle Emissions Impacts, supports our: (1) net zero vision through expanded electrification incentives, (2) clean fuel vision through providing incentives for clean fuels, and (3) clean transportation vision by extending and modifying existing tax incentives for electric vehicle purchases. Together, these provisions present opportunities for greater cost-effective renewable deployment and increased electrification, which will ultimately drive incremental customer savings and increased emissions reductions.

The IRA ties the full value of potential tax credits to prevailing wage and apprenticeship requirements. The prevailing wage requirement requires that laborers and mechanics employed in the construction or repair of eligible facilities be paid wages at rates not less than the prevailing rates for the locality. Additional apprenticeship requirements require an increasing percentage of labor hours be performed by qualified apprentices who participate in a registered apprenticeship program. For projects beginning construction after 2023, qualified apprentices are required to perform 15 percent of labor hours. Contractors employing four or more employees must employ at least one qualified apprentice. The IRA also encourages the onshoring and manufacturing of components that go into clean energy generation. We will take steps to ensure our projects qualify for the full tax credits by ensuring those employed in construction meet prevailing wage and apprenticeship requirements.

The IRA also offers income-qualified and disadvantaged communities opportunities for Home Energy Rebates and various grants. These initiatives, made available by the Department of Energy (DOE) and the Environmental Protection Agency in 2023, enable the adoption of efficiency improvements in homes, and electrification technologies, especially for income qualified and disadvantaged communities which in turn, helps to reduce GHG emissions and help to support the clean energy transition. While utilities do not directly administer these programs, we have engaged with the agencies leading these efforts and other stakeholders to establish partnerships to maximize equitable benefits to communities within the state. For more information on the IRA, please refer to Appendix U: Inflation Reduction Act.

2. Investment and Infrastructure Jobs Act/Bipartisan Infrastructure Law Funding

The Federal government's Justice 40 Initiative requires Bipartisan Infrastructure Law (BIL) funding—also known as the Investment and Infrastructure Jobs Act (IIJA)--

applicants to include Community Benefit Plans (CBP). Xcel Energy submitted multiple grant applications to DOE for projects such as the hydrogen hub, energy storage, and grid resiliency programs which will provide significant funding to Minnesota. Each application includes a CBP outlining plans for community engagement, job creation and retention, and incorporation of Diversity, Equity, and Inclusion into these projects. The aim is to ensure that at least 40 percent of the benefits from federal funding go to disadvantaged communities.

Xcel Energy has been awarded funding for the Heartland Hydrogen Hub, Wildfire and Extreme Weather Mitigation under the Grid Resilience and Innovation Partnership (GRIP) program, Form Energy Long Duration Energy Storage under the Energy Storage Demonstrations program, and the Joint Transmission Interconnection Queue Projects and Portfolios (JTIQ) under the GRIP program. The scope of the Projects and CBPs are subject to negotiations with the DOE over the next 6-12 months. The company will commit to a formal CBP scope of work and milestones to report to the DOE over the project life cycle. This will include metrics such as community engagement, diverse supplier spend, workforce development, and other metrics we will work through with DOE.

I. Resilient Minneapolis Project

The Resilient Minneapolis Project (RMP) seeks to improve BIPOC communities' resilience to crises by installing solar/battery microgrids at three community center locations: the North Minneapolis Community Resiliency Hub, Sabathani Community Center, and the Minneapolis American Indian Center (collectively referred to as the RMP "hosts"). At each site, the Company is working with the hosts to install rooftop solar, battery energy storage systems (BESS), microgrid controls, and necessary distribution system modifications to integrate these technologies. The microgrids, when operating in "island" mode (i.e., during an electric system outage), will provide power for services critical to the communities the RMP hosts serve. Recognizing that outages are generally infrequent and brief, and the need to fully utilize RMP assets to benefit all customers, the RMP BESS systems will also be dispatched on a routine basis to provide a variety of grid services and learnings to benefit all the Company's customers.

Equity is the central driver of the RMP. The Company seeks authentic partnership and long-term investment in the three communities, who are disproportionately vulnerable to emergencies caused by climate change and other factors due to a history of discrimination and racial disparities in income, wealth, health, education, jobs and a wide range of other metrics. Providing islandable microgrids in these three locations

will enable these trusted community organizations to continue delivering critical, and in some cases lifesaving, services in the event of an electric outage – shelter, cooling, food, communications, etc. The process has not been without challenges; in the wake of some miscommunications and delays in early 2023, the Company is learning how best to partner with BIPOC organizations, and seeking to tailor the kind of support we provide to each host's distinct goals and needs.

In pursuit of the Commission's September 21, 2023, Order in this docket,[22] the Company is currently working with the hosts to develop a revised RMP proposal to invest in resilience in the host communities identified in the original proposal. Our revised proposal, due March 19, 2024, will include an explanation of how the revised proposal is in the public interest, what objectives will be achieved, and how resilience for host communities will be improved. It will also discuss how the Company plans to deploy up to $9 million of our IIJA GRIP award allocated to microgrids in BIPOC communities, matched by up to $9 million in funding from our customers, to support greater resilience for BIPOC communities.

J. Tribal Engagement Efforts

Xcel Energy provides electric and/or natural gas service to two Tribal Nations in Minnesota (Prairie Island Indian Community and Lower Sioux Community) and three in Wisconsin (the Red Cliff, Lac Courte Oreilles, and Bad River Bands of Lake Superior Chippewa). We also serve one of the nation's largest urban Native American populations in the Minneapolis/St. Paul Metro area. Some of our recent efforts to conduct outreach, coordinate our work, and build new partnerships with Tribes and Native organizations include:

- The Company has adopted an enhanced Tribal notification process for recent renewable energy, transmission, and other projects. For projects such as the Minnesota Energy Connection, Long Range Transmission Planning 4 transmission line, and Sherco Solar, we went beyond merely notifying Tribes whose current land base is in the vicinity of these projects, also using the U.S. Department of Housing and Urban Development's Tribal Directory Assessment Tool to identify all Tribes with potential cultural or ancestral ties in the counties affected by these projects. We sent notifications to the appropriate contacts – generally the Council President and Tribal Historic Preservation Office – for each of these Tribes, providing basic information about the project

[22] Order Approving Withdrawal and Requiring Filing. *In the Matter of Xcel Energy's 2021 Integrated Distribution System Plan and Request for Certification of Distributed Intelligence and the Resilient Minneapolis Project*. September 21, 2023. Docket No. E-002/M-21-694.

and offering to discuss further if the Tribe had concerns or areas/cultural sites they would like to see the Company avoid in siting/routing and construction.

- The Company has supported the Prairie Island Indian Community's (PIIC's) Net Zero Project, specifically by coordinating on the planning of a PIIC-led initiative to conduct home energy audits, weatherization, and electrification of space and water heating for PIIC residents who are Xcel Energy natural gas customers. We subsequently included this pilot project in our NGIA plan, filed December 15, 2023. If approved by the Commission, the PIIC pilot will provide significant utility contributions for weatherization and electrification, using the flexible structure of NGIA to assist PIIC as an EJ Area under state statute.

- We have been collaborating closely with the PIIC on a requirement of this Resource Plan, "true comprehensive cost-benefit analysis, which includes potential environmental and economic impacts to the neighboring communities – in particular, the Prairie Island Indian Community and its Treasure Island Resort & Casino" relative to the continued operation of the Prairie Island Nuclear Generating Plant (PINGP).[23] The Company consulted with PIIC to develop the approach to this study; hired a consultant to conduct economic modeling both for PINGP retirement scenarios and to quantify the economic benefits to the region of Treasure Island Resort & Casino; and coordinated with PIIC to create a narrative on the non-quantifiable costs and benefits. Further information about the approach to this study can be found in Appendix M: Nuclear; the study itself will be filed as a subsequent supplement to this IRP.

- In response to comments filed by Mille Lacs Band of Ojibwe (MLBO) on the Monticello Subsequent License Renewal Application and Sherco Solar 3, we reached out to coordinate with the Tribe to understand their concerns and ensure they have an opportunity to engage in archeological surveys to identify any sensitive sites (e.g. burial mounds and other cultural/historic sites) or plant resources that should be avoided during construction activities. MLBO has since sent Tribal cultural resources staff and a forester to visit the sites to evaluate any sensitive sites and conduct a red cedar tree survey.

[23] Minnesota Public Utilities Commission. ORDER APPROVING PLAN WITH MODIFICATIONS AND ESTABLISHING REQUIREMENTS FOR FUTURE FILINGS. *In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy*. April 15, 2022. Docket No. E-002/RP-19-368. Order Point 23.E.

- The Company is collaborating with Native Sun Community Power Development on two DOE grants designed to ensure equitable access to electrified transportation on Tribal Nations and for Tribal members. This is detailed in section V.E.6 above.
- We worked with Native-owned solar developer Solar Bear LLC and MIGIZI, a non-profit organization providing career pathways for Native youth, to support a 25-kW solar array on MIGIZI's new building through the Solar*Rewards program for Income-Qualified Nonprofit Entity Systems.[24]
- As noted in section V.C.2, the Company is collaborating with the Indian Land Tenure Foundation to support an improved forest management carbon offset project on the Bois Forte Band of Chippewa reservation in northern Minnesota. The project, part of the Company's strategy to achieve net zero greenhouse gas emissions from natural gas, supports the Tribe's efforts to repurchase and responsibly manage forest lands that were lost to non-Indian ownership in the Allotment Era of the late 1800s and early 1900s. In late 2022 the Company made an initial, voluntary purchase from the project.[25] We have also included this project in our NGIA portfolio; pending Commission approval, we would purchase additional high-quality carbon offsets from the project in the coming years.
- The Company serves on the board of American Indian Opportunities Industrialization Center (AIOIC), a workforce development organization serving Native and BIPOC populations in the Twin Cities. We have collaborated with OIC on securing commercial driver's licenses for graduates of Xcel Energy's ECA, and sent Xcel Energy volunteers to speak with the OIC's Youth Employment Services program on careers in energy. We hope to develop additional energy workforce diversification projects with the OIC.
- The Minneapolis American Indian Center is one of three hosts for solar/battery microgrids that the Company is supporting through our RMP efforts as discussed in the RMP section above.
- During development of the Foxtail and Dakota Range Wind facilities, Xcel Energy voluntarily worked with Standing Rock Sioux (for Foxtail) and Sisseton Wahpeton Oyate (for Dakota Range) to conduct Tribal cultural surveys prior to final design of the facilities. We altered each site's layout to protect identified Tribal cultural resources and had Tribal monitors onsite during construction to

[24] See Minneapolis nonprofit rebuilds 'greener' after civil unrest | Finance & Commerce (finance-commerce.com).
[25] See xcelenergy.com/staticfiles/xe-responsive/Carbon_Offset_Pilot_Brochure.pdf.

facilitate management of incidental finds during construction. We worked with both Tribes' Tribal Historic Preservation Officers to ensure their newly documented resources were protected for the future via the State Historic Preservation Offices for the respective states. Neither project had a federal nexus that required formal consultation. Xcel Energy believes that protecting the cultural and archeological history of the Americas benefits all of our communities.

VI. OTHER EQUITY EFFORTS IN THE STATE IMPACTING THE COMPANY

A. MPCA Air Quality Permitting in Minnesota

The MPCA Air Quality permitting rules requires the consideration of EJ impacts for facilities located in EJ Areas. This process is undertaken by the MPCA for issuance of new, or re-issuance of or modifications to existing, air quality permits meeting the requirements. If, during the permitting process, the MPCA determines the facility is located in, or near, an EJ community the agency may reach out to impacted communities for input, or request outreach by the permittee, in this case Xcel Energy. In the existing process there are no mandatory actions the permittee must perform, only voluntary actions based on agency suggestions.

In addition, the MPCA is currently initiating a rulemaking as required under 2023 legislation,[26] addressing cumulative impacts in EJ Areas in the air quality permitting process. The MPCA has indicated that this rulemaking is expected to be a three-year process with proposed rules expected to be put on public notice in May 2026. Once rules are finalized, cumulative impacts will be taken into consideration in the air quality permitting process.

VII. CONCLUSION

The Company recognizes and embraces the need for equity across all our plans, dockets, and program offerings. We put a priority both on enhancing equitable outcomes and on broadening participation in energy decision-making. We have made notable progress in the last two years, but much work remains to be done. As noted in this appendix, we have implemented measures throughout the Company to enhance equity through community outreach efforts, the establishment of ESAG, our charitable contributions, workforce training programs, our Workforce Diversification

[26] Sec. 116.065 MN Statutes.

Plan (Appendix R1), various program offerings, ECO and NGIA plans, supplier diversity goals, and federal initiatives among others. We will continue to participate in this space and continue to advance equity in all that we do, consistent with the Company's core values.

APPENDIX R1 – WORKFORCE DIVERSIFICATION PLAN

I. XCEL ENERGY'S COMMITMENT TO DIVERSITY, EQUITY, AND INCLUSION

Xcel Energy aims to create an inclusive and equitable work culture where diversity is valued and celebrated, while taking the same approach to conducting business and serving communities. Because social sustainability is central to our business strategy, we are building a workforce that reflects the diversity within our communities. Our most successful ideas and outcomes result from collaboration between people with different experiences and perspectives. By viewing opportunities and challenges through multiple lenses, we are better able to leverage our strengths and achieve our strategic priorities.

The Xcel Energy Enterprise Diversity, Equity and Inclusion (DEI) goals were established as guidelines meant to guide and govern our efforts to introduce and maintain an equitable, inclusive and diverse perspective across all areas of our organization and processes.

Our enterprise DEI Goals are as follows:

- Talent: **Build and maintain a diverse workforce, talent pipeline** and leadership bench strength that reflects the communities and customers we serve.
- Community: **Enhance our community involvement and giving programs** to increase our support of organizations that advance DEI.
- Data Management: **Increase data utilization and transparency to better inform our internal programs, advance our DEI strategies while** increasing internal process consistency and accuracy.
- Supplier Diversity: **Establish targets to broaden our supplier diversity base**, encouraging businesses owned by women, veterans and ethnically diverse individuals to engage in our procurement processes. Our Supplier Diversity goals and actions are further articulated in Appendix R: Equity.
- Workplace Culture: **Create an environment where all employees feel safe, respected, have a sense of belonging, while being empowered** to do their best work.

II. INTERNAL EFFORTS TO SUPPORT STATED DIVERSITY GOALS

Our internal efforts towards advancing and increasing the diversity within our workforce align with a range of focus areas targeted to deliver results across different points through the employee lifecycle including development and retention, attraction and recruitment, and community engagement.

A. Workforce Development and Retention Programs

In alignment with our Talent goal, our focus expands diverse initiatives seeking to enable talent availability for specific underrepresented segments of our workforce. This is accomplished by developing and advancing internal talent with engagement and development programs seeking to create paths for advancement and development for our employees.

1. Executive Sponsorship Program

The goal of this program is to create opportunities for employee networking with executive sponsors that will allow for a more tailored development opportunity for participants, as well as to explore potential career paths throughout the Company. We utilize engagement in this program as a component of our DEI corporate scorecard along with other internal talent focused metrics.

This program promotes increased diversity in our employee base in various career paths throughout the Company and leadership ranks – an important link we have long needed to successfully build out our internal talent development pipeline. The bottom line is that diverse perspectives make us a stronger organization, and building a robust talent pipeline that reflects our communities will be a key to successfully reaching our corporate goals. As a result, the Executive Sponsorship Program has enabled numerous members of our enterprise to obtain and develop meaningful relationship opportunities with senior leaders across the organization. In 2024, we are seeking to introduce improvements to the program infrastructure in order to support a greater number of participants, and to introduce a mentorship program, that, in parallel, will support and funnel internal talent to help them advance proactively in their career.

2. Internal Scholarship Program

We employ undergraduate and graduate college students and law clerks as interns to help build a robust, diverse talent pipeline. We place high school students in positions

across our business areas through partnerships with school districts and community organizations such as Genesys Works, Cristo Rey Jesuit High School, and Girls Inc.

The students are offered the opportunity to apply for a scholarship they can utilize towards their higher education in colleges in the state of Minnesota.

In the last three years, we have awarded scholarships for BIPOC students in the state of Minnesota, selecting our recipients through our internship program (both college and high school) and the Energy Careers Academy. In 2020, we had a total of 7 recipients; increased to 16 recipients in 2021, 10 recipients in 2022 and a total of 19 recipients in 2023. The scholarship values range from $2,500 to $5,000 depending on financial needs and student-provided evidence through the application process. A board of volunteers from internal employees and other partner organizations review the applications and, led by the DEI representative, go through the exhaustive review to select the recipients.

3. Career Launch Program

Participants in Xcel Energy's Career Launch program join the Company as analysts to obtain hands-on experience towards a variety of career paths while also providing the tools to help navigate their futures at the Company. Analysts have the opportunity to select their rotations from more than 40 options that best align with their career goals. The program is designed to support the development of analysts to become strong, capable leaders with the skills and guidance necessary to jumpstart a promising career trajectory with Xcel Energy upon successful completion. Candidates are recruited from a diverse set of perspectives, backgrounds, education, and experiences to strengthen our Company's team working together to lead the clean energy transition.

4. Business Resource Groups

Change happens when people connect in new ways. In the early 2000's, we launched Business Resource Groups (BRG's) to create new avenues for development, recruitment, retention, and advancement and help to reach a broader candidate pool through BRG external offerings. Thirteen BRG's have been established to bring employees together to support common interests and to share perspectives.

Xcel Energy's BRG's are among the Company's strongest examples of how our team members support one another. Many employees dedicate time outside of work hours to create a safe environment, through BRGs, where they can exchange ideas, pursue common interests, seek equitable solutions to personal and professional challenges, and help communities succeed.

The Company's current Business Resource Groups are:

- **AAPI (Asian American and Pacific Islander Alliance)**: Encourages employees to bring their full identities to the workplace by educating the workforce regarding AAPI cultures and professional experiences, facilitating professional development and career growth, and creating a sense of unity between AAPI employees, allies and the community.
- **ABLE (Accessibility, Be an Ally, Lead, and Empower)**: Promotes accessibility and allyship, drives disability inclusion by leading at all organizational levels, and strives to empower self and others.
- **BLAX (Black Employees at Xcel Energy)**: Promotes career development, continued education, training and cultural awareness, and addresses the issues and concerns of people of color.
- **ECN (Employee Connection Network)**: Connects new and existing employees and broadens employee understanding of Xcel Energy through networking and community service opportunities.
- **GROW (Growth and Retention of Women)**: Identifies and implements innovative ideas and strategies for recruiting, developing, promoting and retaining women in non-traditional roles within the Energy Supply business area. Works with schools to increase girls' and women's awareness of such opportunities.
- **NAYGN (North American Young Generation in Nuclear)**: Provides opportunities to develop leadership and professional skills, create lifelong connections, engage and inform the public, and inspire today's nuclear technology professionals to meet the challenges of the 21st century.
- **Pride Alliance**: Advocates for the Company's leadership in diversity and inclusion by addressing issues related to sexual orientation and gender identity.
- **Tribal Wind**: Supports Native American employees through professional development resources, mentoring and networking. Strives to increase cultural understanding and awareness.
- **VETS (Veterans and Employees Together in Service)**: Sustains awareness on issues of interest to veterans and active military employees in our workforce and promotes programs and policies that support the welfare of veterans and their families.
- **WIN (Women's Interest Network)**: Strives to improve the lives of women and make Xcel Energy the workplace of choice for women. WIN programming focuses on professional development and work-life balance issues.

- **Xcelente**: Shares the Latino culture through awareness, inclusion and celebration; promotes the Company's image throughout the community; provides networking and mentoring opportunities.
- **XE WiN (Women in Nuclear)**: Explores and develops programs that help all employees working within our nuclear organization to expand their leadership skills, network and create positive visibility for the nuclear industry within the communities we serve.
- **YPN (Young Professionals Network)**: Provides a community where individuals at the start of their career can discuss career aspirations and challenges, share knowledge and ideas, and build meaningful relationships with co-workers with whom they may not normally interact.

5. Military and Veteran Outreach

We continue to build partnerships and support activities that maintain our visibility as a preferred employer for veterans and those currently serving in the National Guard or Reserves. Veterans made up 9 percent of our new hires in 2022. Xcel Energy attended more than 45 job fairs and events for veterans to seek out new hires and participated in the Department of Defense SkillBridge program and the Hiring our Heroes Corporate Fellowship Program. Approximately 10 percent of current employees are veterans. Many are actively involved in our VETS BRG, volunteer to help with recruitment, and mentor current veteran employees.

In 2023, Xcel Energy was again named a 5-Star Employer through the VETS Indexes Employer Awards that recognizes organizations that do the most to hire, retain, promote and support veterans. In 2022, we were recognized as a Military Times' Best for Vets employer for the eighth consecutive year, a Military Friendly Employer, a Disabled American Veterans (DAV) Patriot Employer, and we received the HIRE Vets Medallion Award for our exceptional commitment to hiring veterans.

6. Training and Employee Resources.

Leaders and employees are encouraged to increase their knowledge and awareness around DEI. The Company offers the following resources to support this:

- **Unconscious Bias and Microinequities Training**: All new hires receive training on how to avoid bias, and ongoing training is incorporated into all of our talent processes, including hiring, performance management, investment decisions and succession planning.

- **Leader Inclusion and Diversity Conversation Starter Guide**: We encourage employees to tackle tough issues and discuss timely events related to inclusion and diversity. The guide aids leaders in creating a safe environment and initiating those conversations.
- **Online Resources**: Our online DEI resource hub was created by employees to help increase awareness and provide help on different topics. Leaders are also provided with unique online resources designed to help them lead inclusively.

B. Attraction and Recruitment

We understand the need and critical role the development of a diverse talent pool plays when seeking to build a diverse workforce. We at Xcel Energy have a series of initiatives that are focused on supporting our progress towards enabling access to diverse talent to build a pathway reflective of the communities we serve:

1. Energy Careers Academy

To create a pipeline of trained candidates ready to fill job openings, Xcel Energy helped launch the Energy Careers Academy in fall 2022, along with the Minnesota State Community and Technical College and Minnesota State Energy Center of Excellence. The academy seeks to open doors to historically underserved populations and prepare them for a career field that offers stable, well-paying jobs. The program provides training in electrical linework and natural gas utility construction and service. Students receive hands-on instruction at Xcel Energy's training facilities and gain exposure to Company employees and leaders, including hiring managers. Energy-related educational programs are typically offered at technical schools in rural locations, but the Academy aims to enroll students in the Twin Cities area, helping remove a potential barrier for urban students. Minnesota State and Technical College is responsible for curriculum, accreditation, and instruction while the Minnesota State Energy Center of Excellence provides general program support and oversight. The three partners plan to increase program options including higher-credit diploma programs.

This program provides 9-month electrical line worker certification and 6-month gas utility construction/service worker accredited training to create a diverse pipeline for careers in these fields. The electrical line worker certificate program began in August 2022 and the gas worker training is expected to begin in 2024. The electrical line worker program is provided in Northeast Minneapolis. Gas worker training will be in Hugo, due to the specialized gas training facility there, but planning is underway to provide transportation if needed. Financial aid is available through Pell Grants and other scholarship opportunities. Students enrolled in the program also receive college and

career readiness training and follow-up services throughout the length of the program. Throughout the program, students will have regular interactions with recruiters and hiring leaders from Xcel Energy and other utilities. Prior to graduation, students will be made aware of various job openings with Xcel Energy and other utilities and supported throughout the application process.

Support provided for Energy Careers Academy students includes:

- Informational sessions with Minnesota utility providers looking to hire students into Line worker apprenticeship programs,
- Mock interview sessions and resume workshops led by the Xcel Energy Talent Acquisition team and Minnesota State Community and Technical College,
- Personnel resources to complete additional education requirement such as commercial driver's license (CDL) permit test preparation, and
- Partnering with local nonprofits to provide funding for students to complete the CDL licensing test.

In 2023, the Energy Careers Academy graduated 11 students and Xcel Energy offered post-graduation placement to 8 of those students. These graduates, all from diverse backgrounds, were placed within our Line worker apprenticeship programs with close support of our internal talent teams. We initiated our second cohort of students in August of 2023, with 50 percent of the 12 individuals being ethnically diverse, and the first female student.

With the incorporation of the ESAG input, our team will continue to assess and evaluate potential improvements to the program to ensure accessibility by all community members. Specific ideas received highlight the need to support St. Paul community members and their access to the training site in Minneapolis, and the benefit of creating additional partnerships with organizations that represent a certain subgroup within our community where access to the program may need additional support (i.e. DACA etc.).

2. Power Up Initiative

Xcel Energy is proud to sponsor the Power Up initiative, a workforce development program which helps prepare underrepresented populations for careers in the utility construction trades. Xcel Energy and the Minnesota Department of Employment and Economic Development (DEED) have partnered with seven different organizations - Avivo, Emerge, Building Strong Communities, Career Solutions, Native Sun Community Power Development, Summit Academy, and Central Minnesota Jobs and Training, to bring two cohorts of 80 people through this workforce development program.

The program focuses on preparing enrollees for unique and challenging careers by teaching them skills such as interview techniques, resume writing, and professional presence as well as introductory tours of different jobsites. The program also allows enrollees to experience a "day in the life" of personnel in the energy construction trades.

The program is currently in its first phase of deployment. The first cohort is demographically diverse and includes women, people of color, indigenous people, and people with disabilities all from differing economic backgrounds. Once completed, these individuals will be well prepared to pursue careers in the energy construction trades. The main target of this program is consistent with our efforts of pipeline diversification and enabling access for our communities to career pathways within the utility industry.

All resources and details of the program are publicly available in the official website: Xcel Energy Power Up Program / Minnesota Department of Employment and Economic Development (mn.gov).

3. College and Highschool Internships

In partnership with the City of Minneapolis, Xcel Energy was one of the founding organizations offering high school students from the cities access to internship positions that allow them to experience valuable workplace exposure that ultimately enables potential access to a diverse range of career paths.

This High School internship program targets students in diverse communities that also meet income requirements to participate. Students are allowed to select internship opportunities and go through the interview process with their potential employer. Students must be 16 years of age and older to participate in the program. Current partners for funneling our internship pipeline are: Step Up (Minneapolis, MN), Right Track (St. Paul), Denver Public Schools (Denver, CO), Summer Earn and Learn (Amarillo, TX), Cristo Rey Jesuit High School (Minneapolis, MN), and Wisconsin Youth Apprenticeships (Eau Claire, WI).

For the last three years, our internship program has provided relevant opportunities for students from the cities of Minneapolis and St Paul. Table R1-1 below showcases the metrics of the breakdown of our students:

Table R1-1: Internship Metrics

Conversion from Intern to Full-time Employee	2020	2021	2022
	27	35	48

Intern Hires - Gender Diversity	2020	2021	2022
Female	25.9%	48.6%	33.3%
Male	74.1%	51.4%	66.7%

Intern Hires - Ethnic Diversity	2020	2021	2022
Minority	37.0%	40.0%	39.6%
Non-Minority	63.0%	60.0%	60.4%

4. Career Fairs and Partnerships with Diverse Professional Organizations

We understand the need for diverse talent across all areas and functions of our organization, and because of that we aim to strategically identify opportunities to partner with organizations leading the charge at enabling access to these talent pools. Some of these partners are:

- National and Regional Partners:
  - People of Color Career Fair,
  - National Black MBA National Conference,
  - National Society of Black Engineers National Conference
  - Society of Women Engineers National Conference
  - Sabathani Community Center Career Resource Fair
  - Genesys Works Career Fair
  - MN Center for Energy & Environment Quarterly Recruitment/info sessions
  - St. Paul Area Chamber Career Connect Day

- College Chapter Partnerships:
  - Society of Hispanic Professional Engineers
    - University of Minnesota Twin Cities
    - University of Denver
    - Colorado School of Mines
    - University of Wisconsin Madison
    - University of St. Thomas
    - West Texas A&M
  - National Society of Black Engineers Chapter Partnerships

- University of Minnesota Twin Cities
- University of Minnesota Duluth
- University of Denver

As we initiate the new year and identify the key priorities for 2024, our team will be exploring deepening these partnerships and leveraging synergies with our BRGs, community-based organizations and talent partners to enhance and diversify the talent pool across all levels of the organization.

C. Community Engagement and Advancement

We recognize the importance of accessing talent and building the talent pool as early as possible. To this end, we work consistently with Community Based Organizations (CBOs) to partner and find ways to work with students at different points of their journey in order to provide early exposure and access to career paths in energy. We participate in the following outreach efforts.

1. Edina Career Tech Ed Community Advisory Board

Edina Public Schools developed a Design Team to look at how grades 6-12 Edina Public Schools courses could be aligned to create a pathway leading to a micro-credential, certification, internship, apprenticeship, or higher level of education study. This group of community partners and local businesses meets on a quarterly basis to discuss the work of subcommittees focused on enhancing Career and Technical Education programming in Edina Public Schools.

2. Metro State Class 310

Xcel Energy was the featured employer for Metro State Class 310 in 2021. This class is designed to give diverse students the opportunity to engage with a Twin Cities business over the course of the semester. Students are introduced to human resource leaders, connect with BRG members for a culture day, and participate in a mock interview event. Students will usually participate in a tour of the business but did not participate in 2021 because of Covid restrictions.

3. Careers in Energy Week

The Company invites students from Minneapolis Public Schools and surrounding districts to participate in Careers in Energy Week which includes plant tours, career panels and access to the Careers in Energy trailer.

For 2023, Careers in Energy Week was celebrated from October 16-20. The celebration was proclaimed by the Governor of Minnesota, Tim Walz. Throughout the week, utility companies within the state of Minnesota visited the communities they serve to highlight and promote energy careers. Xcel Energy had the opportunity to host the following events:

- Oct. 16: A staff engineer representative from Xcel Energy's Renewable Energy department went to Mahtomedi Middle School to speak about Renewable Energy, and how it pertained to their Electrically Powered City Project.
- Oct. 17: Xcel Energy attended the St. Paul Area Chamber's Career Connect Day. The Career Connect Day was an opportunity for St. Paul youth to explore various careers in several different sectors. Xcel Energy's main promotion was Energy Careers Academy (ECA). Xcel Energy brought several graduates from ECA, as well as members of the Talent Acquisition and Inclusion and Diversity teams to the event.
- Oct. 20: Xcel Energy hosted a teacher externship at the High Bridge facility in St. Paul. Teachers from various areas of the Minnesota metro area attended to learn about various offerings and opportunities Xcel Energy offers for youth, as well as creating pipelines with schools for further collaboration.

4. Pro Bono Program

As they focus on fulfilling their missions, nonprofit organizations may not have the staff or resources to improve their business operations or advance new initiatives. Xcel Energy employees' personal knowledge and expertise can be a powerful force for change to help nonprofit organizations achieve their goals and make a deeper impact. That's the premise of Xcel Energy's Pro Bono Skills-Based Volunteer Program. This growing program offers our employees the opportunity to help these organizations and share their talents, grow as leaders and build relationships with their colleagues.

In 2022, 18 employees contributed consulting services in marketing, technology, legal, finance and human resources, volunteering more than 590 hours at three nonprofits and delivering a value of nearly $116,000 through the program. The volunteer effort, which began in 2020, provides a way for employees to contribute their skills through pro bono consulting services to nonprofits serving underrepresented groups in the Twin Cities. Most of the work is virtual, involving three to six hours a week. Because of its success, the program was expanded in 2023 to our corporate offices located in Colorado, North Dakota, South Dakota, Texas and Wisconsin.

5. American Association of Blacks in Energy Minnesota

Xcel Energy was instrumental in creating the newest chapter of the American Association of Blacks in Energy (AABE) in 2022. Its mission supports African American community job training and placement, supplier diversity, legislative change and scholarships. AABE encourages industry and community leaders to collaborate and ensure that all stakeholders have a seat at the table in Minnesota. Xcel Energy employees have been instrumental in volunteering their time to assist with event planning, maintaining the chapter's social media pages and the coordination of chapter meetings as well as taking on various leadership roles.

In the Fall of 2023, Xcel Energy employees assisted in the planning and execution of AABE Minnesota's first inaugural golf tournament to raise college scholarship funds for BIPOC students participating in STEM programs and graduating in 2024. As we enter 2024, we will incorporate AABE into our strategic partners that will contribute to build a diverse pipeline for talent at all levels of the organization.

D. Strategic Partnership: Center of Energy Workforce Development

The Center for Energy Workforce Development (CEWD) is a non-profit consortium of energy companies, contractors, associations, unions, educators, and business partners working together to ensure a skilled, diverse workforce pipeline to meet future industry needs. CEWD's coordinated approach to workforce development has united electric, natural gas, and nuclear firms since 2006. In 2021, in response to the need for expanded collaboration, they expanded their umbrella to include the workforce development needs of those working in the fields of renewables, electric vehicle infrastructure, and energy storage.

CEWD represents more than 140 energy companies. Additionally, they have established partnerships with, and support from, the American Gas Association, American Public Gas Association, American Public Power Association, Distribution Contractors Association, Edison Electric Institute, Electric Power Research Institute, National Rural Electric Cooperative Association, and Nuclear Energy Institute.

Xcel Energy is one of several energy companies that are part of the Minnesota Energy Consortia. Through this partnership, we have helped enable programs focused on building diversity within the Energy Careers pipeline for the state. In partnership and collaboration with CEWD, we have also helped create the DEI Roadmap for Industry Change[1] as a resource and tool for the energy industry professionals and organizations,

[1] CEWD_DEI-Report-View-Printable.pdf).

seeking to create an equitable, more diverse and inclusive workforce that can help address the needs of the future. This tool focuses on offering details on current industry trends but also actionable steps for organizations in different focus areas:

- To Ensure More Diverse, Equitable, and Inclusive Energy Workplaces
- To Increase Diversity in the Energy Workforce
- To Develop a Diverse Talent Pool
- To Retain Diverse Talent in the Energy Workforce
- To Expand Diversity in C-Suite Roles

In addition, several resources are available to provide guidance and additional information on the work with CEWD Minnesota Consortia:

- The Minnesota Consortia Website: Minnesota | CEWD
- The DEI Roadmap for Change: DE&I Roadmap for Change | CEWD
- Energy Careers pathway and resources: Home - Get Into Energy

In 2024, our team will continue to strengthen the relationship with CEWD and the Minnesota Consortia seeking to drive greater impact by leveraging internal efforts and the established DEI Roadmap for change, alongside other local industry partners.

III. CREATING SUSTAINABILITY FOR INTERNAL DIVERSIFICATION EFFORTS

A. One Xcel Energy Way: DEI Rally Room

Xcel Energy has incorporated a new internal process to drive operational excellence focused on identifying requirements to help achieve desired performance for a specific function. As part of the internal implementation aligned to our workforce development efforts, the organization officially kicked off a designated DEI Rally Room.

A Rally Room is a command center that brings leaders and teams together (cross-functional as required) to rally and manage around a key objective and theme (corporate priorities). Ultimately, the teams visualize what work is needed, establish responsibilities, support each other, and deliver to achieve the desired results. This effort is designed to be highly visual, focusing on clearly displaying information on how we are addressing a specific priority, including problem definitions, what "good" looks like, goals, key metrics, performance trends, specific problem areas, action items and current status. In summary, collaboration, planning, visual management, operating

reviews, problem solving and defining standards for sustainability are paramount aspects of the Rally Room.

1. Goals of the Diversity, Equity, and Inclusion Rally Room

In 2023, the Company identified and established a set of opportunities which then translated into work packages to allow for the introduction of improvements, new processes and positive changes seeking to create a sustainable infrastructure for the existing and potential new talent programs at Xcel Energy.

The first six months of the project allowed us to deliver the following accomplishments:

- Problem definition and identification.
- Focus groups and internal data analysis with employees and BRGs.
- Engagement of leaders and business units to drive alignment.
- Prioritization of focus areas and initiatives for 2024 tactical implementation plan.
- Connection point with the Equity Stakeholder Advisory Group to receive and incorporate feedback as part of the analysis phase.

The overall focus areas of the Rally Room aligned with specific tactical implementation plans are:

- Attraction and Recruitment: Focus on improving the employee attraction and recruitment experience by improving the key elements that inform and shape the strategy of these activities within the talent organization.
- Retention and Development: Improve existing programs and introduce new strategies focused on increasing employee satisfaction scores, and overall education towards building a culture of inclusion.
- Inclusion and Belonging: Improve employee sentiment associated with these Inclusion index components that have been consistently in a downward trend for the last three years.
- Operations and Field Employees: Improve overall employee experience focusing on main detractors based on employee feedback and existing internal data trends.
- Culture and wellbeing for employees: Improvement of overall employee experience and connection to our collective culture.
- Middle Management and Business Leaders: Focus on education, development, and support of leaders impacting our employee experience and overall enterprise culture.

B. Current State and Measuring Progress

At Xcel Energy, our focus towards advancing talent and supporting the communities that we serve has become an internal imperative with accountability that we are seeking to advance and mature. We recognize our opportunities to continue effectively diversifying and building a diverse workforce inclusive of all members of our communities, and with the Rally Room project we are actively focusing on making progress.

In alignment with this effort, we are utilizing internal existing data points to evaluate potential solutions to advance and ensure progress is not only reported but measured. Through different channels, we publicly share our workforce demographics data to ensure alignment and foster conversations that can drive advancement with both internal and external partners. As shown in the table below, our reporting for internal demographics includes both gender and ethnicity, which allows for further assessment of opportunities and pathways for recruitment and retention:

Table R1-2: Xcel Energy Minnesota Internal Workforce Demographics[2]

	Female	Minority	Black	Hispanic	Asian	Native Hawaiian/ Pac Islander	American Indian/ Alaska Native	Two or More
Minnesota Workforce Demographics	21.39%	9.87%	2.80%	2.39%	2.87%	0.04%	0.35%	1.41%

- Workforce Representation Data: 2022 Sustainability Report – Diversity_Equity_Inclusion_SR.pdf (xcelenergy.com)
- Workforce Representation Data: EEO1 annual report - EEO-1-Employer-Information-Report.pdf (xcelenergy.com)
- Additional Data summary: Sustainability Report Data - Sustainability_Data_Summary_SR.pdf (xcelenergy.com)
- Additional Workforce data: Global Reporting Standards Content Index - GENERAL STANDARD DISCLOSURES (xcelenergy.com)

We constantly evaluate and assess the internal representation and diversity data, with the goal of measuring progress as well as utilizing additional leading indicators that can

[2] As of 12/31/2023.

help us evaluate potential trends and points of advancement. Based on the existing market availability from the most recent census, or the estimated amount of people available and aligned with our internal job codes, and current data points, we focus on finding strategic ways to partner and develop access points for talent that can contribute to a healthy and diverse expansion of our talent pool.

The Rally Room initiative and its focus on data driven processes with One Xcel Energy Way, as well as measurement of key performance indicators to track progress, have introduced a new way for our organization to define and track our goals with a focus on periodically measuring the indicators that can support our progress. Some of these indicators are:

- Recruitment metrics (talent pipeline metrics, recruitment event driven metrics, candidates' metrics).
- Retention metrics (internal talent mobility and advancement, BRG engagement and participation, volunteering metrics).
- Employee engagement and participation (twice a year employee survey focused on employee satisfaction and belonging).

With the intention of driving progress on these metrics, the upcoming year for the Rally Room will include the tactical implementation of initiatives aligned with the identified work packages, the internal reporting and assessment of metrics for these initiatives, as well as consistent points of evaluation throughout the year to assess progress.

APPENDIX S – STAKEHOLDER ENGAGEMENT SUMMARY

I. INTRODUCTION

In preparation for the development of this Integrated Resource Plan (IRP), numerous stakeholder outreach efforts were made as required from the Commission's last IRP Order.[1] We appreciated the opportunity to host multiple informational and technical workshops and to connect with our stakeholders. The workshops offered provided stakeholders with details about the Company's IRP process, allowed us to obtain stakeholder feedback and input, and respond to stakeholder questions. We appreciated our stakeholders' participation in the various workshop offerings, as well as their questions, feedback and input, which were taken into consideration in this IRP and will be taken into consideration in development of future IRPs. In addition to workshops specific to IRP planning, additional outreach efforts were made regarding remediation efforts at the Allen S. King Generating Plant (A.S. King) and the Sherburne County Generating Plant (Sherco); equity efforts through the formation of our Equity Stakeholder Advisory Group (ESAG); with the Prairie Island Nuclear Generating Plant (Prairie Island) community; with the Clean Energy Organizations (CEO's) regarding legislated community solar garden mandates and how the new 3 percent legislation dovetails with those mandates. The Company is committed to engaging all interested stakeholders and the general public in the development of our IRP.

Stakeholder workshops pertaining to the IRP itself were offered to address multiple IRP Order Points.[2] In addition, quarterly stakeholder outreach meetings were held with the A.S. King and the Sherco communities as required by Order Points 20 and 21. Details of these meetings are included in Appendices Q and R. Outreach to the Prairie Island stakeholders was conducted as required by Order Point 22 and is detailed in Appendix M: Nuclear. Order Point 25 required the Company to establish a stakeholder group to address equity efforts including the establishment of an environmental justice accountability board. The results of these efforts are detailed in Appendix R: Equity.

We discuss here our IRP stakeholder engagement efforts associated with the Order Points, input received from stakeholders during those efforts, and how the Company has incorporated or addressed the input received, as appropriate.

The Company agrees that stakeholder engagement can help generate new ideas and enhance collaboration around our integrated resource plans. The stakeholder discussions we have facilitated have been useful for the Company to gain a better,

[1] Docket No. E002/RP-19-368 (hereafter, 2019 IRP).
[2] 2019 IRP at Order Points 10, 12, 14, and 15.

more holistic understanding of different stakeholder priorities and policy drivers that we can consider in our system resource planning. We appreciate our stakeholders' participation in these workshops.

In the remainder of this section, we provide:

- Workshop series overview
- Workshop summaries and IRP/Integrated Distribution Plan (IDP) workshop Survey Results
- Additional Outreach Efforts.

II. WORKSHOP SERIES OVERVIEW

The Commission's IRP Orders required the Company to conduct outreach efforts on storage options, including solar generation and battery storage; the role of hydrogen and clean fuel alternatives including full supply-chain and life-cycle carbon impacts; development of a modeling construct for solar-powered generations connected to the company's distribution grid; and regarding forecasting of electric adoption rates.[3] Based on the amount of material we wanted to share with stakeholders, the Company held five workshops, which included presentations from the Company's staff, questions and input from attendees, and time for open discussion. The series of workshops was held beginning September 2022 and ran through August 2023, with workshops being held virtually, in-person, or as hybrid meetings. Additional meetings, outside of the workshop series, were held regarding the development of a modeling construct and solar bundles. A separate RFP 101 Workshop, not required by Orders, was held on our Request for Proposal (RFP) process. These meetings are summarized below.

The overall duration of all the IRP workshops combined was more than 16.5 hours. We recognize that this was a significant amount of time for stakeholders, and we appreciate their time participating and input. Table S-1 includes a matrix of the IRP Order Points requiring stakeholder outreach and the corresponding workshops held. Table S-2 includes a listing of additional outreach conducted.

[3] IRP Orders at Order Points 10, 12, and 15.

Table S-1
IRP Order Points and Workshops Held

Order Point	Addressed in Workshop
IRP Overview (directed by IDP Order Point 6.1)	IRP/IDP 101 Workshop: September 26 and 27, 2022
IRP Order Point 9.d: Improve non-wires alternatives analysis, including market solicitations for deferral opportunities to make sure Xcel can take advantage of distributed energy resources to address discrete distribution system costs.	Planning the Grid of the Future Part 2 Workshop: June 12, 2023
IRP Order Point 10: In its next resource plan Xcel shall, either through its Integrated Distribution System Plan proceedings or through another stakeholder process, develop and/or improve its forecasts of the adoption rate for the following technologies, to be used in Xcel's base case scenario and its overall demand forecast.	
(A) Adoption of light-, medium-, and heavy-duty electric vehicles	Forecasting: Electrification and DER Workshop: February 13, 2023
(B) Adoption of electric space heating.	Forecasting: Electrification and DER Workshop: February 13, 2023
(C) Adoption of electric water heating.	Forecasting: Electrification and DER Workshop: February 13, 2023
(D) Electrification of other end uses.	Forecasting: Electrification and DER Workshop: February 13, 2023
(E) Increased potential for demand response and load flexibility from an increase in electrification of the technologies in A-D.	Resource Modeling Workshop: August 8, 2023
(F) Adoption of solar-powered generators- including generators sited by customers, community solar gardens organized under Minn. Stat §216B.1641, and generators that are neither sited by customers nor related to community solar gardens.	Resource Modeling Workshop: August 8, 2023
IRP Order Point 12: Xcel shall include in its next resource plan a deeper analysis of:	
(1) storage options, including options combining solar generation and battery storage and	Resource Modeling Workshop: August 8, 2023
(2) the role of hydrogen and clean fuel alternatives in Xcel's resource mix. In preparation, Xcel shall work with stakeholders to develop a fair basis for comparing the full supply-chain and life-cycle carbon impacts of the generation and storage resource options under consideration to help the Commission evaluate the "adverse socioeconomic effects and adverse effects upon the environment" of each option, pursuant to Minn. R. 7843.0500, subp. 3.C.	Policy, Planning and Technology Workshop: November 15, 2022 Resource Modeling Workshop: August 8, 2023
IRP Order Point 15: Xcel shall work with stakeholders to develop a modeling construct that enables Xcel, as part of its next resource plan, to model solar-powered generators connected to the company's distribution grid as a resource. Xcel and stakeholders shall address the following factors in developing the modeling construct:	
A. Using a "bundled" approach as is used to model energy efficiency and demand response.	Resource Modeling Workshop: August 8, 2023
B. The costs borne by the utility and the costs borne by the customer.	Resource Modeling Workshop: August 8, 2023
C. Cost effectiveness tests.	Resource Modeling Workshop: August 8, 2023
IRP Order Point 16: In its next resource plan, Xcel shall account for local clean energy goals, in aggregate, in forecasting and modeling. In particular, the plan should include consideration of local community generation goals for distributed generation.	Policy, Planning and Technology Workshop: November 15, 2022 Resource Modeling Workshop: August 8, 2023

Table S-2
Additional IRP Stakeholder Outreach Efforts

IRP Order Point 15: Xcel shall work with stakeholders to develop a modeling construct that enables Xcel, as part of its next resource plan, to model solar-powered generators connected to the company's distribution grid as a resource.	Meetings held with Clean Energy Organizations: July 20, 2023 October 24, 2023
IRP RFP 101	October 12, 2023
Modeling Assumptions Discussion	Department of Commerce: October 2, 2023 Public Utility Commission Staff: October 9, 2023

To better accommodate stakeholders' schedules and increase participation rates, a survey was sent to stakeholders to solicit information pertaining to their preferred meeting format. Responses indicated that 66 percent of stakeholders preferred meetings held virtually, yet 66 percent also indicated that meetings held in-person were more effective. A variety of meeting workshop options were held over the series, with all in-person workshops later in the series being offered as hybrid workshops.

Invitations were filed in Docket No. E002/RP-19-368 and emailed to those who have requested to be on our "Interested Parties List." As discussed below, four workshops covered topics related to both the IRP and the IDP.[4] At every workshop, we referenced the "Interested Parties List" and provided direction on how stakeholders could be added to the list. Approximately 500 stakeholders on our Interested Parties List received email invitations for each workshop. Based on the number of direct e-mail invitations alone, which does not include attendees that may have been alerted to the workshop via docket submissions, participation rates ranged from five percent to 11 percent, or approximately 25-55 participants. Participants could submit questions during the registration process and were also provided ample opportunity to ask questions and provide feedback and input during each workshop. Consistent with the Commission's July 23, 2020 Order in Docket No. E002/M-19-666, workshops were open to any interested person.[5] We filed the Company's presentation in Docket No. E002/RP-19-368 after each workshop.

Conservatively speaking, we estimate that the Company's employees dedicated over 700 labor hours to the development and delivery of these workshops. We recognize the benefit and the importance of connecting with our stakeholders and receiving their input and feedback on our planning processes. The in-person and virtual workshops each held their own benefits. The in-person workshops allowed the Company to

[4] Docket No. E002/M-23-452 (hereafter, 2023 IDP). IDP workshop materials and summaries were filed in the 2021 IDP docket (Docket No. E002/M-21-694).
[5] Order Point 5 states, "Xcel must allow any interested person to participate in stakeholder engagement meetings regarding its IDP and HCA."

connect one-on-one with our stakeholders, while the virtual sessions provided participants easier access to the workshops and minimized travel requirements.

The workshop series began with a general overview on the IRP process, and each following workshop became more detailed and technical in nature. We found that once the information became more specific, the number of stakeholders attending each consecutive workshop decreased, but the feedback we received and questions that were asked also became more specific.

After the completion of the workshop series, we conducted a survey of the stakeholders that attended any of the IDP or IRP workshops to obtain their feedback on the workshop series structure, content, and the IDP/IRP stakeholder process. The results of that survey are included below.

III. WORKSHOP SUMMARIES

In this section, we provide a summary of each stakeholder workshop. For each workshop summary in this section, we provide:

- Workshop logistics.
- Approximate number of external stakeholders in attendance.
- IRP Order Points covered[6] as well as IDP Order Points covered where appropriate.
- An overview of the workshop content and presentations. We note that each workshop presentation was filed in the instant docket.
- A discussion of stakeholder questions/input received and how we are considering or have incorporated input.

A. Workshop 1: IDP/IRP 101

- **Logistics**: Virtual: September 26, 2022 and In-Person: September 27, 2022
- **Attendance**: 54 total participants – 49 virtual; 5 in-person
- **IDP Order Point**: *6.a – Integrated Distribution Planning 101*

1. Workshop 1 Overview

This workshop was held in response to IDP Orders. A summary is included here in that it provided a general overview of both the IRP and IDP planning processes. To be

[6] Order Points listed come from the April 15, 2022 Order unless otherwise noted.

inclusive and reach a broader audience, this workshop was held twice – once virtually during business hours and again, in-person during the evening at the Wilder Foundation located in St. Paul. Both workshops used the same presentation. Forty-nine stakeholders participated virtually, and five attended the in-person workshop.

The intent of this workshop was to share information about Xcel Energy's IRP and IDP processes and to receive input from the general public. The workshop included a high-level overview of both the IRP and IDP, a summary of the regulatory processes for each, the Company's internal planning processes for each, and where alignment and/or differences exist between the two plans.

The presentation began with an overview of the Company's service territory; customers; priorities; and our clean energy goals. This was followed by an overview of the IRP process, which included a discussion of statutory requirements and the internal and external processes involved. It was conveyed that the intent of the IRP process is to identify the best set of resources to meet customer needs, which requires a balancing of four core objectives: reliability, cost, environmental considerations, and risk. This was followed with a high-level overview of the IRP modeling process, including an overview of the EnCompass Power Planning Software utilized.

The IRP discussion was followed by an overview of the IDP process. This included a discussion on the objectives and filing process; an overview of the transmission and distribution systems; the internal planning process, inclusive of how the load forecast is developed; risk analysis that is conducted on the distribution system using the forecast; and mitigation plan development, non-wires alternatives (NWA) analysis, and project prioritization in the budgeting process.

The presentation also discussed how the IDP and IRP planning processes interact and their respective timelines.

2. Workshop 1 Stakeholder Questions and Input

- Several clarifying questions were asked by participants.
- We received input regarding integration of the IRP and IDP, encouraging the optimization of investments across the two plans rather than independently. This feedback aligns with stakeholder input in our most recent IRP and IDP dockets, and with the Commission's most recent IRP and IDP Orders, which require the Company to "take steps to better align distribution and resource planning."[7]

[7] *See* April 15, 2022 Order in Docket No. E002/RP-19-368 (IRP Order), at Order Point 9.

We agree that integrated planning is increasingly important. At the workshop, we explained that the different scales, timelines, and cadences of the planning processes present some challenges to full alignment. However, we are continually seeking to improve alignment and have addressed this topic further in Appendix L: System Planning Integration of this IRP and our 2023 IDP filing.[8] We were able to align several of the forecast vintages between this IRP and our 2023 IDP filing; however, as noted in Table L-1: Forecast Vintage Comparison in Appendix L, some updates were made to those vintages, as new information was available.

B. Workshop 2: Policy, Planning, and Technology

- **Logistics**: Hybrid (In-Person and Via Conference Call): November 15, 2022
- **Attendance**: Approximately 50 total participants – 30-40 virtual; 14 in-person
- **IRP Order Point**: 12.2 *Xcel shall include in its next resource plan a deeper analysis of the role of hydrogen and clean fuel alternative in Xcel's resource mix. In preparation, Xcel shall work with stakeholders to develop a fair basis for comparing the full supply-chain and life-cycle carbon impacts of the generation and storage resource adverse effects upon the environment.*
- **IRP Order Point: 16**-*In its next resource plan, Xcel shall account for local clean energy goals, in aggregate, in forecasting and modeling. In particular, the plan should include consideration of local community generation goals for distributed generation.*

This workshop addressed requirements from the Commission's IDP Order Point.[9]

1. Workshop 2 Overview

In order to encourage interaction and dialogue, this meeting was held in-person with a call-in number provided. Fourteen stakeholders attended in person, with approximately 30 to 40 stakeholders attending virtually. The presentation was subsequently filed in the instant docket.

The intention of the workshop was to share information about: federal, state, and local policies, goals and regulations; Xcel Energy's corporate goals and technological advancements; and to discuss how they will impact Xcel Energy's resource planning and distribution planning processes. In addition, we sought to obtain input from stakeholders on how they thought we should incorporate these policies, goals, and regulations.

[8] Docket No. E002/M-23-452. *See* Appendix A1.
[9] IDP Order at Order Point 6.

The workshop presentation reviewed our key inputs to our planning process: Xcel Energy's goals; policies and regulations including an overview of the Good Neighbor Rule, the Inflation Reduction Act (IRA), the Infrastructure Investment and Jobs Act (IIJA), the Energy Conservation and Optimization Act (ECO), and the Natural Gas Innovation Act (NGIA); community clean energy goals; Xcel Energy's Equity Stakeholder Advisory Group (ESAG); lifecycle greenhouse gas emissions considerations; advanced grid technologies; and new generation and storage resource options.

2. Workshop 2 Stakeholder Questions and Input

- Several clarifying questions were asked by participants.
- We specifically requested participants to submit ideas for alternate lifecycle carbon emission assessments for us to consider in relation to Order Point 12 of the IRP Order. No suggestions have been received to date.
- We were asked how we plan to incorporate local clean energy goals into IDP forecasting. We indicated that a survey had been sent to communities asking for information pertaining to their clean energy goals. The information will be used in our planning.
- We were also asked if there is a back-up plan in case new technologies do not materialize. We responded that this is precisely why we look at a wide variety of resource options and that there is sufficient time in the planning horizon to pivot if a new technology does not materialize as originally intended.
- We were asked if we were considering new nuclear generation. We responded that we are investigating new nuclear technologies and their costs and benefits to the system, but that there is currently a moratorium on new nuclear in Minnesota.
- We were encouraged to evaluate a higher penetration rate of demand side management, and we indicated that we would look at it in the 2024 IRP along with the impacts of advanced rate making. These evaluations have been addressed in Appendix J: Distributed Energy Resources.

C. Workshop 3: Forecasting: Electrification and Distributed Energy Resources

- **Logistics**: Virtual: February 13, 2023
- **Attendance**: 46 total participants
- **IRP Order Point**: 10.(a)-(d)- *In its next resource plan Xcel shall, either through its Integrated Distribution System Plan proceedings or through another stakeholder process, develop and/or improve its forecasts of the adoption rate for the following technologies, to be used in Xcel's base case scenario and its overall demand forecast.*

A. Adoption of light-, medium-, and heavy-duty electric vehicles.
B. Adoption of electric space heating
C. Adoption of electric water heating.
D. Electrification of other end uses.

This workshop also addressed requirements of our Integrated Distribution Plan Order Point.[10]

1. Workshop 3 Overview

The intent of the workshop was to share information with our stakeholders regarding the forecast processes relied on in the IRP and IDP and to receive their feedback. We discussed:

- The forecasting process in general;
- Detailed information on our forecasting methodologies for electric vehicles (EV), solar photovoltaics (PV), demand response (DR) and load flexibility, beneficial electrification, and energy efficiency; and
- The timing of the various forecasts and how they impact both the IRP and IDP process and consistency between the plans.

The workshop presentation provided specific information on our load and demand forecasts; discussed forecast methodologies and assumptions for technologies including EVs, distributed solar, end-use/building electrification, and batteries; as well as DR and energy efficiency. We also discussed how these forecasts are utilized in both the resource planning and distribution planning processes. This workshop provided ample opportunity for participants to ask questions and to provide feedback on the forecast process utilized in the Company's IRP and IDP process.

2. Workshop 3 Stakeholder Questions and Input

- Several clarifying questions were received from stakeholders.
- We were asked if we are considering dynamic pricing to encourage DR. We indicated that we have on-going dynamic pricing pilots, but that dynamic pricing has not been incorporated into the current forecast. If dynamic pricing is approved, it will be incorporated into the forecast.
- A stakeholder inquired if we consider climate change impacts on weather in the forecasting process. We indicated that while we are not specifically doing this to date, we rely on historical weather normal averages. As the weather changes, it

[10] IDP Order, at Order Point 6.

will be reflected in the forecast going forward. We noted we are also concerned about trying to predict impacts of global climate change on weather and are evaluating ways to incorporate those impacts into the forecast.

- Regarding EV forecasting, we were asked if we conducted a very high EV adoption scenario that surpasses 20 percent by 2030. We explained that we have not conducted this scenario, as it would require every new vehicle purchase in Minnesota to be an EV, taking into consideration the retirement rate of non-EVs. We will continue to monitor the total new vehicles trends.
- We were asked if we would consider the High Electrification Scenario to reflect the impacts of our current and future EV programs or if we see our programs receiving adoption rates somewhere between the Mid and High scenarios. We explained that the high adoption EV scenarios that we evaluate are more aspirational. While our programs encourage higher EV adoption levels, there are numerous external factors that impact whether the higher adoption scenario is realized. The most critical aspect is price parity of EVs with internal combustion engine vehicles. Our forecasting model incorporates price parity and historical adoption trends. Once actuals start to show this growth, the model will incorporate that change.
- We were asked if we have done any work on price sensitivity of EV demand, DR for EVs, and if there are any areas of study for the overlap of Time of Use (TOU) rates and DR. We were also asked if DR participation rates increase or decrease when the customer is on a TOU rate. We responded as follows:
    - Regarding DR, a finding that came out of the measurement and verification study indicates that there was not a change in usage. It was also noted that in the second year, TOU rate impacts tend to be concentrated to a small number of customers but for those customers, the impacts had a large effect.
    - Regarding EVs, we have been operating residential managed charging programs and pilots involving EV-specific TOU rates, and bill credit incentives to encourage EV charging to occur during off-peak system hours. Off-peak hours are from midnight to 6 am, Monday-Friday. We have seen significant sensitivity to on/off peak times, with roughly 90 percent of all charging activity from program and pilot participants taking place during off-peak hours.
- We received a suggestion that we present any building electrification scenarios in terms of the percentage of sector-specific end use that is served by electricity (e.g., 20 percent of residential space heating is electric by 2030). We are considering this feedback but note that building end-use electrification forecasting is still emerging.

- Stakeholders shared feedback on our distributed generation (DG) forecasts and how distribution system constraints are reflected in our forecasts. In response to participant questions on this topic, we indicated that our community solar garden (CSG) forecast is limited by available substation capacity, but our rooftop solar forecast is unconstrained. Stakeholders indicated a desire to see a forecasting scenario that accounts for interconnection constraints, and a scenario that assumes no constraints. In our 2023 IDP, partly in response to this feedback, we reflected the unconstrained scenario in all of our solar LoadSEER modeling because it provides a better indication of where system upgrades and investments may be required.

D. Workshop 4: Planning the Grid of the Future Part 2

- **Logistics**: Virtual: June, 12 2023
- **Attendance**: 26 total participants
- **IRP Order Point**: 9.d- *Xcel shall takes steps to better align distribution and resource planning including: improve non-wires alternatives analysis, including market solicitations for deferral opportunities to make sure Xcel can take advantage of distributed energy resources to address discrete distribution system costs.*

This workshop also addressed requirements from the Commission's IDP Order.[11]

1. Workshop 4 Overview

This was the second part of a two-part workshop, with the first part held on May 22, 2023. Part 1 addressed only IDP Order Points and thus is not summarized here. At this workshop, the Company covered grid investment plans, including synergies with hosting capacity, NWA analysis, and the use of weighted average cost of capital (WACC) versus societal discount rates.

The presentation started with an overview of 2023 legislation that impacts the IDP planning process, followed by a brief overview of the IDP planning process. Next, the Company reviewed the mitigation planning process, budgeting process and how projects are prioritized, EV grid investments, and hosting capacity investments. Lastly, we talked through the NWA screening analysis process inclusive of avoided revenue requirements (ARR), stacked values and WACC versus societal discount rates applied.

[11] IDP Order, at Order Points 3 and 6.

This workshop provided ample opportunity for participants to ask questions and to provide feedback to be considered in our plans. In an attempt to obtain more input from stakeholders, this workshop employed the use of Microsoft Teams Polls (Polls). During the workshop, we posed eight questions to participants and received response rates of four percent to 27 percent. Questions posed and responses received were posted to the docket along with the slide deck.

2. Workshop 4 Stakeholder Questions and Input

Stakeholder questions and discussion focused primarily on NWA analysis and DER hosting capacity, with a few additional questions surrounding our budgeting process and forecasting.

- Several clarifying questions were asked by participants.
- Regarding NWA analysis, a stakeholder asked if mandated projects could be considered for NWAs. We responded that this may be possible if a mandated project, in which we are required by a local jurisdiction to move our facilities, includes a capacity component. In our 2023 IDP, we discussed the types of projects that would lend themselves to non-traditional solutions.
- We were also asked if we would consider conducting NWA analysis for projects below the $2 million threshold set in the Commission's IDP Filing Requirements.[12] We indicated that we think $2 million remains an appropriate threshold.
- A stakeholder expressed surprise at the results of the NWA analysis conducted using the weighted average cost of capital (WACC) versus the societal discount rate but opined that the societal discount rate was most appropriate to capture the societal value of an NWA as opposed to building a large generation plant. We clarified that an NWA would not be offsetting a generation plant but would be an alternative to traditional poles and wires upgrades. The NWA analysis considers a wide variety of technology, in front of the meter and behind the meter.
- A stakeholder asked if we have thought about supply set-up for a solar plus storage owner and if we have thought about how NWA contracts will be structured to meet special needs. We indicated that we are evaluating how specific contracts could be structured.
- Regarding hosting capacity and DER, we were asked how important hosting capacity is for meeting local goals for electrification and local solar and if we

[12] See December 8, 2022 Order in Docket Nos. E002/M-21-694 and E002/M-17-897, Xcel Energy IDP Filing Requirement 3.E.1.

would consider adding the hosting capacity layer to the Service Reliability and Service Quality Map so that applicants can view relative hosting capacity by geography and census tract. We indicated that right now, this information is contained in two separate maps and that a side-by-side comparison can be conducted to obtain the desired information. However, we are considering combining this information into one map in the future.

- A question was posed if there are any areas that can be considered a priority area for where DERs could be sited with lower interconnection costs, which would guide the development of DERs. We explained that the hosting capacity map is the best tool to guide DER development; the green areas of the hosting capacity map will have comparatively lower interconnection upgrade costs.
- A stakeholder asked if we had considered dynamic curtailment as a way to address a limitation identified in an interconnection study. We indicated that this is also known as flexible interconnection, and it is something we are trying to study more as the data becomes available. We are currently involved in a study about this with the Electric Power Research Institute (EPRI). We were also asked if we can incorporate state and local goals around electrification. We indicated that we are required to consider local goals as part of the IRP, and this year, we sent a survey to community members asking them about their clean energy goals to ascertain that we will be able to help communities meet their goals. The survey is discussed in Appendix V: Community Goals and was also addressed in the 2023 IDP.
- We were asked to provide more detail in our upcoming filing on how the "as funds allow" portion of the budget is calculated, including an explanation regarding where that funding comes from. In the 2023 IDP filing, we discussed how our budgets are developed each year using a "bottoms-up" approach.

Lastly, we were asked if we would be willing to share a draft copy of the IDP before it is officially filed, if we will be providing a preview before filings, and if we could provide the stakeholder workshop report to the Interested Parties List. We responded that we intended to hold an IDP preview workshop for stakeholders in September 2023, and that we would send a copy of the stakeholder workshop report to the Interested Parties List via email upon filing. We also indicated that stakeholders are also welcome to comment on our IDP after it is filed. A copy of the stakeholder workshop report was sent to all participants of any of the IDP workshops on August 1, 2023 and the IDP Preview was held September 19, 2023.

3. Poll Input

In an effort to obtain more input from stakeholders, this workshop employed the use of Microsoft Teams Polls (Polls.) This application allowed us to present questions to participants to generate more input on specific topics. We also posed open-ended questions to generate conversation. Participation in the Polls was not mandatory. During the workshop, we posed eight questions to participants and received response rates of 4 percent to 27 percent. See Table S-3 below for questions and a summary of responses:

Table S-3
Planning the Grid of the Future (Part 2) – Polls Questions and Responses

Question	Summary of Responses
1) What do you recommend that we do to proactively prepare for EV adoption?	Stakeholders suggested partnering with EV providers to gauges sales in the region, appliance disaggregation, load hosting capacity analysis, load control to disable charged when load is needed for grid support, proactively upgrade transformers, time of use rates for all customer classes, and upgrading the grid to prepare.
2) How should we identify and prioritize locations for the Hosting Capacity Program?	Stakeholders identified equity, looking at locations with known capacity constraints, planned locations for public EV charging stations, upgrading communities who are hosting many megawatts of CSG and larger DG installations, and having a common understanding of what grid access means. We will consider these ideas in our plan for the distributed energy resources system upgrade program, which we must file with the Minnesota Department of Commerce by November 1, 2023. (See Docket No. E002/M-23-458.)
3) Ideas on alternative methods to allocate costs of distribution system upgrades?	One stakeholder responded, noting an emerging approach in some states to charge the first DG applicant for a part of the upgrade with the expectation that the next DG applicants would pay their prorated share going forward. We will consider this in the forthcoming IDP. (We discussed this approach in Appendix I of the 2023 IDP.)
4) Is our ARR split methodology a fair approach to cost-sharing NWAs?	All five respondents indicated that they were not sure.
5) Should Xcel Energy continue to conduct NWA analysis using both the WACC and societal discount rates?	Five respondents thought it was appropriate to continue to utilize both methodologies and three were not sure.
6) What is your prioritization of the NWA roadmap items?	The weighted results indicated the LoadSEER enhancements were most important and 8760 NWA analysis, potential stacked value additions and automation of efficiency improvements all tied for second.
7) Do you agree with the direction of our planning process?	Three somewhat agreed, two were neutral and two somewhat disagreed.
8) Are there other ways participants you would like provide input on the IDP process?	One respondent indicated that they would like to see more discussion around the use of Flexible DER Interconnections using Dynamic System Ratings. Another participant indicated that they would like to have the opportunity to speak with Xcel Energy engineers one on one. In our view, the series of six workshops provided covering the IDP process has provided ample opportunity for stakeholders to ask detailed, specific questions of the Company's engineers who presented and were available throughout the duration of the workshops to receive feedback and answer questions.

E. Workshop 5: Resource Modeling

- **Logistics**: Hybrid (In-Person and Via Conference Call): August 8, 2023
- **Attendance**: 41 total participants 9 in-person and 32 virtual participants
- **IRP Order Point**: 3(c)- *Xcel shall analyze this likely need [for firm dispatchable resources] based on up-to-date system-wide modeling, including corrected modeling of wind fleet variability and of exchanges with MISO, in order to –*
  1) *establish the capacity, energy, resource adequacy, energy availability, ancillary service, and reliability needs, and*
  2) *quantify and compare the contribution of the electric system attributes from the different resource options considered to meet the identified grid needs.* And
- **IRP Order Point** 10(e) and (f)- *In its next resource plan Xcel shall, either through its Integrated Distribution System Plan proceedings or through another stakeholder process, develop and/or improve its forecasts of the adoption rate for the following technologies, to be used in Xcel's base case scenario and its overall demand forecast. (E) Increased potential for demand response and load flexibility from an increase in electrification of the technologies in A–D. (F) Adoption of distributed solar-powered generators—including generators sited by customers, community solar gardens organized under Minn. Stat. § 216B.1641, and generators that are neither sited by customers nor related to community solar gardens.* And
- **IRP Order Point:** *12- Xcel shall include in its next resource plan a deeper analysis of (1) storage options, including options combining solar generation and battery storage, and (2) the role of hydrogen and clean fuel alternatives in Xcel's resource mix. In preparation, Xcel shall work with stakeholders to develop a fair basis for comparing the full supply-chain and life-cycle carbon impacts of the generation and storage resource options under consideration to help the Commission evaluate the "adverse socioeconomic effects and adverse effects upon the environment" of each option, pursuant to Minn. R. 7843-0500, subp. 3.C.* And
- **IRP Order Point:** *15- Xcel shall work with stakeholders to develop a modeling construct that enables Xcel, as part of its next resource plan, to model solar-powered generators connected to the company's distribution grid as a resource. Xcel and stakeholders shall address the following factors in developing the modeling construct:*
  A. Using a "bundled" approach as is used to model energy efficiency and demand response.
  B. The costs borne by the utility and the costs borne by the customer.
  C. Cost effectiveness tests.
  D. Other topics as identified by stakeholders.

  Xcel shall include improved load flexibility and demand response modeling methodologies prospectively, including in its next resource plan.
- **IRP Order Point:** *16- In its next resource plan, Xcel shall account for local clean energy goals, in aggregate, in forecasting and modeling. In particular, the plan should include consideration of local community generation goals for distributed generation.*

1. Workshop 5 Overview

At this workshop, the Company shared information regarding several aspects of our modeling approaches for the next IRP. The workshop included an overview of our EnCompass modeling process and objectives as well as our planned approach for modeling inputs- including generation and demand-side resources- and new analysis approaches used in the IRP.

The presentation started with an overview of the Xcel Energy IRP process including a refresher on IRP goals and objectives and modeling tools employed; a discussion of statutes and rules governing the process; and how equity fits into the process. This was followed by a presentation of the economic modeling framework steps taken, and what we plan to include in the 2024-2040 IRP baseload scenarios which was followed by a discussion of examples of sensitivities that will be run to help address portfolio risk and to ultimately inform the preferred plan. A listing of generic resource technology and changes from the last IRP were discussed. Information pertaining to options inclusive of cost and performance data sources and how profiles of generic wind and solar will be developed; key renewable and battery input assumptions; impacts of new tax credits and interconnection costs; alignment of the IRP and IDP and sensitivities used; incorporation of demand response and energy efficiency bundles; and details of the Energy Conservation and Optimization Plan were shared. The presentation wrapped up with a discussion of new factors and approaches to be incorporated such as the recent 100 by 2040 legislation, Community Solar Garden and DG solar requirements, new environmental regulations; and changes to the MISO construct. This was followed by an overview of the Lifecycle Emissions Analysis that was undertaken and results noted.

This workshop provided ample opportunity for participants to ask questions and to provide feedback to be considered in our plans. As with prior workshops, we used Polls to draw out stakeholder input. During the workshop, we posed five questions to participants and received response rates of 29 percent to 68 percent. Questions posed and responses received were posted to the docket along with the slide deck.

2. Workshop 5 Stakeholder Questions and Input

Stakeholder questions and discussion focused primarily on NWA analysis and DER hosting capacity, with a few additional questions surrounding our budgeting process and forecasting.

- Several clarifying questions were asked by participants.
- Several stakeholders made comments pertaining to incorporation of equity into the process with emphasis on clean energy benefits and accessibility.

We indicated that we are still working through the incorporation of equity into the process and that we would appreciate feedback on this. It was also indicated that the IRP process focusses on need versus resources and that equity considerations are easier to incorporate into the actual selection process. We have established the Equity Stakeholder Advisory Group (ESAG) and have received input from members. As well, we will be forming an Environmental Justice Accountability Board (EJAB) and will be discussing equity matters with that group going forward.

- A request was made that the cost/benefit analysis for Prairie Island (required in Order Point 23.E of the Commission's order approving the Company's prior IRP) be clearly connected to the assumptions used in IRP modeling. The Company will ensure this is the case by providing the EnCompass model outputs to the contractor we have engaged to run cost/benefit analysis modeling scenarios using the REMI E3+ model; in essence, the EnCompass outputs will be the inputs to REMI, ensuring consistency in assumptions. For further details see Appendix M: Nuclear.
- One stakeholder indicated their concern about the inclusion of advanced nuclear technology and also wondered if we were considering virtual power plants in the plan. Virtual Power Plants have been incorporated into our planning evaluations detailed in Appendix X: Advanced Technologies.
- Questions regarding usage of green hydrogen were asked- if we would be producing our green hydrogen, purchasing it off the market or selling excess to the market. We indicated that we are still in the planning stages of producing green hydrogen- with the thought being that we would likely produce it for our own consumption but that if excess were available we could consider selling that.
- We were encouraged to not model sources on 100 percent natural gas when they may eventually operate on hydrogen and to not keep these two fuel sources separate.
- We were asked how we intended to incorporate proposed EPA greenhouse gas rules (NSPS 111(b) and (d)) into modeling. We indicated that we intend to include the proposed rules in our analysis. This rule has been incorporated into the environmental policy sensitivity, limiting operation of impacted existing combined cycle units to a capacity factor less than or equal to 50 percent and limiting new combustion turbines to a capacity factor of 20 percent.
- A stakeholder noted that the DG standard is not 1-10MW but simply 10 MW.
- A stakeholder inquired if we intended to have additional conversations with stakeholders regarding the DG modeling construct. We indicated that we have held meetings with stakeholders on this and that future meetings were expected. A summary of these conversations follows below.

- Regarding Order Point 15, a stakeholder wanted to note that the 3 percent solar carve out is a floor and not a ceiling. The comment was noted.
- It was asked if the model could go beyond the 3 percent. We indicated that we are still assessing this and that the impact on affordability would need to be considered.
- We were asked why DG was not included for the generic resources as base load. We indicated that the theory is for the base model to be the middle of the road scenario with sensitivities evaluated to determine what level of renewables can be achieved.
- It was noted that in the last IRP there wasn't addition of wind until 2026 and we were asked if that could also happen on the solar side. We indicated that we would consider that.

3. Poll Input

As with the prior workshop, we again used Polls in Microsoft Teams and also used OpinionX to obtain stakeholder input. We also asked open-ended questions to prompt discussion. During the workshop, we posed five questions to participants and received response rates of 12 percent to 63 percent. See Table S-4 below for questions and a summary of responses:

Table S-4
Resource Modeling – Polls Questions and Responses

Question	Summary of Responses	
1) How would you weight the following core planning objectives? (Distribute 100 total points across the 5 categories) Environmental, Cost, Reliability, Risk, Other	1. Environmental 2. Reliability 3. Cost 4. Risk 5. Other: Unidentified 6. Other: Equity distribution of Cost/Benefits 7. Other: Socioeconomic	785 Points 775 Points 680 Points 515 Points 35 Points 15 Points 5 Points
2) Please rank the following in order of importance as they pertain to addressing equity: 1) Involvement in decision making opportunities 2) Access to renewable distributed generation 3) Affordability 4) Job/Workforce Opportunities 5) Decreased exposure to environmental impacts 6) Energy efficiency program accessibility	1. Affordability 2. Decreased Exposure to Environmental Impacts 3. Energy Efficiency Program Accessibility 4. Job/Workforce opportunities 5. Involvement in Decision Making Opportunities 6. Access to Renewable Distributed Generation	130 Points 110 Points 101 Points 93 Points 84 Points 65 Points
3) What additional metrics would help us evaluate these core planning principles?	Responses included: protecting life; level of DER adoption and distribution-level interconnection; equity; people; EV adoption; resiliency; updated capacity factoring; factoring in long term	

Question	Summary of Responses
	perspective and looking at cutting emissions and future benefits; land use; baseload vs. dispatch generations; affordability; extreme weather events; and growing income disparity
4) What types of additional Demand Response, otherwise known as load flexibility, do you envision?	Responses included: EVs as energy source; time of use rates; EV flexibility; behind the meter; microgrids; batteries as an aggregate resource; EV's and other behind the meter storage; large scale batteries as technology permits; distribution resources and microgrids for further distribution build out; third party aggregators of DR and Virtual Power Plants; and electric heating using Bitcoin mining.
5) Rank the policy and planning changes in the order you think they will have the most impact on our plans: 1) 100 x 40 2) MN CSG and DG Solar Programs 3) Federal Incentive Programs 4) MISO Resource Adequacy Changes 5) EPA Power Plant Regulations	1. MN 100x40 92 Points 2. MISO Resource Adequacy Changes 69 Points 3. Federal Incentive Programs 67 Points 3. EPA Power Plant Regulations 67 Points 5. MN CSG & DG Solar Programs 50 Points

F. IRP Workshop Survey Results

After the conclusion of the IRP and IDP workshop series, we requested feedback on the series through an online survey. We sent the survey to everyone who participated in one or more of the IRP and IDP workshops. The intent of the survey was to obtain feedback on the workshops in order to inform future efforts. The survey included questions pertaining to duration, frequency, location, satisfaction and if the level of information shared was appropriate. Also, we requested feedback on how we could improve stakeholder efforts going forward and if there was support for similar workshops in the future. Of the nearly 160 emails sent requesting a response to the survey, we received six responses, or a response rate of approximately four percent. Those that did respond indicated that:

- They found the duration of the workshops was just right.
- The workshops were informative and helpful.
- They felt they had a better understanding of the process after participation.
- Regarding venue location, one participant suggested that the workshops be held in a location other than downtown Minneapolis, and one indicated that the venue location affected their decision to attend in person.
- Regarding the level of detail that was provided, the majority of respondents found the level of detail "just right." One respondent indicated that they found that the information was often very technical and that while they found they were offered ample opportunity to ask questions and provide feedback, it was difficult to be able to do so while absorbing the information and suggested a more basic conversation. On the other hand, one respondent felt the information shared was too simplified.

- All but one respondent found that the IRP process was about what they expected- with one finding it more complex than expected. Three indicated agreement with our planning process and the other three did not respond to this question. No additional information was offered.
- Four respondents indicated satisfaction with the stakeholder process and two did not. One that did not agree indicated they felt that it would be helpful to have an even more basic explanation of some of the topics covered so that they are accessible to those working on these matters for the first time. The other expressed appreciation for all the effort put into the workshops but suggested the sharing of the presentation prior to the workshop for review by registrants so that they could be better prepared to ask questions.
- Five respondents indicated that they felt they had sufficient opportunity to offer input during the workshops. The one that indicated they didn't have sufficient opportunity pointed to the poll questions being simplified on complex topics and felt that workshop leaders were guiding the answers.
- Two respondents provided feedback on how we could improve the stakeholder process going forward. One suggested sharing an even more basic explanation of the topics for those new to the work. The other suggested the pre-sharing of slides and holding smaller group discussions instead of broader discussions.
- All supported the Company hosting a series of workshops again in the future.

We appreciate the valuable feedback provided by the six survey respondents and will consider the feedback received in future workshops.

IV. ADDITIONAL OUTREACH EFFORTS

A. CSG and 3 Percent Solar Mandate Discussions with CEO's

1. July 20, 2023 meeting

On July 20, 2023, a roundtable discussion was organized by Xcel Energy with members of the Clean Energy Organizations[13] (CEO's) to gather feedback on potential impacts to the distributed solar modeling constructs, discussed in Order Point 15, by recent legislation requiring three percent of retail electric sales in Minnesota be generated from solar systems constructed or procured after August 1, 2023 by 2030.[14] The CEO's indicated that they do not expect any changes to the Order Point 15 distributed solar

[13] Representatives from Vote Solar, The Institute for Local Self-Reliance and Fresh Energy participated in the discussion.
[14] Minn. Stat. § 216B.1691, Subd. 2h, amendment effective January 1, 2024.

modeling constructs resulting from the new 3 percent mandate. Their interpretation is that the 3 percent requirement will likely occur in front of the meter while solar bundling will likely occur behind the meter. We agree with this interpretation and will proceed to develop a solar bundle modeling construct in addition to incorporating the 3 percent requirement into our Resource Plan.

2. October 24, 2023 meeting

On October 23, 2023, a second roundtable discussion was organized by Xcel Energy with members of the Clean Energy Organizations[15] (CEO's) to further discuss the distributed generation (DG) solar bundle modeling construct, as directed in Order Point 15. This discussion was geared solely towards new selectable DG solar bundles not already included in the base case, and bundles above and beyond the 2023 Community Solar Garden (CSG) and three percent legislation. The Company presented details regarding the DG solar modeling framework presented by the Institute for Local Self-Reliance (ISLR) in the last IRP and the parties had an extensive discussion about updated model assumptions. The parties agreed using assumptions in the 2023 National Renewable Energy Laboratory (NREL) ATB, where applicable, was reasonable. In addition, solar bundle sizing, bundle pricing impacted by lending rates, and representative operation and maintenance costs were discussed. The suggestion was made that the cost benefit tests be consistent with the National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources.

B. Modeling Assumption Discussions

1. Department of Commerce Modeling Assumption Discussion

On October 2, 2023, the Company met virtually with representatives from the Department of Commerce (DOC) to share our IRP modelling assumptions and to receive feedback and input on the assumptions. We also addressed a set of questions sent prior to the meeting by the DOC. These questions addressed seasonal modeling, the MISO construct, resource acquisition, scenarios, modeling assumptions and pricing assumptions.

2. Public Utilities Commission Staff Modeling Assumption Discussion

As well, the Company met virtually with MN Public Utilities Commission Staff on October 9, 2023 to discuss our IRP modelling assumptions and to receive their

[15] Representatives from Vote Solar, Sierra Club, Fresh Energy and MN Center for Environmental Advocacy participated in the discussion.

feedback and input. We discussed the MISO construct, various scenarios, optimization of EnCompass modeling for seasonal impacts, major assumption changes such as MISO accreditation, IRA assumptions, policy changes, long term duration storage, distributed generation modeling, forecasts and local clean energy goals.

C. RFP 101 Workshop

On October 12, 2023, the Company hosted a Request for Proposal (RFP) 101 Workshop. The idea for this workshop arose from Xcel Energy's Equity Stakeholder Advisory Group (ESAG) engagement meetings. As part of a broader discussion in ESAG on diversifying the energy workforce, we heard from ESAG members that the Company should take steps to increase participation of Black, Indigenous and People of Color (BIPOC) organizations in the RFP bidding process. The intent of this workshop was to share general information about the NSP RFP bidding process for new generation resources to interested bidders. As well, we also hoped to learn information that could help our design of future RFPs and further ensure a fair and competitive process.

The Workshop focused on RFPs for generation resources that serve the bulk NSP system, such as utility scale generation sources or large distributed generation. The workshop did not cover rooftop distributed generation or Community Solar Gardens or any specific RFPs.

The workshop invitation was submitted to the IRP docket, to our MN DER distribution list comprised of 2,908 individuals, to our "RFP Renewables Release List" comprised of an additional 90 individuals, and to our ESAG distribution list. This workshop generated significant interest with 88 external participants attending the workshop.

V. CONCLUSION

We appreciate stakeholders' participation in these workshops, for input received and questions asked. We recognize that the scheduled time for the entire series of workshops was more than 16.5 hours, which is an extensive time commitment for stakeholders. The Company hopes that participants found the workshops informative, useful, and an effective way to provide us their input and feedback. We took great effort to ensure that stakeholders had every opportunity to ask questions and provide feedback. Based on feedback obtained at workshops and through survey results the stakeholder workshop series was successful in that stakeholders found it informative and were supportive of Xcel Energy hosting a series of workshops again in the future.

From the Company's perspective we found it successful in that we were able to receive valuable input from our stakeholders.

Where feasible, we have incorporated specific stakeholder input into the IRP process, as noted above in the workshop summaries. We are tracking all input that has not been incorporated directly and we will continue to consider and, where feasible, incorporate this feedback in the future.

We are committed to continuing to deliver reliable, affordable, and clean energy to our customers. This commitment requires a rigorous planning process that reflects the input and priorities of stakeholders, including the Commission, our customers, and the communities we serve.

We appreciate the interest and desire for our stakeholders to be involved and help shape the future of our system, their willingness to participate in these workshops and provide us their input.

APPENDIX T – MISO GRID CONGESTION

I. INTRODUCTION

Congestion is a complex issue that requires careful planning, management and coordinated efforts from multiple stakeholders. Here we provide an overview of the problem of congestion as it relates to resource planning and outline the steps, we are taking to address it. Though we cannot address congestion alone, we are looking for solutions to address congestion for our customers' benefit and furthering policy objectives. We have engaged in multiple efforts to find and mitigate transmission constraints. While many of our investments target physical improvements to constraints impacting our system, we are also reviewing regional policies to ensure adequate measures are in place to avoid future congestion impacts.

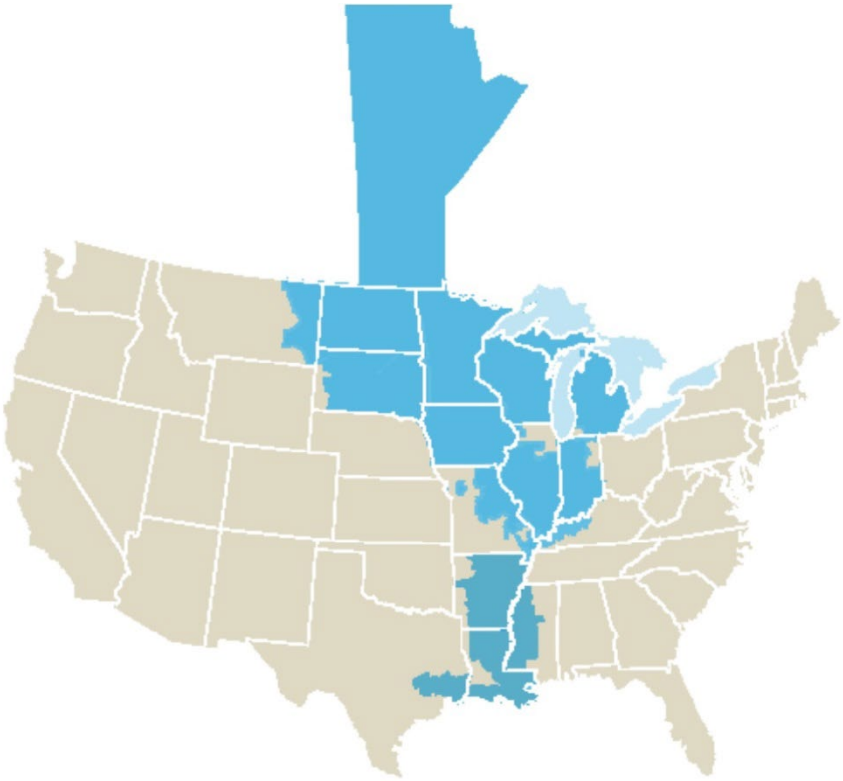
II. DEFINING GRID CONGESTION

The grid is facing new challenges as traditional baseload units retire, large scale renewables deployment increases, and Distributed Energy Resources (DER) are increasingly adopted. Sustainable, clean energy depends upon the necessary infrastructure to support the delivery of electricity from remote renewable resources to more heavily populated load centers. The Xcel Energy operating companies NSP-Minnesota and NSP-Wisconsin, operate an integrated transmission system (the NSP System) that comprises more than 8,400 miles of transmission and sub transmission facilities operating at voltages between 23.7 kilovolts (kV) and 500 kV, and approximately 550 transmission and distribution substations. The NSP System is within the Midcontinent Independent System Operator (MISO) footprint and serves retail customer loads in Minnesota, North Dakota, South Dakota, Wisconsin and Michigan.

A fundamental responsibility of transmission system operators is to ensure reliable operation of the transmission system. The Mid-continent Independent System Operator (MISO) is the regional transmission organization (RTO) which operates the transmission system and an energy market in parts of 15 states and the Canadian province of Manitoba. As an RTO, MISO is responsible for planning and operating the transmission system within its footprint in a reliable manner. MISO also provides operational oversight and control, market operations, and oversees planning of the transmission systems of its member Transmission Owners (TOs). MISO has 48 TO

members with more than 65,800 miles of transmission lines that are under MISO's functional control.[1] MISO's members also include 128 non-TOs such as independent power producers and exempt wholesale generators, municipals, cooperatives, transmission dependent electric utilities, and power marketers and brokers.[2] A map of MISO's geographic footprint is provided in Figure T-1 below.

Figure T-1: MISO Footprint



MISO is responsible for managing the flow of electricity on the transmission system. MISO does this by balancing the generation and consumption of electricity and ensuring the reliability of the electric grid. MISO accomplishes this as part of its duties as an Independent System Operator (ISO) by not only scheduling and dispatching

[1] *See* MISO, *Fact Sheet* (updated Mar. 2023), *available at* https://www.misoenergy.org/about/media-center/corporate-fact-sheet/.
[2] A complete membership list of MISO members by stakeholder group is available at: https://www.misoenergy.org/Library/Repository/Communication%20Material/Corporate/Current%20Members%20by%20Sector.pdf.

generators, but also operating a day ahead and real-time energy market system for electricity which is designed to provide pricing signals that encourage the efficient use of generation resources and transmission capacity.

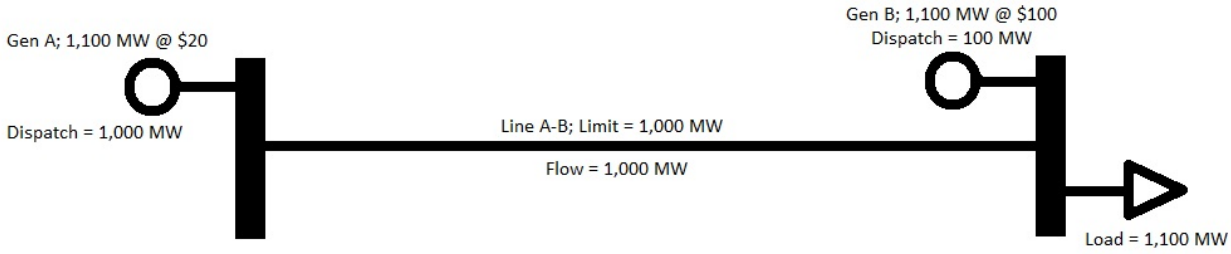
Limits on transmission facilities can prevent MISO from dispatching the most efficient generation resources during all hours of the year, thereby increasing wholesale energy costs. Transmission constraints are the physical limits on the amount of electricity flow the system is allowed to carry in order to ensure safe and reliable operation. Transmission constraints occur at different points on the transmission system, such as transmission lines, substations, or in specific regions. Regardless of the source, these constraints result in bottlenecks in the transmission system, and higher costs for electricity delivery.

These transmission constraints create inefficiencies in the wholesale energy market and increase costs through shadow prices. Locational marginal prices (LMPs) are economic indicators used to reflect the value of electricity at specific locations within the grid. MISO calculates LMPs for over 2,000 nodes. LMPs include marginal energy costs (i.e., cost of generating the last megawatt-hour MWh of energy in order to balance supply and demand in the market) as well as congestion costs and transmission losses. Collections of nodes are often represented by zones or hubs that provide a summary of regional prices and a benchmark for forward trading of power. When there is congestion in the transmission system, shadow prices signal the congestion cost savings for increasing a given transmission path by 1 Megawatt (MW). Shadow prices are used throughout the industry to determine which transmission paths or flowgates are the most congested and are used by the market model to set LMPs at different nodes throughout the system. The price of electricity is not uniform across the grid due to constraints and losses. Ignoring the effect of transmission losses, when no transmission constraints are restricting economic dispatch, all marginal prices at all points would be identical. If there is a constraint, the marginal prices on two sides of the constraint will differ. The difference in price is an economic measure of congestion.

Transmission congestion refers to the economic impacts on the users of electricity that result from operation of the system within these limits. Congestion occurs when demand for electricity in a particular region exceeds supply, and there is insufficient transmission capacity to move the least costs generation to customers. Once the system is overloaded, cheaper generation cannot be dispatched, and more expensive generation is used to serve load. Higher cost generators from areas without transmission constraints must be used to meet customer demand, thereby raising the price of electricity.

Figure T-2 is an illustration of how congestion affects the energy used and pricing in a single moment of time. The illustration assumes an energy need of 1,100 MW that could be supplied by two potential generators, one at a charge of $20 per MW and one at $100 per MW.

Figure T-2: Congestion Illustration



In this theoretical intact system, Generator A could serve the entire 1,100 MW needed, but cannot do so because of the 1,000 MW limit on Line A-B. Instead, Generator A's dispatch is limited to 1,000 MW and Generator B will be called on to deliver the 100 MW balance. If Generator A were able to deliver the entire 1,100 MW it can generate, the energy cost would be $22,000 assuming no energy is lost during transmission. Due to system constraints, the total cost to deliver the 1,100 MW rises to $30,000 because 100 MW cannot be delivered, and replacement energy is required (1,000 MW X $20 for Generator A plus 100 MW X $100 for Generator B). In short, the congestion causes the overall cost of energy to increase $8,000 or 36 percent based on this simplified example. When there is no congestion, the lowest cost generator, regardless of fuel source, is the one that serves load.

Managing congestion is critical to minimizing costs associated with electricity production and transmission and enabling further investments in renewable energy. LMPs play a crucial role in managing grid congestion and optimizing the operation of the electricity market by using economic indicators to manage the flow of electricity. However, congestion also represents increased prices for our customers. By addressing the causes of congestion directly we can work to mitigate its impact on electricity prices.

III. CAUSES AND IMPACTS OF GRID CONGESTION

Generally, we see congestion on the transmission system because of the increasing demands for electricity, both in terms of load, and the changing generation mix of its supply. Integrating new renewable generation can lead to congestion on the MISO system, causing transmission constraints as the system may lack the flexibility to accommodate further resources without physical improvements. The existing transmission infrastructure may be outdated, in need of significant upgrades, or unable to accommodate additional generation leading to congestion as energy must find alternative pathways to get to customers. Further, policy may also contribute to congestion through unintended impacts. While there are many causes of congestion, its impact on higher prices for our customers must be accounted for in our system planning.

Across our footprint we are experiencing significant growth in energy demand, prompting us to seek innovative solutions to meet the increasing electricity needs of our customers. One prominent approach has been an escalating reliance on wind and solar generation. With its abundant wind resources and the growing solar potential, the upper Midwest is emerging as a leader in renewable energy deployment. Wind farms are becoming a common sight across the region and solar installations, ranging from rooftop arrays to large-scale solar farms, are proliferating, harnessing the region's sunlight. By harnessing wind, solar and other forms of renewable energy, we are striving to meet the surging energy demand while achieving a greener and more sustainable energy future.

The growth in renewable generation may both increase and decrease the need for new transmission. As legacy units retire, they are often being replaced by wind and solar generation, but the fuel sources for these resources are often locationally dependent. Regions with favorable conditions, and abundant resources are not often located near load centers. Historically, transmission lines delivered power from large scale base load generators to population centers. The infrastructure needed to support the dispersed replacement generation for retiring baseload units is continuously growing.

While there are abundant levels of wind, solar, and even biomass in the Upper Midwest, often they are located in more remote locations. Siting renewables in these remote locations requires new or upgraded transmission to efficiently deliver energy to load centers. More remote areas lack the necessary transmission infrastructure for large scale renewable projects due to their lower population density, and lower historical electricity

demand as they were not historically prioritized with for extensive transmission infrastructure development in the past. As a result, the existing transmission system does not always have the capacity to accommodate the additional power generated by large renewable energy projects.

Further, in addition to the physical constraints mentioned, fuel costs can increase congestion impacts. Congestion costs can be exacerbated by high natural gas prices due to natural gas fueled generation generally being dispatched to offset congested renewables due to the natural gas generation's flexibility and distance to the load.

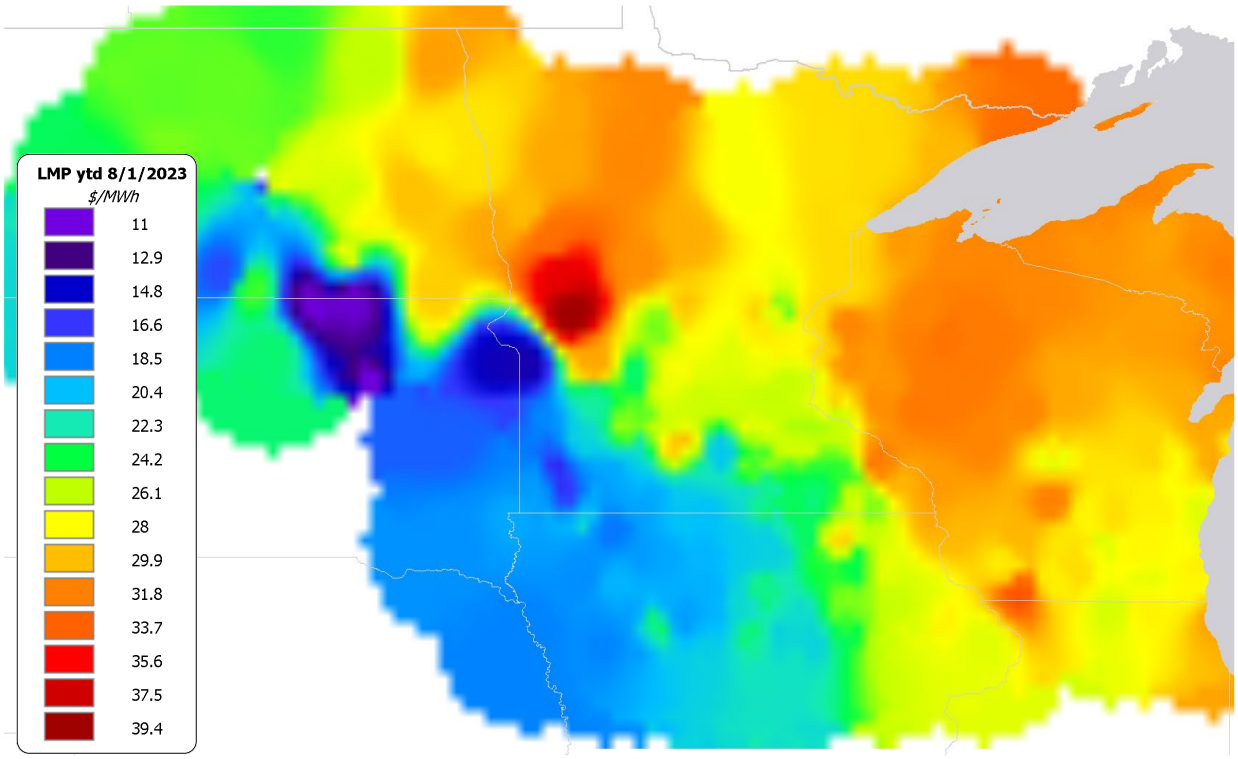
Finally, as mentioned, policy may also contribute to congestion through unintended impacts. We identified congestion impacts that resulted in increased costs to customers as part of the MISO Generator Interconnection Process. One of the ways in which MISO exercises its role of managing the flow of electricity is by analyzing transmission service requests by parties looking to use the transmission system. The MISO Generator Interconnection Process is used to analyze interconnection requests for new generators connecting to MISO facilities to ensure the reliability of the transmission system and ensure the deliverability of new and existing network resources.

In our work with MISO and stakeholders, we found that the MISO Generator Interconnection Process had resulted in increased costs to customers though the thresholds in which generators were made responsible for upgrade costs, and how the dispatch of resources in the Interconnection Process study were being implemented. The MISO thresholds at the time the issue was identified were that a 5 percent or greater contribution would require a generator seeking Network Resource Interconnection Service (NRIS) to pay for an identified upgrade. For a generator seeking Energy Resource Interconnection Service (ERIS), a contribution level of 20 percent or greater was required to be assigned the costs of an upgrade. This resulted in needed upgrades being identified during the System Impact Study efforts, but due to contribution levels being below the thresholds, these constraints were not being mitigated.

Over time we have seen increasing congestion on the MISO system. As a visual representation, we can examine historical congestion through examining the average LMPs on MISO system. Figure T-3 shows LMPs on the MISO system in our area year to date as of August 1, 2023.[3]

[3] Hitachi Energy Velocity Suite simple average, LMPs on the MISO system in our area year to date as of August 1, 2023.

Figure T-3: MISO Historical LMP Averages



Areas which are dark blue to purple show low average LMPs and represent the market signal an abundance of generation and a lack of load while orange to dark red signal an abundance of load, and lack of generation. Regions with a drastic price difference in a relatively short distance are highly congested areas signaling constraints on the system.

Currently, wind generation from the western part of MISO flows toward the load centers in the east, such as the Twin Cities Metro area and load centers beyond the transmission interconnection between Minnesota and Wisconsin. The existing west-to-east transmission capacity is at times operating at its limit. The transmission interface across the Minnesota-Wisconsin border is currently stability-limited and trying to force additional renewable energy through these lines could result in voltage collapses in Northern Wisconsin that would destabilize the grid. This forces us into curtailing wind

energy at its source in the west as it is operationally and economically inefficient to utilize the inexpensive and clean energy to which we have access.

Table T-1 below shows congestion and curtailment information for 2022 and 2023. These are the official curtailment values and reflect the curtailment billed to the Company. The months where the curtailment data was not available, we used the MWh derived in our monthly curtailment estimate calculation. The costs for these months were the MWh from our estimate, multiplied by the average monthly cost of curtailment.

Table T-1: Congestion and Curtailment Costs for 2022 and 2023

[PROTECTED DATA BEGINS

PROTECTED DATA ENDS]

The monthly costs (listed as negative values) of recent congestion impacts are provided in Table T-1 in the column titled Total Impact. Monthly Total Impact is the sum of the Congestion and Curtailment costs, offset by Financial Transmission Right (FTR) revenue. Curtailment and Congestion are considered negative and Financial Transmission Right (FTR)s are considered revenue positive in the calculation.

While curtailment and congestion costs are dependent on transmission outages and wind levels, overall, these numbers show higher costs than we have experienced in the in recent history. This increasing curtailment is the result of several various aspects of system operations, but a common factor is that the Upper Midwest MISO transmission system has become oversubscribed and unable to support all the wind generation that

has recently gone into service. For instance, in 2022 wind generation went into service before the completion of transmission upgrades required for the generation to interconnect were complete, causing several transmission outages. In other words, there was more wind generation installed in the western subregion of MISO than could be delivered to meet customer demand throughout the MISO footprint. Without additional transmission development, and steps to mitigate these impacts, we will more frequently encounter this problem as we add more renewable generation to our system.

Beginning in June 2020 the NSP system began to see a significant increase in congestion costs in MISO settlements, exhibiting another step increase in April 2021. For 2023 through June, congestion costs have fallen off to some degree as compared to 2022; however, there remains significant volatility as observed in April 2023 and may increase moving forward in 2023 and 2024. Therefore, to better align the 2024 forecast with costs expected for congestion, we have updated our MISO cost and revenue forecast to include data inclusive of results observed for April 2021 through June 2023 which are annualized to provide the forecast for 2024. Figure T-4 shows NSP congestion costs from January 2019 to June 2023.

Figure T-4: NSP Congestion Costs

[PROTECTED DATA BEGINS

PROTECTED DATA ENDS]

IV. EFFORTS TO ADDRESS CONGESTION

Managing congestion is crucial for minimizing production and transmission costs and facilitating investments in renewable energy. A strong transmission system ensures

continued reliable and affordable service, and the ability to meet state and regional energy policy goals, and support for a diverse generation mix, including renewable energy.

Congestion costs are directly affected by transmission investment. If transmission investment removes a constraint to relieve congestion, then the investment will reduce congestion costs to customers. The congestion costs avoided are a direct measure of the economic benefit from, or value of, this investment. However, projects must be measured to ensure the value of the investment exceeds the costs.

Upgrading or replacing aging infrastructure helps ensure the safe and efficient transmission of electricity, however constructing transmission lines can be technically complex, expensive, and time consuming. Developing or upgrading transmission infrastructure requires significant planning and coordination, obtaining all necessary permits and regulatory approvals. As a project's scale increases, so do the permitting and environmental considerations. Anticipated benefits, by themselves, may or may not be sufficiently large and recurrent to warrant the investment and reducing congestion costs is not the only economic benefit that might justify a transmission investment. Robust analysis is needed to determine which projects to pursue.

The MISO Transmission Expansion Plan (MTEP) is a comprehensive process undertaken by MISO to assess, plan and propose transmission system improvements within its operational footprint. MTEP aims to ensure reliability, efficiency, and the cost effectiveness of the electrical transmission infrastructure within the MISO region through identifying needs, developing scenarios, studying alternatives, performing cost benefit analysis, and conducting stakeholder engagement. The MTEP process aims to address congestion and level the playing field for all generators to deliver their energy based on supply and demand. This in turn ensures that the energy market operates in the most efficient and cost-effective manner.

MISO adheres to the planning principles outlined in FERC Order No. 890 and 1000 in developing the MTEP. These FERC Orders require an open and transparent regional transmission planning process and include the requirement to plan for public policy and for coordinated inter-regional planning and cost allocation. Consistent with these FERC directives, the MTEP process seeks to ensure the reliable operation of the transmission system, support the achievement of state and federal energy policy requirements, and enable a competitive energy market to benefit all customers. Xcel Energy plays an active part in the entirety of the MTEP process including the futures development and model development, and validation.

The development of the MTEP typically starts in June every other year and is an 18-month overlapping cycle of model building, stakeholder input, reliability analysis, economic analysis, resource assessments, and drafting of the MTEP report. As part of the process MISO usually performs a Market Congestion Planning Study (MCPS). The 2016 MCPS was an example of how transmission can produce lower APC as this study resulted in the development of our Huntley-Wilmarth 345 kV line Market Efficiency Project (MEP). The Huntley to Wilmarth 345 kV project alleviated the observed congestion at the Minnesota/Iowa border. Though we acquired new right-of-way to construct the 345 kV circuit on the approved route, approximately 40 percent of the line was constructed as a double circuit with the existing Wilmarth-Lakefield Jct. 345 kV line.

The last MCPS was performed in 2019, with the 2020, 2021, 2022, and 2023 MCPS Studies being eliminated to open resources for Long-Range Transmission Planning (LRTP)—which is MISO's largest ever undertaking to update and modernize the transmission system. The LRTPs are a comprehensive planning effort outlining the transmission infrastructure needs and tests expansion plans for the MISO region to accommodate widespread changes in the electric landscape due to changing technology and customer needs. The scale and pace of these changes have required prompt attention to develop the most efficient, cost-effective investments to ensure grid reliability in the future. The LRTP initiative is MISO's response to the current and future resource evolution that has and continues to affect the bulk electric system.

The LRTP projects are sorted into various tranches depending on their priority. Tranche 1 resulted in a $10.3 billion transmission portfolio that was approved by the MISO Board of Directors in July 2022. The projects in the Upper Midwest represent about $3 billion in total investment; with Xcel Energy's assigned projects representing about $1.2 billion of the total Upper Midwest investment. The MISO LRTP Tranche 1 projects in Minnesota utilize the existing 345 kV second circuit capabilities where possible, which will increase the overall ability to transfer power across the system while limiting environmental and landowner impacts. We have also submitted additional projects as part of MISO LRTP Tranche 2 portfolio currently in development. As Tranche 2 projects are announced, we will continue to engage in transmission development, and look forward to developing approved projects to enhance the capacity of the grid.

While Xcel Energy regularly participates in MISO to address congestion and expand capacity, we additionally study congestion with our project partners, or on our own.

For instance, Xcel Energy, as part of Grid North Partners[4] conducted a study to identify the root causes of congestion from July 2020 to July 2022. The study identified 94 facilities in and around Minnesota causing congestion in Minnesota. The second circuit on the Brookings County - Lyon County and Helena-Hampton transmission lines, along with five other projects to upgrade facilities were submitted in MISO's MTEP to mitigate some of this congestion. A total of 17 facilities were able to be upgraded at low cost (under $1 million) and another five upgrades we found (under $10 million) to mitigate congestion. Much of the congestion observed is due to high-wind weather patterns with much longer duration than the typical 4-hour batteries available as a non-transmission alternative.

Also, as a result of the study, Xcel Energy initiated an out-of-cycle request to MISO for completing the second 345 kV circuit from Brookings County - Lyon County and Helena-Hampton for the existing CAPX Brookings-TC facility. In addition, though not a Market Efficiency Project per se, Xcel Energy recently initiated two projects, the MN Energy Connection and the King Connection, which are designed to utilize existing transmission access rights and will enable further renewable investment. The MISO interconnection queue has many new interconnection requests seeking to connect to a system that is already congested. Reusing existing transmission rights through the MN Energy Connection and King Connection Projects allows Xcel Energy to interconnect additional MWs through its existing transmission rights, avoiding lengthy delays often related to MISO queue interconnection studies.

In addition to these larger transmission projects, Xcel Energy has been developing multiple market participant-funded transmission projects to address congestion. These projects aim to enhance the reliability, efficiency, and capacity of the electric transmission grid by addressing constraints. For instance, we converted the bifurcated 115 kV line from High Bridge to Rogers Lake to a double circuit 115 kV line to alleviate congestion on the High Bridge Generating Plant. Additionally, we constructed new breaker positions at High Bridge and Rogers Lake to accommodate the second 115 kV circuit to remove the bifurcation ties at both ends of the High Bridge – Rogers Lake 115 kV line while adding breaker positions at both substations.

[4] Grid North Partners include DPC, OTP, MP, MRES, CMMPA, RPU, SMMPA, WPPI, Xcel Energy and GRE.

Xcel Energy performed its own internal analysis to determine small projects designed to address constraints and remove system limiters on congested lines. The projects listed in Table T-3 focus on substation equipment and sag limits in Southwest Minnesota.

Table T-2: Xcel Energy Congestion Projects

Substation	Chisago County (CHI)
Scope	Replace primary and secondary 115 kV bus 1 differential relays for TR05 and TR06
Property Units	(4) Control System
ISD	8/1/2022
Substation	Inver Hills (IVH)
Scope	Replace busbar
Property Units	(1) Conductor
ISD	3/1/2023
Substation	Kohlman Lake (KOL)
Scope	Replace meter on breaker 5P106
Property Units	(1) Control System
ISD	8/1/2022
Substation	Prairie (PRA)
Scope	Replace meter on breaker 5G8
Property Units	(1) Control System
ISD	8/1/2022
Substation	Scott County (SCO)
Scope	Replace busbar
Property Units	(1) Conductor
ISD	3/1/2023
Substation	Wilmarth (WLM)
Scope	Replace bushing current transformers on breaker 5S11, and switches 8S26B1, 8S25B, 8S25A, 8S26B1
Property Units	(1) Circuit Breaker (BCT) (4) Switches
ISD	3/1/2023
Substation	Riverside (RIV)
Scope	Replace switches 5M330B, 5M331B, 5M329A, 5M330A, 5M329B, 5M331A, aux current transformers on 5M304 and 5M305, and two sections of busbar

Property Units	(6) Switches (2) Device, Potential (2) Conductor
ISD	3/1/2023
Substation	Red Rock (RRK)
Scope	Replace bushing current transformers on breaker K2, switches K2B1, 946B, K2B2, 946A, and meters on 946 and K2
Property Units	(1) Circuit Breaker (BCT) (4) Switches (2) Control Systems
ISD	3/1/2023

We are working with the Grid North Partners' Tech Team to further identify simple system upgrades (≤ $1M cost) to improve transmission line ratings.

Xcel Energy has been monitoring congestion and curtailment on a weekly basis to find new issues as they arise and determine whether a permanent solution is warranted or if the congestion is related to temporary system conditions. For example, Xcel Energy Transmission Operations takes both system reliability and curtailment and congestion cost impact into consideration when scheduling transmission outages. Also, we started an internal study process to determine any transmission system reconfigurations on the underlying transmission system able to positively impact the bulk transmission system and congestion. We confirmed our first system reconfiguration project in Southwest Minnesota to help alleviate congestion in the area.[5] Finally, we implemented a process to study reconfiguration requests from outside entities. These requests are looked at to determine effectiveness, duration, and impact on the transmission system. Reliability is the primary determinant to whether a reconfiguration request is approved. MISO is working on setting up their process which Xcel Energy will participate in.

Lastly, policy can contribute to congestion. As mentioned, we found that the MISO Generator Interconnection Process had resulted in increased costs to customers through the thresholds in which generators were made responsible for upgrade costs, and how the dispatch of resources in the Interconnection Process study were being implemented. After working with MISO and stakeholders, a 10 percent rather than

[5] This request was reversed after several months due to a policy issue with MISO and SPP. In October MISO and SPP began coordinating their Day Ahead studies to recognize some of each other's flow gates which will help reduce SPP flows on the system. SPP previously did not recognize MISO flow gates and set a dispatch that could negatively impact MISO's dispatch. Xcel Energy Transmission Operations takes both system reliability and curtailment and congestion cost impact into consideration when scheduling transmission outages.

20 percent contribution threshold for generators requesting ERIS was implemented for facilities 230 kV and lower. This represents a step in the right direction and will alleviate some future congestion related impacts going forward, however we will continue monitoring the contribution of ERIS requests on 345 kV facilities to determine the impact. Due to this policy change, new wind coming online in the future will likely contribute less to congestion than previous projects due to triggering more transmission upgrades before the project goes online.

V. NON-TRANSMISSION SOLUTIONS

As stated, the growth in renewable generation may both increase and decrease the need for new transmission. While in cases it can cause new congestion issues, in others places new generation near load centers may help alleviate congestion impacts.

Using regional LMPs as part of generation planning offers a nuanced approach to mitigating congestion impacts. By closely examining the MISO Historical LMP Averages, such as depicted in Figure T-3, planners can identify areas where the cost of electricity delivery is significantly higher due to congestion. These high-cost areas often indicate a mismatch between local generation and demand. Incorporating this LMP data into generation planning allows for strategic placement of new generation assets, particularly near load centers marked by high LMPs. This targeted approach not only optimizes the use of existing transmission infrastructure but also minimizes the need for costly upgrades. Moreover, it provides a financial incentive for developers to invest in regions where their generation capacity can be most effectively utilized. By aligning generation planning with regional LMPs, utilities can make data-driven decisions that contribute to a more efficient, reliable, and cost-effective grid, thereby alleviating both current and future congestion-related impacts.

Finally utilizing DER or increasing energy storage technology on the load-side of a constraint, will also have a similar effect in reducing congestion costs. Investment in energy storage technology such as batteries can help alleviate grid congestion by allowing excess generation to be stored for later use. This can reduce the amount of electricity that needs to be transmitted over congested lines.

VI. CONCLUSION

Transmission congestion is a significant challenge. Addressing congestion is important for ensuring the reliable and affordable delivery of electricity to consumers. By

expanding transmission capacity, improving coordination between transmission system operators, periodically reexamining policies, investing in generation and storage technology, we can do our part to help alleviate grid congestion and ensure reliable delivery of electricity to Xcel Energy customers.

APPENDIX U – INFLATION REDUCTION ACT

I. MAXIMIZING INFLATION REDUCTION ACT (IRA) BENEFITS

The Inflation Reduction Act (IRA) aligns with our vision to reduce carbon emissions from the electricity we generate and deliver to our customers by enabling economic investments in carbon-free resources. The availability of tax credits, the expanded types of clean energy technologies that qualify, and the quicker ability to monetize the tax credits through transferability accelerates our ability to achieve our clean energy and carbon-free goals—with greater certainty.

The IRA provides the opportunity to transfer Production Tax Credits (PTCs) and Investment Tax Credits (ITCs) to unrelated taxpayers for cash. Eligible credits include PTCs and ITCs earned after 2022, including PTCs from projects placed in service before 2022. However, tax credits carried forward from years prior to 2022 are not eligible for transferability. Consideration paid in exchange for transferred tax credits is not includible in gross income and is not deductible by the transferee.

The Company's 2024 IRP leverages significant incentives from the IRA. Below is a summary of the tax credits available for our supply side resources included in our resource plan.

Tax Credits Considered for Supply Side Resources

- **PTC extension (Sec. 13101)** The IRA extends the existing PTC to projects for production of electricity from renewable sources such as wind, biomass, hydropower, and other resources. The IRA also made solar eligible for the PTC. Eligible projects must begin construction before January 1, 2025. However, after 2024, the technology neutral provisions in the IRA (discussed below) take over and continue with essentially the same PTC provisions through at least 2032. The base credit is set to $0.03/kW, adjusted for inflation. The full credit is five times the base credit. In order to qualify for the full credit, the project must meet certain prevailing wage and apprenticeship requirements. The credit is increased by 10 percent if the project meets certain domestic content requirements and by another 10 percent if located in an energy community. Eligible energy communities include (1) brownfield sites, (2) census tracts or adjoining census tracts where coal units were retired after 2009, or (3) a statistical area with above average unemployment and significant coal, oil, or natural gas employment or where coal, oil, or natural gas contributes significantly to local tax revenues.

- **Technology neutral PTC – new §45Y (Sec. 13701)** The IRA adds a new technology-neutral tax credit for production of clean electricity. This credit replaces the existing PTC for electricity generated from renewable sources (extended in Section 13101 through 2024). Eligible facilities are those generating electricity for which the greenhouse gas emissions rate is not greater than zero. To qualify, the facilities must be placed in service after December 31, 2024. The base credit is $0.03/kW adjusted for inflation. The full credit is five times the base credit and is earned if certain prevailing wage and apprenticeship requirements are met. The credit is increased by 10 percent for projects meeting certain domestic content and increased by 10 percent if located in an energy community. Credits phase-out the later of (a) 2032 or (b) when U.S. greenhouse gas emissions from electricity are 25 percent of 2022 emissions or lower. The full credit is given during the first year after the phase out year, with a reduction to a 75 percent credit in second year after the phase out year, and a 50 percent credit in third year after the phase out year. No credit will be given in the fourth year after the phase out year.

- **ITC extension (Sec. 13102)** The IRA extends and modifies the existing ITC for investments in renewable energy projects. With the technology neutral provisions, the ITC is now available for projects that begin construction through at least 2023. ITC eligible projects include fuel cell, solar, geothermal, small wind, energy storage, biogas, microgrid controllers, and combined heat and power properties. For the energy storage ITC, the battery no longer has to be co-located with renewables. Similar to the PTC, in order to qualify for the full 30 percent ITC, the project must meet certain prevailing wage and apprenticeship requirements. The credit is increased by 10-percentage points if the project meets certain domestic content requirements, and it can also be increased by 10-percentage points if it is located in an energy community for a total credit rate of up to 50 percent.

- **Technology neutral ITC – new §48E (Sec. 13702)** The IRA adds a new technology-neutral tax credit for investment in facilities that generate clean electricity. This credit replaces the existing ITC for facilities generating electricity from renewable sources (extended in Section 13202 through 2024). To be eligible to receive the credit, the facility must generate electricity with a greenhouse gas emissions rate that is not greater than zero or be a qualified energy storage technology. The base credit is equal to 6 percent of qualified investment (basis). The full credit is 30 percent, which is five times the base credit. The full credit is earned if the facility meets certain prevailing wage and apprenticeship requirements. The credit is further increased by 10-percentage points for

facilities meeting certain domestic content requirements, and it can also be increased by 10-percentage points if the project is located in an energy community. Total credit rate is 50 percent if both domestic content and energy community requirements are met. Phase-out starts the later of (a) 2032 or (b) when U.S. greenhouse gas emissions from electricity are 25 percent of 2022 emissions or lower.

- **Zero emission nuclear PTC – new §45U (Sec. 13105**) The IRA introduced a new PTC for production of electricity from a qualified nuclear power facility. This credit is effective for production during 2024-2032. The full credit rate is 1.5 cents/kilowatt hour. The credit is reduced as the market price of wholesale electricity increases. The credit starts phasing out as wholesale electricity prices rise above $25 per megawatt-hour and fully phases out at $43.75 per megawatt-hour. In order to qualify for the full credit rate, the facility must satisfy the previously discussed prevailing wage requirements.

- **Clean hydrogen – new §45V (Sec. 13204)** The IRA introduced a new 10-year PTC for clean hydrogen production. Facilities that begin construction after 2022 and before 2033 qualify. The PTC is computed per kg of clean hydrogen produced multiplied by the applicable amount. The applicable amount is 60 cents (base rate) or $3 (full rate) multiplied by the applicable percentage. The applicable percentage depends on the greenhouse gas emissions associated with the production based on the following schedule:
  - 0 percent if lifecycle emissions are over 4 kg of CO2 per kg of clean hydrogen produced
  - 20 percent if lifecycle emissions are 2.5-4 kg of CO2 per kg of clean hydrogen produced
  - 25 percent if lifecycle emissions are 1.5-2.49 kg of CO2 per kg of clean hydrogen produced
  - 33.4 percent if lifecycle emissions are 0.45-1.49 kg of CO2 per kg of clean hydrogen produced
  - 100 percent if lifecycle emissions are less than 0.45 kg of CO2 per kg of clean hydrogen produced

For example, 100kg of clean hydrogen produced at $3 full rate utilizing less than 0.45kg CO2 per clean hydrogen produced will generate $300 in clean hydrogen PTCs. The facility must satisfy the previously discussed prevailing wage/apprenticeship requirements to claim the full credit. Both wind PTC and clean hydrogen PTC can

be claimed with respect to the wind electricity generated. Both the zero-emission nuclear PTC and the clean hydrogen PTC can also be claimed with respect to the nuclear energy electricity generated. However, the clean hydrogen PTC is not allowed if the facility includes carbon capture equipment qualifying for carbon capture credit. Direct pay of this tax credit is available during the first five years of the PTC period. Direct Pay allows the project owner to receive a cash payment from the IRS for the full value of the tax credit in lieu of the tax credit. This PTC is also eligible for tax credit transferability (discussed previously) after the period in which direct pay is available. In addition, electing ITCs in lieu of PTCs is also available.

Tax credits for forecasted DG Solar are not modeled in our plan since they are tariffed. Tax Credits impacting Demand Side Resources are discussed more fully in our recently filed Integrated Distribution Plan filing.

We make every effort to identify and evaluate every opportunity for tax credits, low-interest loans, and other types of federal funding that can reduce the costs of our projects. Our Preferred Plan provides an estimated $700 million in savings between 2024 and 2029, and over $5 billion between 2030 and 2040, for a total of 5.7 billion in estimated savings from the IRA.[1]

We assume the full base credit in our modeling for future generic resource additions. We do not assume bonuses for domestic content or energy community. Most of our acquisitions must follow a competitive bidding process, and therefore, it is more difficult to control location, domestic content, prevailing wage, and various other factors. For our build own transfers and self-build projects, we pass on 100 percent of realized tax credits (net of transaction costs) to our customers. For power purchase agreements, which compete in most of our request for proposals, we do not know the percentage of tax credits passed through in terms of lower rates. However, we assume that the availability of these tax credits allows bidders in our competitive processes to lower their prices from what they would otherwise charge.

[1] Estimated PTC/ITC amount are based on the preferred plan with PVSC dispatch results assuming the NREL 2023 ATB assumed tax credit schedule and qualifying for full tax credits. Actual earned tax credits might differ from these estimates due to curtailment and other conditions.

APPENDIX V – COMMUNITY GOALS

I. INTRODUCTION

An increasing number of Minnesota communities served by the Company have adopted energy, climate, and broader sustainability goals. We are supportive of our communities and aim to help them achieve their energy goals whenever possible. We must balance those community goals in light of our system resource planning process, which charts the course for the size, type, and timing of our system resources and must ensure safe and reliable energy while keeping bills low and complying with applicable laws and regulations, including statewide energy standards.

Our communities' targets vary, but often include goals for increasing the community's share of renewable generation, share of carbon-free generation, energy efficiency goals, and carbon or greenhouse gas reduction goals (usually a percent reduction below a specified baseline year by a specified target year; in some cases, net zero by 2050, with interim milestones). Some communities are also incorporating goals for electric vehicle (EV) adoption or other forms of beneficial electrification and building efficiency into their plans or as elements of broader sustainability or Climate Action Plans. Finally, in addition to a goal to use more renewable energy, some communities have adopted a subsidiary goal that some specified amount of that renewable generation should come from local distributed resources (i.e., small-scale generation connected to the distribution system and sited within jurisdictional boundaries).

Order Point 16 of the Commission's 2019 IRP Order states:[1]

> *"In its next resource plan, Xcel shall account for local clean energy goals, in aggregate, in forecasting and modeling. In particular, the plan should include consideration of local community generation goals for distributed generation."*

In response to this Order Point as well as stakeholder and Commission feedback on our 2021 Integrated Distribution Plan (IDP) and our 2019 IRP, in early 2023, we conducted a survey of the local jurisdictions we serve in Minnesota. Our community relations managers sent the survey via email to 415 cities, townships, and counties in Minnesota. The goal of the survey was to gather complete, detailed information on our communities' goals and specific plans so that we could aggregate and analyze the data in comparison to our forecasts and sensitivities in this Resource Plan. This was necessary not only to attempt to gather a complete picture and holistic representation of our communities' goals, but also because of the widely varying nature of our

[1] ORDER APPROVING PLAN WITH MODIFICATIONS AND ESTABLISHING REQUIREMENTS FOR FUTURE FILINGS, Docket No. E002/RP-19-368, April 15, 2022 (IRP Order).

communities' goals. For example, some community carbon reduction goals use different baseline years. Some goals apply to municipal operations, while others may include residential building energy use. Some communities may have different geographic requirements or carbon accounting approaches. In addition, we understand that some communities may set goals that are intentionally aspirational.

II. SURVEY RESPONSES AND RESULTS

Due to the nature of goal setting in the clean energy landscape, the details and plans vary greatly. For instance, some of our larger cities have very detailed, measurable goals with entire departments devoted to them and complex processes and maps documenting their progress. Other smaller cities have high level vague goals that are no less important to those cities but have fewer resources devoted to them, and therefore have much fewer measurable details and less information to support them. Accordingly, it is hard to summarize such widely varying information from our communities, especially if measurable goals are absent. Due to the wide variation in details, the high-level nature of many plans, and the lack of specific implementation plans and measurable goals, we were not able to confidently aggregate the data and utilize it directly for resource plan modeling purposes, which creates challenges when it comes to system modeling. However, at a high level, below is what we learned from the survey respondents:

Table V-1: Summary of Survey Responses

Survey Responses	Number of Respondents
Invitations Sent	415
Responses	120
Respondents with Goal or Plan[2]	38
Respondents without a Goal or Plan	82
Anonymous respondents with a Goal or Plan	11[3]

Table V-2: Community Goals Summary

Goal Category	Number of Communities	Highest Goal (% by Year)
Distributed Generation	12	30% by 2030
Renewable Energy	18	100% by 2040
Electric Vehicle Adoption	15	100% by 2038
Building Electrification	5	100% by 2038
Carbon Reduction	17	100% by 2028

[2] *Response to Survey Question: "Does your city have a plan that includes at least one of the following: distributed generation, renewable energy, electric vehicle adoption, building electrification (i.e., converting natural gas heating and/or appliances to electric), or carbon reduction from electricity?"*

[3] These 11 respondents that did not identify their community are encompassed in the 38 who had a goal or plan.

In some cases, we were able to supplement the information provided by the survey respondent by reviewing the community's plan document(s) or website. However, due to the limited number of communities that had specific implementation plans and measurable goals, the data we received was not sufficient for us to confidently utilize it for resource plan modeling purposes. Despite this, we believe that our decarbonization and clean energy plans at the system level will meet most communities' goals. In the remainder of this Appendix, we discuss the various ways we support our communities and their clean energy goals, before addressing how our Resource Plan aligns with the themes of community goals identified through our survey and supplemental research. Additionally, we note where our voluntary programs can help our customers and communities achieve their individual objectives.

III. SUPPORT FOR OUR COMMUNITIES AND CLEAN ENERGY GOALS

Xcel Energy has a long history of supporting the communities we serve, and we always want to work with our customers and communities in support of their energy goals. Examples of our partnerships and programs in support of community goals include:

- **Community Relations Managers and Account Managers**. Each community we serve has a Community Relations Manager dedicated to building and maintaining positive relationships and collaborations with municipalities and their residents. Community Relations Managers are a community's first call when exploring new or expanded clean energy and sustainability goals.[4] Dedicated Account Managers help customers – including municipalities – explore program and service options, including renewables, energy efficiency, demand response, rate structures, and more.
- **Partners in Energy (PiE)**. Through the PiE program, the Company provides communities in Minnesota and Wisconsin – as well as Colorado – with no-cost services to develop an energy plan and assistance with implementing that plan. Each community has its own unique energy needs and priorities, and PiE tailors its services to complement each community's vision. Support can include workshop facilitation, outreach support, establishing baselines, scenario planning, documentation, education and outreach, tracking and reporting, and more. There are 38 communities in Minnesota and six in Wisconsin that have participated in or are currently participating in the PiE program.[5] After communities have completed the program, free ongoing support is available. This service includes

[4] https://mn.my.xcelenergy.com/s/community/managers.
[5] https://xcelenergycommunities.com/.

regular meetings, outreach support to promote their energy goals, and energy data tracking.

- **Community Energy Reports**. We provide data and analysis for enrolled communities and municipalities to track their energy and sustainability goals.[6]
- **Renewable Energy Programs**. Our voluntary renewable energy programs – including Renewable*Connect, Renewable*Connect Flex, and net energy metering – were designed to help customers and communities reach their clean energy goals faster.
- **Electric Vehicle Programs**. We have existing, and are developing new, electric vehicle programs to enable fleet electrification, public charging, and more. We have partnered with cities on community charging hubs and offer residential charging programs for customers, which can help cities reach their stated EV penetration goals.
- **Certified Renewable Percentage**. Through our Certified Renewable Percentage offering, retail customers can take credit for the renewable energy portion of electricity delivered through our regular energy mix.[7]
- **Customized support for sustainability initiatives**. In addition to working closely with our communities on energy goals, we partner with our communities when they have non-energy-related sustainability initiatives. For example, we are providing tree clippings from our vegetation management work to the City of Minneapolis in support of the City's biochar program.

In addition to leading the clean energy transition for all our customers – we are committed to working closely with our communities to help them achieve their sustainability goals. While our Resource Plan charts the course to provide Minnesota customers with 100 percent carbon-free energy by 2040, our many voluntary programs and supportive partnerships can help communities achieve specific goals.

IV. MEETING COMMUNITIES' GOALS

A. Clean Energy and Carbon Reduction

Our Preferred Plan complies with Minnesota's 100 percent carbon-free energy standard, which requires the Company to generate or procure carbon-free energy

[6] https://www.xcelenergy.com/community_energy_reports.
[7] Certified Renewable Percentage is currently available in Minnesota and Wisconsin. *See* https://my.xcelenergy.com/s/energy-portfolio/power-generation/certified-renewable-percentage.

equal to 100 percent of its Minnesota retail sales by 2040. Our Preferred Plan achieves 92 percent carbon reduction by 2040, from 2005 levels.

Communities' decarbonization goals vary, and some go beyond the electric sector, encompassing economy-wide emissions. Based on the information received in response to the survey, we believe that the carbon reductions in our Preferred Plan would accomplish most communities' goals, for those that indicated measurable, community-wide renewable or clean energy goals and/or an electric sector carbon reduction goal.

B. Renewable Energy

Our Preferred Plan exceeds Minnesota's 55 percent Renewable Energy Standard (RES) by 2030. Of all the plans that we reviewed, only four had measurable community-wide, system renewable energy goals. Based on the information we received about these four communities from survey respondents, we believe that Minnesota's statewide RES – and therefore our Preferred Plan – aligns with three communities' renewable energy goals – the Cities of Falcon Heights, Maplewood, and Minneapolis.

As noted above, through our Certified Renewable Percentage offering, retail customers can count the renewable energy portion of electricity delivered through our regular energy mix toward their energy goals. In Minnesota, the third-party verified Certified Renewable Percentage was 42.6 percent in 2022, and we anticipate it will continue to increase as the amount of renewable energy on our system increases.

Several jurisdictions that responded to the survey have indicated a goal of 100 percent renewable energy community-wide and/or for their municipal operations. No scenario modeled as part of this Resource Plan – including the Preferred Plan, as discussed in Chapter 5 – achieves 100 percent renewable energy within the planning period. For our communities with a goal of 100 percent renewable energy community-wide (and any customer with renewable energy-specific goals), voluntary renewable energy programs – including Renewable*Connect, Renewable*Connect Flex and net energy metering – can enable customers to claim up to 100 percent renewable energy accurately (i.e., the customer retains the Renewable Energy Credits).

C. Distributed Generation

The IRP Reference Case scenario reflects full compliance with Minnesota's new distributed solar energy standard (DSES), which requires the Company to generate or procure energy from distributed solar equal to three percent of its Minnesota retail sales

by 2030; we estimate that complying with the DSES will require approximately 500 MW of new distributed solar by 2030. The Reference Case also assumes that community solar garden (CSG) deployment reaches its statutory limit. Therefore, our Reference Case – and our Preferred Plan – assumes approximately 2,682 MW of incremental distributed solar through the planning period.[8] We also modeled sensitivities that assume higher levels of "natural" DG adoption – i.e., higher adoption absent any additional incentive payments or other direct actions by Xcel Energy. Finally, we modeled DG solar bundles as a selectable resource option, meaning offering EnCompass choices of different amounts of DG Solar installations for the Company actively procure, similarly to how we procure utility-scale solar. As discussed in Chapter 5: Economic Modeling Framework and Appendix J Distributed Energy Resources, DG bundles selected in the special study may possibly present future opportunities to help achieve community goals.

The IRP process identifies the size, type, and timing of our system's resource needs; it does not identify the location of the resources. As noted above, survey respondents provided data surrounding their distributed generation goals. We believe our Preferred Plan aligns with most of those goals, although we caveat again that the IRP process does not identify resource locations.

D. Electrification and Electric Vehicles

Our High Load modeling sensitivity includes the High EV forecast and High Beneficial Electrification (BE) forecast. The High EV forecast reflects an assumption equal to nearly 670,000 EVs on the road by 2030 and 2 million by 2040, reflecting 20 and 56 percent of registered vehicles in Minnesota, respectively.

Regarding electrification, some jurisdictions indicated goals for building decarbonization. Our High load sensitivity assumes beneficial electrification that exceeds the base forecast. Known electrification projects would be reflected in the base forecast scenario. Quantifying the potential impact of electrification targets for direct use in forecasting and modeling (i.e., converting goals to kW or kWh) is challenging. Given that only a small number of communities have indicated electrification goals, we believe that our High beneficial electrification forecast – which is system-wide – would encompass those goals. Under the High load sensitivity, new load from BE would comprise about 3.5 percent of total energy requirements.

[8] This number includes CSGs, rooftop solar, and the DSES.

V. CONCLUSION

We emphasize again that we are supportive of our communities' clean energy and sustainability goals and aim to help them achieve their objectives. We encourage our communities to work with their Community Relations Manager to discuss their objectives and ways we may be able to help.

We serve 415 cities, townships, and counties across Minnesota, and our integrated Upper Midwest system provides electricity to customers and communities across five states. We are committed to responsible system planning and investments that ensure safe, reliable, affordable electricity for all the communities and jurisdictions we serve. While some customers and communities may have different priorities; indeed, most communities responding to our survey indicated that they did *not* have clean energy-related plans or goals, we are always eager to work with our customers and communities to find ways to help them meet their energy goals while minimizing cross-subsidization.

APPENDIX W – RDF PLANTS

I. INTRODUCTION

The Company is committed to supplying safe, reliable, and affordable energy to our customers while advancing our renewable energy objectives. Xcel Energy's Red Wing, Wilmarth, and French Island Waste-to-Energy Generating Plants are a key component of this strategy by providing a reliable source of baseload power that contributes to the Company's ability to provide reliable renewable energy to Minnesota customers. Unlike other forms of renewable energy, waste-to-energy generating plants can operate around the clock, supplying a consistent source of dispatchable power.

As part of this Resource Plan, the Company extended the life and operations of our Red Wing, Mankato, and French Island renewable Refuse Derived Fuel (RDF) plants. As noted in Appendix H: Resource Options, these plants were slated for retirement in 2027. With this Resource Plan, the Company is extending the operating lives of these plants to 2037, 2037, and 2040 respectively. These plants not only add significant value to our system and help us achieve our renewable energy goals with reliable power, but also provide value to the local communities they serve, including providing: (1) diversification of renewable energy sources; (2) landfill avoided costs and greenhouse gas emissions reductions; (3) encouragement of waste reduction and recycling; (4) green jobs and economic growth; and (5) lower comparative costs thanks to negotiated tipping fees. For these reasons, these plants are a valued resource in not only the Company's generating fleet, but to the communities these plants serve.

Here, the Company provides an overview of the specific operational characteristics of the Red Wing, Wilmarth, and French Island Waste-to-Energy Generating Plants followed by an overview of the environmental and economic benefits of using RDF as a fuel source.

II. XCEL ENERGY'S RDF PLANTS PROFILES

A. Red Wing Waste-to-Energy Generating Plant located in Red Wing, MN

Figure W-1: Red Wing Waste-to-Energy Generating Plant

The Red Wing Waste-to-Energy Generating Plant is in Red Wing, Minnesota. The Red Wing Waste-to-Energy Generating Plant is an integral part of the Ramsey and Washington Counties' Solid Waste program, as well as the Solid Waste programs of the local community and Goodhue County. From 1987 to 2022, the plant burned almost 6,700,000 tons of RDF, which is equivalent to an amount of municipal solid waste (MSW) the size of a football field piled 1.2 miles high that would otherwise have to be put in landfills. Annually, the plant produces enough electricity to power 50 percent of homes within the City of Red Wing.

The two RDF units at the plant are a 24/7 operation and have a capacity of 23 MW total. The two boilers combined burn an average of 200,000 - 220,000 tons of RDF per year depending on preventive maintenance and project schedules. The RDF storage capacity at the site is about 1,000 tons in an existing storage barn. Relevant plant statistics include:

Capacity:	23 MW total
Maximum and Optimal Capacity Factors:	*86%*
Capital and Operating Costs:	*Approx. $5M O&M and $ 2M Capital per year*
Lifetime:	*December 31, 2027*
Decommissioning Costs:	*$ 15.5M*

The facility operates with 28 employees. Plant employees regularly conduct tours for various local clubs, schools, professional organizations, county employees, and elected officials. Recently, the plant has partnered with various community businesses and the Red Wing High School to provide internship opportunities for students through Learn and Earn programs.

B. Wilmarth Waste-to-Energy Generating Plant located in Mankato, MN

Figure W-2: Wilmarth Waste-to-Energy Generating Plant

The Wilmarth Waste-to-Energy Generating Plant is in Mankato, Minnesota. The Wilmarth Waste-to-Energy Generating Plant is an integral part of the Ramsey and Washington Counties' Solid Waste program, as well as the solid waste programs of their local communities. RDF suppliers include Ramsey and Washington Counties, Minnesota Waste Processing Company (portions of Blue Earth, Nicollet, Le Sueur,

and Sibley Counties), and Prairieland (a joint venture of Faribault and Martin Counties). The facility incinerates approximately 2,800 pounds per year of pharmaceutical waste for 13 nearby cities and counties, saving thousands of dollars in disposal costs.

The two RDF units at the plant are a 24/7 operation and have a capacity of 20 MW total. From 1987 to 2022, the plant burned approximately 5,900,000 tons of RDF, which is equivalent to the amount of MSW the size of a football field piled 1.06 miles high. The two boilers combined burn an average of 170,000 – 190,000 tons of RDF per year depending on preventive maintenance and project schedules. The RDF storage capacity at the site is about 1,000 tons in an existing storage barn. Relevant plant statistics include:

Capacity:	20 MW total
Maximum and Optimal Capacity Factors:	*86%*
Capital and Operating Costs:	*Approx. $5M O&M and $ 2M Capital per year*
Lifetime:	*December 31, 2027*
Decommissioning Costs:	*$ 15.9M*

The facility operates with 27 employees. Plant employees regularly conduct tours for various local clubs, schools, professional organizations, county employees, and elected officials.

C. French Island Waste-to-Energy Generating Plant located in La Crosse, WI

Figure W-3: French Island Waste-to-Energy Generating Plant

The French Island Waste-to-Energy Generating Plant is in La Crosse, Wisconsin. French Island is an integral part of the La Crosse County Solid Waste program. Bottom ash, the coarse, granular, incombustible by-product of RDF combustion that is collected from the bottom of furnaces, is beneficially disposed of in the La Crosse County landfill as daily cover. To date, the plant has disposed of and recovered energy from over 2.6 million tons of wood waste and railroad ties and nearly 1.8 million tons of RDF thereby keeping it out of the La Crosse County landfill. Our partnership has saved about 40 percent of the landfill's airspace annually since 1988. The county and the plant have also partnered on ferrous and non-ferrous recycling. The plant recycles over 1,000 tons of ferrous metal and over 250 tons of non-ferrous metals annually.

Unique to the plant is the French Island Resource Recovery Facility, which allows it to accept MSW directly. French Island's Resource Recovery Facility has the capacity to process about 100,000 tons of MSW each year. Processing of the MSW removes non-combustible materials from the waste, then chops and shreds it into a uniformly sized fluffy product known as RDF that is blown into the boilers and burned with wood waste.

The two generating units at the plant are a 24/7 operation and have a capacity of 18 MW total. The French Island Waste-to-Energy Generating Plant Unit 1 and Unit 2 boilers use RDF, unmodified wood waste, and railroad ties as their primary fuels. The two boilers combined burn an average of 55,000 tons of RDF per year and 55,000 – 65,000 tons of wood waste and railroad ties per year. From 1987 to 2022, the plant burned almost 1.8 million tons of RDF, which is equivalent to an amount of MSW the size of a football field piled 0.32 miles high. Relevant plant metrics include:

Capacity:	18 MW Total
Maximum and Optimal Capacity Factors:	*55%*
Capital and Operating Costs: Approx.	*$5M O&M and $2M Capital*
Lifetime:	*June 30, 2030*
Decommissioning Costs:	*$17.0M*

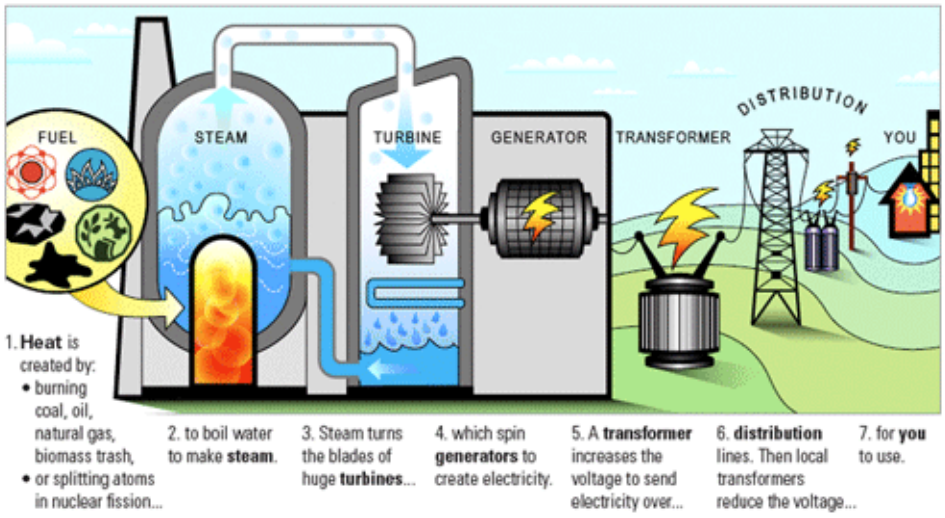
The French Island Waste-to-Energy Generating Facility operates with 31 employees. Recently, plant employees began providing educational outreach about the safe disposal of lithium-ion batteries to help keep them out of the waste stream. Plant employees regularly conduct tours for hundreds of people annually, including local clubs, schools, professional organizations, engineering firms, environmental students, county employees, and elected officials.

Capital improvements for the plants over the next five years will primarily be focused on reliability and environmental compliance. Examples of reliability improvements include boiler section replacements, fuel and ash conveyor rotating assembly replacements, and steam turbine blade replacements. Examples of environmental compliance projects include baghouse bag replacements and continuous emission monitoring analyzer replacements.

III. OPERATIONAL CHARACTERISTICS

The Company's waste-to-energy plants use the same basic principles common to all thermal generators. The process starts with combustion of RDF in a boiler. This combustion releases heat, which is used to boil water. Second, the steam is directed to flow through the blades in the steam turbine. Third, the high-pressure steam spins the turbine blades, converting thermal energy into mechanical energy. The spinning turbine is connected to a shaft in the generator. Fourth, as the turbine spins, the shaft in the generator turns a magnet surrounded by coils of copper wire. This induces the flow of electrons, generating electricity that can then be fed into the grid. This process is outlined in Figure W-4 below.

Figure W-4: Process of Converting RDF into Electricity by Way of Combustion



Though this general process is common to all thermal plants, we discuss the specifics of the plants boiler and combustion systems, emissions controls, and environmental monitoring of the Company's waste-to-energy generating plants below.

A. Boiler and Combustion System

The Red Wing Waste-to-Energy Generating Plant was built in the late 1940's as a coal-fired facility. Unit 1 began commercial operation in October 1949 and Unit 2 began commercial operation in November 1949. The plant was converted from coal to RDF in 1987. Both of Red Wing's units consist of a 40's vintage Foster Wheeler designed refuse derived fuel-fired boiler, which supplies steam to a tandem compound, single flow condensing General Electric steam turbines. The nameplate capacity of each steam turbine is 11.5 MW. The boilers are designed as a natural circulation boiler with a balanced draft furnace and basket style air heater. They can achieve a design rating of 125,000 pounds per hour steam flow at 625 pounds per square inch outlet pressure and 825 degrees Fahrenheit superheater outlet temperature. Cooling water for Unit 1 and Unit 2 is supplied to the condenser from the Mississippi River.

The Wilmarth Waste-to-Energy Generating Plant was built in the late 1940's as a coal-fired facility. Unit 1 began commercial operation in 1948, while Unit 2 began commercial operation in 1951. Wilmarth's two units were converted to burn RDF in 1987. Both units consist of a natural circulation boiler designed by Babcock and Wilcox for 125,000 pounds per hour steam flow at 675 pounds per square inch outlet pressure and 825 degrees Fahrenheit. The boilers also have a balanced draft furnace, and basket

style air preheater. The boilers supply steam to two Allis Chalmers steam turbines. Both steam turbines are tandem compound, single flow condensing units with a nameplate rating of 10 MW. Cooling water for Unit 1 and Unit 2 is supplied to the condenser from the Minnesota River.

The French Island Waste-to-Energy Generating Plant was built in the 1940's as a coal-fired facility. Unit 1 began commercial operation in 1940, while Unit 2 began commercial operation in 1948. Both were converted to burn oil in the early 1970's. When oil became too costly, alternative fuels needed to be used. Unit 2 was converted to burn waste wood and RDF in a balanced draft Fluidized Bed Combustion Boiler in the early 1980's, with Unit 1 following in 1987. There are also two oil-fired combustion turbines on-site to meet peak generation demands that have a combined capacity of 159 MW in the winter.

French Island's Unit 1 consists of a refuse derived fuel-fired fluidized bed boiler designed by Energy Products of Idaho for 150,000 pounds per hour steam flow at 450 pounds per square inch outlet pressure and 750 degrees Fahrenheit superheater outlet temperature. Unit 2 consists of a refuse derived fuel-fired fluidized bed boiler designed by Edgemoor Ironworks for 150,000 pounds per hour steam flow at 450 pounds per square inch outlet pressure and 750 degrees Fahrenheit superheater outlet temperature. Both boilers have a balanced draft furnace and a tubular air preheater. They also supply steam to two Allis Chalmers steam turbines. Both steam turbines are tandem compound, single flow condensing units with a normal capacity of 8 MW. Cooling water for Unit 1 and Unit 2 is supplied to the condenser from the Mississippi River.

The Company's waste-to-energy plants have a comprehensive safety and maintenance program, which includes regular inspections of critical components, ongoing maintenance and repair activities, and a comprehensive training program for operators and maintenance personnel. In addition, the plants have several safety features and systems in place to ensure safe and reliable operation.

B. Emission Controls

The Red Wing, Wilmarth, and French Island Waste-to-Energy Generating Plants have received several periodic updates to ensure that they exceed the compliance requirements of all applicable environmental regulations. The plants utilize one or more of the following emissions control systems:

- Flue gas desulfurization systems, which remove sulfur dioxide from the flue gas using a wet or dry scrubbing process.
- Selective non-catalytic reduction (SNCR) systems, which reduce nitrogen oxide emissions by injecting ammonia or urea into the combustion chamber.
- Baghouse filters, which capture particulate matter (such as ash) from flue gas.
- Activated carbon injection systems, which capture mercury and other hazardous air pollutants in the flue gas.
- Continuous emissions monitoring systems, which measure the levels of various pollutants in the flue gas.

The Red Wing Waste-to-Energy Generating Plant employs a combination duct scrubber and baghouse to effectively reduce emissions from burning RDF. The scrubber treats the flue gas with a water spray and dry lime, while the baghouse traps particulate matter, including mercury, dioxins, and metals, by forcing flue gas streams through large, microfiber filter bags.

The Wilmarth Waste-to-Energy Generating Plant employs a combination scrubber and baghouse to effectively reduce emissions from burning RDF. The scrubber treats the flue gas with a water spray and lime slurry while the baghouse traps particulate matter, including mercury, dioxins, and metals, by forcing flue gas streams through large, microfiber filter bags.

The French Island Waste-to-Energy Generating Plant also uses a duct scrubbing system using dry lime injection to help further decrease emissions of sulfur dioxide and hydrogen chloride. Bag houses efficiently collect particulate matter, including mercury, dioxins, and metals such as lead and cadmium, to minimize their release to the air. A selective non-catalytic reduction system on both boilers helps reduce emissions of nitrogen oxides and an activated carbon injection system helps to further reduce emissions of mercury and dioxins/furans.

C. Environmental Monitoring

The Red Wing, Wilmarth, and French Island Waste-to-Energy Generating Plants have several environmental monitoring programs in place to ensure that they operate in compliance with all applicable environmental regulations. These programs include:

- Water Quality Monitoring, which measures thermal limitations of the water discharged from the facilities.

- Annual Air Performance Monitoring, with stack testing for metals as part of their environmental permits with pollution control.
- Quarterly ash testing.

In addition, we conduct continuous air quality monitoring, which monitors the levels of various pollutants (such as carbon dioxide, nitrogen oxide, sulfur dioxide, and particulate matter) of the flue gas leaving the facilities. We've outlined the results of the most recent testing in Table W-1 below.

Table W-1: 2022 Waste-to-Energy Generation Plant Emissions Profiles

OpCo	Plant	Unit	Year	CO_2 MT/MWh*	CO_2 Lbs./MWh*	NOx Lbs./MWh	SO_2 Lbs./MWh
NSP-M	Red Wing	1&2	2022	0.85	1887	5.27	5.59
NSP-M	Wilmarth	1&2	2022	0.66	1470	5.45	5.69
NSP-W	French Island	1&2	2022	0.54	1196	9.67	1.36

* Biogenic CO_2 emissions are excluded for both the MT/MWh and lbs./MWh.

The Company takes great care to ensure that the RDF incinerated at our facilities does not contain unacceptable waste and is reliable for use in our waste-to-energy power plants. The RDF undergoes rigorous testing to ensure that it meets our fuel specifications, and the plants work closely with waste processors and haulers to ensure that RDF is processed in a way that is safe and sustainable.

IV. BENEFITS OF RDF PLANTS

The Company's waste-to-energy generating plants utilize renewable RDF. RDF is produced from MSW that has been processed and shredded. MSW consists of most waste discarded by society that is no longer needed or recyclable. Our waste-to-energy generating plants process a significant amount of MSW (either as RDF or directly as MSW) that would otherwise be sent to landfills, thereby reducing the amount of waste that needs to be landfilled and the associated environmental risks. When RDF is combusted, there is typically a 90 percent reduction in volume and 75 percent in weight.

Our plants utilize solid waste derived from non-recyclable waste, the use of which supports a circular economy by turning waste to energy, increasing the recycling of steel and nonferrous metals, and reducing greenhouse gas emissions. The Company's waste-

to-energy generating plants are a valuable part of our generation fleet, and can help address challenges of energy security, climate change, and waste management, making them an important part of a sustainable energy system now, and into the future.

A. Diversification of Energy Sources

The Company's waste-to-energy generating plants contribute to diversification by providing a source of renewable energy that is independent of weather conditions. This reliable source of renewable energy is increasingly important as we continue to transition to higher levels of variable renewable penetration to meet Company and state policy objectives. -RDF acts as a complimentary fuel to solar or wind, as these resources are intermittent. Possessing a reliable source of renewable energy will help to address the issue of intermittency, and through fuel diversity enhances the overall stability of the system. Overall, the Company's waste-to-energy generating plants play a key role in diversifying our energy mix to maintain reliability and improve the sustainability of our system.

B. Landfill Avoided Costs and Greenhouse Gas Emissions Reduction

The Company's waste-to-energy generating plants reduce greenhouse gas emissions by diverting waste from landfills and by supplying advanced pollution control technologies thus contributing to the generation of renewable energy and earning renewable energy credits (RECs). As mentioned previously, RDF plants can process a significant amount of MSW that would otherwise be sent to landfills. This results in avoided landfill development cost, and greenhouse gas emission reductions.

Xcel Energy's waste-to-energy generating plants significantly reduce the volume of waste that would otherwise go to landfills. By diverting waste towards energy conversion, this saves airspace at and prolongs the life of the landfill. This reduces the need for new landfills or expansion of existing sites, resulting in costs savings from avoided landfill development. Though the costs of landfill development may vary depending on the costs for land, construction of infrastructure, managing the landfills, and varying soil conditions, using estimates from existing landfills, we estimate our waste-to-energy generating plants have avoided more than $2.6 million per year in total, as shown in Table W-2.

Table W-2: Estimated Avoid Costs by Landfill

Avoid Costs by Landfill	Annualized
LaCrosse County	$ 332,547
Ponderosa (Blue Earth Co.)	$ 162,133
Pine Bend	$ 2,044,597
City of Red Wind	$ 82,733
Prairieland	$ 44,235
Total Avoided Costs	**$ 2,666,244 per year**

Using these numbers, we estimate the Company's Red Wing, Wilmarth, and French Island Waste-to-Energy Generating Plants have provided a combined adjusted total avoided cost of over $91 million over their operating lives. We expect similar annual avoided costs of approximately $ 2.6 million going forward. While the Company does not realize any portion of these savings, they represent significant value to the plant host communities in terms of avoided cost.

Further, our Red Wing, Wilmarth, and French Island Waste-to-Energy Generating Plants reduce greenhouse gas emissions over the landfill alternative. In our resource planning efforts, generally EnCompass evaluates all the costs to our system of (in this case) operating or retiring the plants, including accounting for the plants' own emissions. However, EnCompass does not account for the emissions that would occur from alternate waste disposal if the plants close. Landfills produce methane, a potent greenhouse gas, and other gases, as waste decomposes. By diverting waste from landfills, waste-to-energy generating plants reduce the overall amount of methane released into the atmosphere.

The Company partnered with the State University of New York at Buffalo to conduct an analysis of greenhouse gas emissions from our waste-to-energy generating plants compared to the landfill alternative. A lifecycle comparison of the two scenarios—operating the plants through 2050 versus closing them and disposing of the waste some other way—was conducted in which the resulting CO_2 equivalent emissions were compared with the emissions of methane, converted to CO_2 equivalent terms using global warming potential. We provide the University at Buffalo's study as Appendix W1: University at Buffalo Waste-to-Energy Report.

As explained in Appendix W1, overall, our waste-to-energy plants provide a net greenhouse gas emissions reduction over the landfill alternative. The study estimates that continued operation of Xcel Energy's Red Wing, Wilmarth, and French Island

Waste-to-Energy Generating Plants from 2023 – 2050 would provide a social cost of carbon savings of $16 million versus the alternative of landfilling the waste.[1]

C. Encouragement of Waste Reduction and Recycling

Based on the findings of the study, the following recommendations were made to further reduce the climate impact of the Company's waste-to-energy facilities:

- Recycling efforts, including pre-combustion sorting of MSW streams and post-combustion sorting of ash, should be expanded.
- Establishing and/or expanding partnerships with the intention of securing a waste feedstock with elevated biogenic fraction should be pursued, especially given external composting efforts that remove food waste from MSW.
- Given the low impact of transportation and supplemental fuel on net GHG emissions, emission reduction effort should focus on the waste stream and MSW incineration.
- Identifying steam customers would displace additional emissions from facility footprints.

Our waste-to-energy facilities are part of the solution for addressing waste management. The Red Wing, Wilmarth, and French Island Waste-to-Energy Generating Plants are not only an important contribution to our generating fleet but are instrumental to meeting the Minnesota Pollution Control Agency (MPCA)'s Solid Waste Management Policy Plans.

The MPCA's waste hierarchy prioritizes waste management strategies to minimize environmental impact. At the top of the hierarchy is waste prevention, which aims to reduce waste generation at the source. This is followed by reuse, which encourages the use of products in their original form rather than disposing of them. Recycling comes next, focusing on converting waste materials into new products. Composting is also a part of this tier, turning organic waste into valuable soil amendments. Composting is followed by waste-to-energy conversion, which is preferable to both the landfill with methane collection and straight landfill alternatives.

We have included the waste hierarchy in Figure W-5. This hierarchy serves as a guideline for individuals, businesses, and policymakers to make more sustainable choices in waste management.

[1] Assuming a 28 times global warming potential for methane. If a 35 times global warming potential is assumed for methane, the carbon savings increases to $73 million.

Figure W-5: MPCA Waste Hierarchy

Waste-to-energy conversion is considered preferable to landfilling for several reasons including the noted energy recovery, but also waste diversion and volume reduction, greenhouse gas emissions reduction, supporting better waste management practices, and supplying green jobs and economic growth. While waste-to-energy conversion of RDF itself is not directly involved in recycling, its utilization does contribute to sustainable waste management practices and indirectly supports recycling efforts.

In fact, studies suggest communities with waste-to-energy plants have a recycling rate approximately five percent higher than the national average.[2]

MSW is a nonhomogeneous product that contains noncombustible materials. Some noncombustible material in MSW can be reclaimed and recycled. The processing of RDF typically involves four main steps. First, the MSW is collected and transported to a resource recovery facility where it is unloaded and sorted. Second, MSW is pre-processed to remove non-combustible materials such as metals, glass, and stones. In the stages of processing following the separation of ferrous metals, disc screening and air classification are used to separate combustible materials. At this state of the process, aluminum beverage cans and other aluminum materials are removed by eddy current separation. The remaining waste is then shredded and screened. Third, the shredded waste is further separated into various components, including RDF, which is a high-energy content fuel consisting of combustible materials such as paper, cardboard, plastics, and textiles. Finally, near the end of the process line, a shredder is used to further reduce and size the RDF product. A second magnet at this location is again used to remove additional ferrous metals before the RDF is ready to be burned.

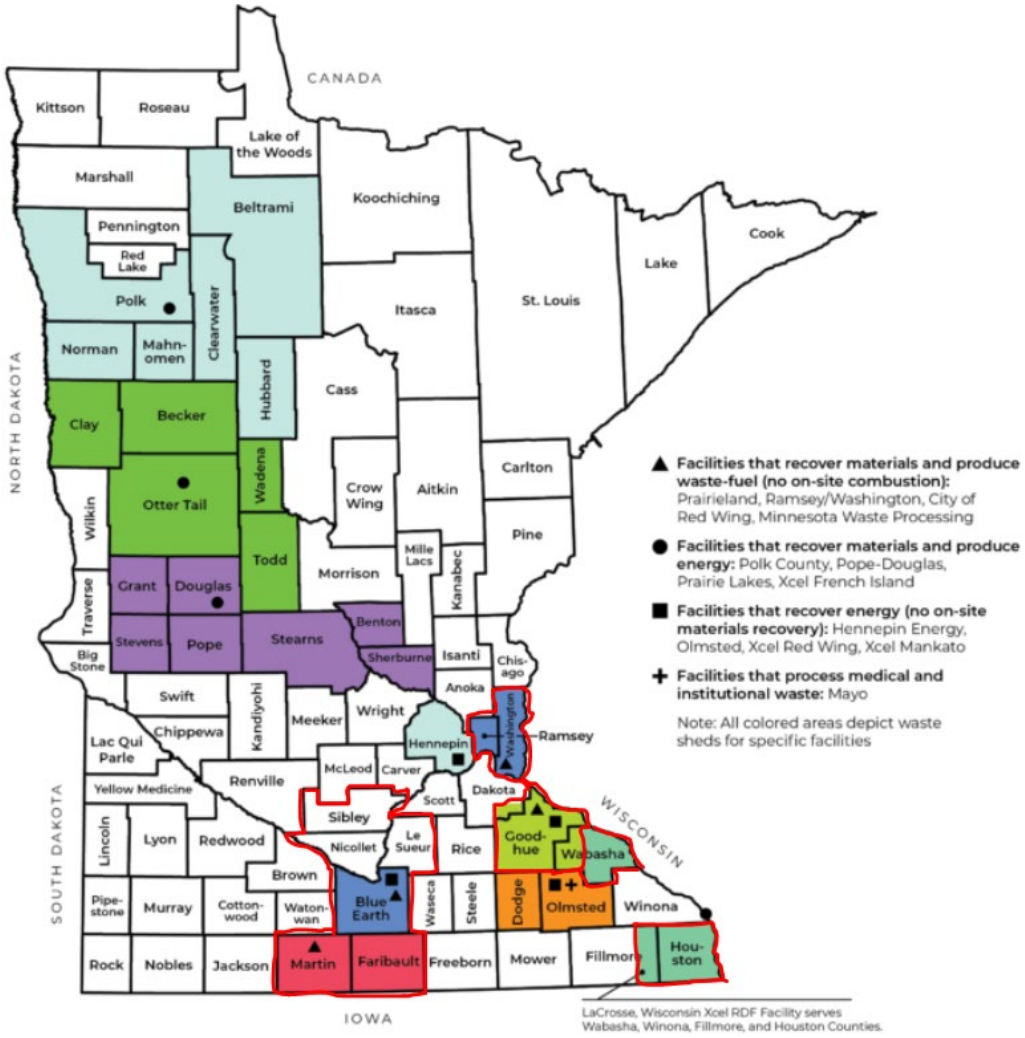
Through multiple points in the MSW to RDF process, and further in RDF processing, ferrous materials are recovered for recycling. This helps catch recyclable materials that were mistakenly discarded. By incorporating RDF as part of the waste management strategy, recycling efforts are complemented by maximizing resource use and minimizing waste disposal, moving waste management up the waste hierarchy.

The Company's waste-to-energy generating plants are an integral component of the MPCA's Metropolitan Solid Waste Management Policy Plan for 2016 – 2036.[3] The MPCA's Metropolitan Solid Waste Management Policy Plan establishes a framework for managing waste in the seven-county metro through setting regional objectives and strategies by setting goals for source reduction, recycling, and organic recovery; using existing resource recovery facility capacity; and minimizing land disposal. While the Metropolitan Solid Waste Management Policy Plan is a 20-year plan, counties and solid waste management districts outside the seven-county metro area must prepare and implement detailed solid waste management plans every 10 years. Figure W-6 below shows Minnesota counties that rely on Minnesota Resource Recovery Facilities within Minnesota. Outlined by a red line are portions of 13 Minnesota counties that are served by the Company's waste-to-energy plants.

[2] Berenyi, E. B. (2009). *Recycling and Waste-to-Energy: Are They Compatible? 2009 Update*. Westport, CT: Governmental Advisory Associates, Inc. https://www.ecomaine.org/wp-content/uploads/2020/06/Berenyi-GAA-2009.pdf

[3] *See* https://www.pca.state.mn.us/sites/default/files/w-sw7-21.pdf.

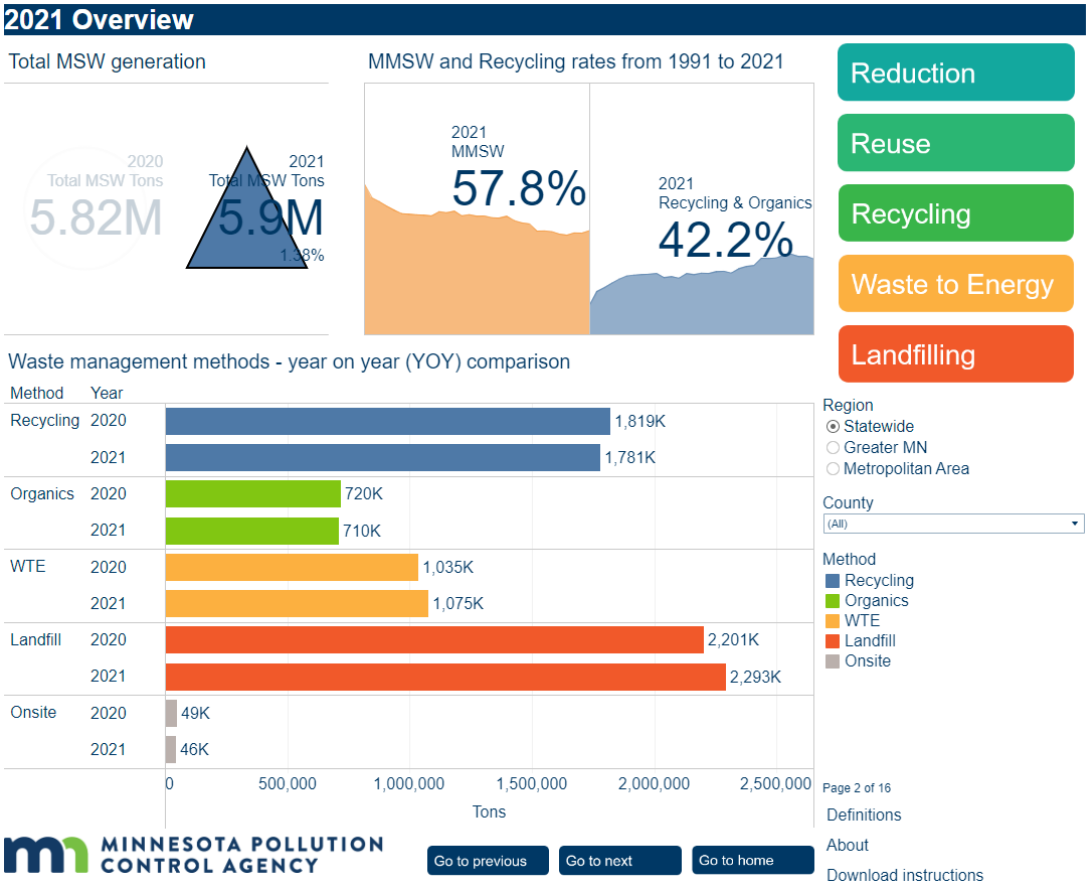
Figure W-6: Minnesota Counties Served by RDF and Waste-to-Energy Generating Plants[4]



The MPCA annually publishes a report summarizing information submitted by all 87 counties and the Western Lake Superior Sanitary District Regarding Select Committee on Recycling and Environment (SCORE) Activities detailing trends in waste generation, management and disposal. Figure W-7 shows the dashboard data from the report. Data from the report helps the MPCA and local units of government develop policy and plans to manage waste in a manner that protects the environment and human health.[5]

[4] Adapted from Minnesota Resource Recovery Association; *see* http://mnresourcerecovery.com/index.php/mrra-facilities/.
[5] *See* https://www.pca.state.mn.us/air-water-land-climate/understanding-solid-waste.

Figure W-7: MPCA 2021 SCORE Report Data for Minnesota Waste Management[6]



According to the SCORE report, in calendar year 2021 in Minnesota, MSW increased year-over-year by 1.4 percent; while the combined recycling and organics rate is 42.2 percent in 2021, which represents a 1.9 percent year-over-year decline from 2020.

In 2021, the Company's waste-to-energy plants converted 6.5 percent (378,461 tons) of Minnesota's total Mixed Municipal Solid Waste (approximately 5.9 million tons) into electricity. Red Wing and Wilmarth Waste-to-Energy Generating Plants together contributed approximately 35 percent of Minnesota's total waste-to-energy conversion. Overall, waste from portions of 13 Minnesota counties is converted to electricity at the Company's waste-to-energy generating plants.

[6] Available at https://public.tableau.com/app/profile/mpca.data.services/viz/2021SCOREReport/2021SCOREreport?:tabs=n.

We are taking steps to further address the recommendations noted in the University at Buffalo's study in a number of ways. For example, we are exploring ways to increase recycling in the waste-to-energy production stream – from evaluating cost sharing of an eddy current investment with our RDF providers to increase their recycling rates for non-ferrous materials, to evaluating using an ash drum magnet to further increase our own ferrous recovery within our plants. We are implementing win-win community service programs, such as free disposal of storm damaged trees to increase the biogenic fraction of our fuel. We are also interested in reducing transportation emissions, and we are in the early stages of evaluating a hydrogen-powered trucking option.

RDF contributes to a circular economy by ensuring that the maximum value is extracted from waste materials. By recovering energy from such waste, RDF helps close the loop by preventing valuable resources from being wasted and contributing to overall sustainability goals. While co-generation or district heating customers would further reduce global warming for the sites because it would decrease methane consumption for building heating, our plants are generally far from large loads. This means the capital investments of such projects are not justified.

D. Green Jobs and Economic Growth

The Company's Red Wing, Wilmarth, and French Island Waste-to-Energy Generating Plants provide several economic benefits to the communities where they are located. The waste-to-energy plants provide stable, well-paying employment opportunities for local workers, helping to stimulate economic growth, and improve quality of life in their community.

Furthermore, the plants supply employment and economic benefits through supporting the local waste streams that supply RDF at our waste-to-energy plants. The Company contracts with various suppliers and municipalities to procure RDF or MSW. RDF suppliers include:

- Recycling and Energy Board made up of Ramsey and Washington Counties.
- Prairieland (a joint venture of Faribault/Martin Counties, which also receives some waste from Truman County).
- The City of Red Wing, Minnesota, (which takes waste from Goodhue County).
- Minnesota Waste Processing Company (a private company that takes waste from portions of Blue Earth, Le Sueur, Sibley, and Nicollet Counties).

Fuel Supply contract negotiations for our next 10-year term have been limited to our largest fuel provider, the Renewable & Energy Center (R&E) representing Washington

and Ramsey Counties. Recently, we executed a letter of intent with the Recycling and Energy Board to negotiate in good faith a new 10-year agreement. The maintenance fees and volumes of fuel per year are part of ongoing negotiations. However, once these are understood, we will be reaching out to our other three fuel providers for similar conversations.

The continued operation of local MSW to RDF processing plants support waste recycling steams which require technical expertise, and supply employment opportunities for local workers. By locally sourcing RDF, we are supporting local jobs and businesses, and supplying a market for waste haulers and processors. This supports local economies and creates jobs in the communities where we operate, furthering economic development and improving the quality of life in the community. In 2021, the Company's waste-to-energy plants supported 200 local jobs. Annually, the sites contribute $2 million of tax revenue and spend approximately $3.5 million on goods and services in the community.

In addition to supplying employment opportunities, the Company's waste-to-energy plants help to enhance the overall environmental quality of their communities through reducing the amount of waste that goes into landfills, thereby helping to reduce greenhouse gas emissions and other potential environmental pollutants. The sites ease community fears of ground water contamination from nearby landfills and have also reduced local landfill footprints by 26 million cubic yards from 1987 to 2020. These environmental benefits further contribute to economic growth and social well-being of the communities that they serve.

E. Lower Comparative Costs

The Company's Red Wing, Wilmarth, and French Island Waste-to-Energy Generating Plants charge maintenance fees to help offset the costs of their operation and cover the costs of any needed plant improvements. The maintenance fee refers to the fee charged to waste management companies for disposing of their waste at the generating plant. In other words, it is the cost associated with maintaining the plants so that the waste providers can continue processing and delivering RDF. The maintenance fee serves as a revenue source for the waste-to-energy plants and helps cover the operational and maintenance costs associated with waste management and energy recovery processes.

The maintenance fee is lower than the tipping fee to dispose of unprocessed MSW into a landfill, so this arrangement is financially advantageous to both parties. The Company receives invoices from RDF suppliers which contain two components. The first is the maintenance fee, which is a credit to the Company that offsets the higher plant maintenance costs resulting from the nature of burning RDF and needed plant

improvements. The second is a fuel charge component, which is paid by the Company to the suppliers for the RDF burned at the plants.

The fuel charge fee is typically based on the weight or volume of waste delivered to the facility. The maintenance fee is dependent on several factors, including the location, size of the plant, local regulations, waste composition, and market conditions. These fees are negotiated through contracts between the Company and the waste management companies servicing the specific waste-to-energy generating plants. In 2021, each plant collected the following maintenance fees:

Red Wing	$ 4,402,799
Wilmarth	$ 3,163,474
French Island	$ 2,750,679

It is worth noting that maintenance fees can vary widely and may be influenced by factors such as transportation costs, labor expenses, needed capital investments, chemical costs, plant specifics, and the overall competitiveness of the waste management industry in proximity to the plant.

We refund to electric customers the maintenance fee revenues we collect at the Red Wing and Wilmarth plants (with the caveat that we forecast the maintenance fees when determining the amount of the credit in our rate cases). The credit/refund gets credited back in base rates.

V. CONCLUSION AND SUMMARY OF KEY POINTS

The use of RDF as a fuel source at the Red Wing, Wilmarth, and French Island Waste-to-Energy Generating Plants provide significant environmental and economic benefits. Extending the operating lives of the Red Wing, Wilmarth, and French Island is in the best interest of our customers, our employees, and the communities we serve. We have detailed a plan for the continued safe, reliable operation of these facilities, and we are committed to ensuring that the facilities continue to operate in compliance with all applicable regulations and in a manner that supports sustainable waste management practices.

Current and Future Life Cycle Greenhouse Gas Emissions Modeling for Xcel Energy Waste-to-Energy Facilities

Spring 2023

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Disclaimer: This is an academic study completed by researchers at the State University of New York's University at Buffalo, in partnership with Xcel Energy, Inc. Findings are those of the independent research team and may or may not align with the positions and views of the company.

Executive Summary:

Researchers from the University at Buffalo (The State University of New York) completed a life cycle assessment study to quantify greenhouse gas emissions associated with Xcel Energy, Inc. waste-to-energy (WTE) facilities at Red Wing, Wilmarth, and French Island. The study is novel and has added industrial relevance because it considers actual input data for each of the three facilities, provided to the research team by Xcel engineers and scientists. Importantly, comparisons are made between emissions associated with the in-use WTE facilities and landfill alternatives that would be most likely to accept the waste if the incineration facilities did not exist. Emissions for both the in-use and alternative scenarios were modeled from 2019 to 2050, considering expected changes in the respective regional waste management sectors as well as increasingly carbon-neutral electricity production portfolios. Finally, the study considered two different global warming potential (GWP) values for methane, 28 and 35, accounting for the gradually increasing warming impact of methane relative to carbon dioxide. Data from the United States Environmental Protection Agency's Waste Reduction Model (WARM) was used to quantify equivalent CO_2 emissions for all scenarios.

2019-2050 Cumulative Emissions Results: Landfill comparisons highlight the climate benefits of WTE, as 5 of the 6 modeled scenarios show reduced (10 – 58%) cumulative GHG emissions from 2019 to 2050 for WTE compared to landfilling. The 6th scenario (Red Wing, methane GWP = 28) shows similar emissions for both options (2% fewer emissions for landfilling). Given the study's reliance on real inputs, the research team believes that this work serves as a strong endorsement of the climate benefits of WTE compared to landfilling alternatives.

2019 Facility-Level Data: The analysis found that, for 2019, a year considered to be representative of typical operation for all three facilities, GHG emissions for the three Xcel facilities are most substantially caused by the waste combustion process. Compared to this, combustion of supplemental and transportation fuels are not substantial emissions sources. While the masses recycled by the three facilities are small (1-4% of the incoming waste streams, by mass, is recycled), the displaced GHG emissions from this pre-combustion sorting are substantial (negative emissions equaling 11-18% of total facility emissions). The opportunity to sort MSW streams before processing is unique to WTE and should be expanded, as reasonably possible. Displaced emissions due to electricity generation account for about 25% of total facility emissions for Red Wing and Wilmarth, and about 50% for French Island owing to that facility's substantial biogenic waste component.

Recommendations: Based on the findings of this study, the following recommendations are made to further reduce the climate impact of Xcel's WTE facilities:

- Recycling efforts, including pre-combustion sorting of MSW streams and post-combustion sorting of ash, should be expanded.
- Establishing and/or expanding partnerships with the intention of securing a waste feedstock with elevated biogenic fraction should be pursued, especially given external composting efforts that remove food waste from MSW.
- Given the low impact of transportation and supplemental fuel on net GHG emissions, emission reduction effort should focus on the waste stream and MSW incineration.
- Identifying steam customers would displace additional emissions from facility footprints.

Introduction:

The United States (US) generates waste at a rate of 4.5 to 5.0 pounds per day per person (lb/day/person) (US EPA, 2023a). About 35% of this municipal solid waste (MSW) is recycled or composted, leaving nearly 3 lb/day/person for disposal in landfills or waste-to-energy (WTE) facilities – totaling about 170 million tons per year in the US (US EPA, 2023a). It is estimated that US residents waste about 1 lb/day of food, only about 5-6% of which is composted (US EPA, 2023a). Organics collection for post-consumer composting requires sorting at the consumer-level, which, while growing in popularity, remains quite limited across the US. In other words, there is a significant amount of curbside and industrial waste that must be managed in a landfill or a WTE facility – other options do not exist for these types of waste without significant changes in existing waste management infrastructure, including sorting technology. It is notable that WTE facilities are better able to support some degree of pre-processing sorting than landfills, with many already having associated infrastructure in place.

While US society is increasingly aware of its elevated consumption and correspondingly high waste generation rates, from 1990 to 2018, per capita US waste generation was mostly stagnant, fluctuating between 4.4 and 4.8 lb/day (US EPA, 2023a). In 2018, based on mass, landfills are more than four times more popular than WTE for MSW in the US, accounting for about 50% of total waste handled, compared to 12% for WTE. As a contrasting example, Taiwan processes a substantial fraction of its waste in WTE facilities (Chen, 2018; Tsai *et al*., 2006; Tsai *et al*., 2020). Among developed countries, the US is unusually dependent upon landfills. The state of Minnesota has a higher reliance on WTE than much of the rest of the US, but it still only processes about 30% of its MSW in WTE facilities.

In the US, landfilling is, relatively, convenient and inexpensive. There are over 2,500 landfills in the US, compared to only 75 WTE facilities (in 25 states) (US EPA, 2023b; US EPA, 2023c). Factors limiting WTE industry growth, according to the US Environmental Protection Agency (EPA), include no need to conserve space (i.e., the US is a large country), WTE's complicated design and operation, and its elevated capital costs relative to alternative waste management options. Additionally, EPA reports general public opposition to WTE, due in part to an outdated, although previously justified, belief associating WTE facilities with harmful air pollution (US EPA, 2023c). From 1990 to 2005, due to EPA's Maximum Available Control Technology standards, national emissions of particulate matter and mercury from MSW facilities, as examples of representative air pollutants, dropped by 96%. Other significant reductions are well-documented for polychlorinated dibenzo-p-dioxins and dibenzofurans (> 99% reduction, nationally). MN air pollution control standards are even more stringent than federal policies. In other words, strict permits have allowed air pollutant emissions to be maintained well-below regulated levels. Moreover, space and cost issues should not be deciding factors in choosing between waste management technologies – an updated approach is required.

Given the increasing need to address global climate change, resulting from across the board rising greenhouse gas (GHG) concentrations (including both methane [CH_4] and carbon dioxide [CO_2]) and an increasing US focus on reducing methane emissions (see: Global Methane Pledge, US Methane Emissions Reduction Action Plan, New York State Climate Scoping Plan, etc.) due to the substantial difference in Global Warming Potential (GWP) between methane (a landfill product) and CO_2 (a WTE/combustion product), this work proposes that climate implications must be used to inform decision making associated with final management options for waste disposal (The White House, 2021; Climate & Clean Air Coalition, 2023; NYS, 2023).

The decomposition process for biogenic waste in landfills (i.e., waste that originates from plants and plant products in which carbon content was fixed by photosynthesis) in anaerobic conditions generates methane, a fuel and a potent greenhouse gas. If captured, this biologically produced methane can be converted into renewable natural gas and used to displace other gas directly or for electricity production, thereby displacing emissions from fossil fuel combustion. If released, however, the methane is 28 (100-yr Global Warming Potential, GWP) or 86 (20-yr GWP) times as problematic as the equal mass of CO_2. Note that while 28 is the currently favored GWP applied for methane in federal documentation, there is an increasing number of legislators, scientists, and scientific bodies reporting the higher, 20-yr GWP because of methane's short lifetime in the atmosphere (approximately 12 years, compared to approximately 100 years for CO_2). In this report, conservative values of 28 and a slightly elevated 35, based on anticipated increases in GWP levels, are applied. Anthropogenic carbon-based products, often associated with materials produced from fossil fuels and including long-lived plastic materials, and metals contribute minimally to excess GHG emissions at landfills but, of course, would be better handled via upstream recycling.

Currently, state-of-the-art MSW landfills capture up to about 65% of generated methane throughout their estimated 100-year lifetimes, meaning that even in a best-case-scenario, much of the produced methane is released to the atmosphere. Lower values have been reported, including 48% average landfill gas collection efficiency in a recent paper analyzing 396 operating US landfills (Themelis and Bourtsalas, 2021). Those landfills that do collect the gas can flare it (i.e., convert the high GWP CH_4 into low GWP CO_2 through combustion), use it as an energy source, or sell it as "green" natural gas. With that said, many landfills have no existing methane collection system associated with their processing, openly releasing CH_4 into the atmosphere. Flaring also

requires supplemental fuel consumption and can generate air pollution, including nitrogen oxides. For landfills without flaring, other air emissions are minimal, but soil and groundwater pollution can be problematic.

Many modeled case studies exist for GHG emissions from both landfills and WTE, considered separately. Often, these are prepared in support of municipality waste management plans. More recently, several studies that quantitatively compare GHGs from the two facility types using models were completed (Aracil *et al*., 2018; Monni, 2012; Woon and Lo, 2013). Results from these analyses consistently disagree, however, and there remains a lack of clarity in the literature about the role ultimate waste disposal options play in reducing GHG emissions. This is due to, at least, variable assumptions regarding waste composition, steam generation, and methane capture rate for landfills and waste composition, steam generation, and transportation distances for WTE. Clarifying the analysis through the use of actual data provided by Xcel is expected to improve accuracy and relevance, providing a better roadmap for others grappling with challenging waste management decisions.

This study, therefore, compares overall GHG emissions from 3 Xcel Energy, Inc. (referred to as "Xcel" from here on) WTE facilities located in Minnesota (MN) and Wisconsin (WI) to the landfills to which the waste would have otherwise been sent. It considers business as usual (using actual 2019 data provided by Xcel) to a scenario in which the WTE facility did not exist and waste was instead disposed of in the landfills near respective waste sources. It also considers temporal variability, forecasting GHG emissions implications to 2050. The goal is to quantify how equivalent CO_2 emissions compare for landfills and WTE, using real inputs. The complete life cycle assessment considers waste source and type, transportation to disposal sites, emissions displaced via electricity generation and methane capture, and residual production/disposal.

Methodology:

Three Xcel WTE facilities were considered throughout this study, described throughout this report as Red Wing, Wilmarth, and French Island. The Red Wing Generating Powerplant is located in Red Wing, MN and is rated at 23 MW of electricity. The Wilmarth Generating Plant is located in Mankato, MN and is rated at 20 MW. The facility was originally constructed as a coal-fired powerplant and was converted to burn MSW in the late 1980s. The French Island Generating Plant is located in La Crosse, WI and was retrofitted to burn refuse-derived fuel (RDF) in 1987. The facility is smaller than the other two plants with a rating of 18 MW and is unique because a significant amount (nearly 50%) of its incoming waste stream is wood, associated with municipal tree waste collection, scrap rail ties, and industrial waste wood sources.

While forecasting into the future was completed as a portion of this study, the initial year of data provided by Xcel was 2019 for all considered facilities. Xcel considered this data set to be representative of a typical operating year, since 2019 is the most recent year wholly unaffected by the impact of the COVID-19 pandemic. Provided data included waste location, waste composition, transportation method, upstream recycling weights and compositions, energy generated, supplemental fuel consumed, and residue produced during the WTE process. Additionally, Xcel made recommendations about the landfill (or compost) alternative sites that would be used if the WTE facilities did not exist. In every case where it was possible, assumptions were made in a conservative (i.e., landfill-friendly) manner for data generation and other model inputs.

GHG Emission Factors: For both landfilling and WTE, as well as displaced emissions associated with recycling, GHG emission factors (positive or negative) were calculated using values and data associated with the EPA's most current Waste Reduction Model (WARM) (US EPA, 2020). While

all calculations were completed using Microsoft Excel software, the original input emission factors were extracted from WARM documentation describing how model inputs were developed (US EPA, 2020). These values were modified by the research team to remove the transportation component, as this value was calculated independently (i.e., using data inputs provided by Xcel).

WARM values were also updated to reflect a methane 100-yr global warming potential (GWP) of 28 or 35, and a lifetime landfill gas collection efficiency of 60%. The value of 28 was selected to reflect recent changes made by US EPA and other national and international climate organizations to more accurately reflect current knowledge of the role of methane as a GHG; 35 represents expected continued growth of this value. As noted earlier, the 20-yr GWP for methane, 86, is *not* considered in this report. This is done partially for consistency with state and federal reporting norms, and partially to maintain conservative (i.e., landfill-friendly) assumptions. An assumed landfill methane recovery rate of 60% is intended to represent an above average (although not state-of-the-art) landfill performance for methane capture, as discussed in the section above.

For GHG emission factors associated with the transportation sector, US EPA AP-42 emission factors were considered (US EPA, 2023d). These are conservative values reported using units of CO_2 per mile per kilogram for specific vehicle types. For GHG emissions associated with supplemental fuel use, 30% efficiency was assumed for natural gas boilers at the WTE plants.

Waste Location and Composition: For all facilities, Xcel provided detailed records describing waste composition (based on past waste audits for all facilities) and locations from which, and methods by which, the waste was collected and transported to the three WTE facilities. To match waste categories considered by US EPA's WARM, waste was categorized as fossil fuel-derived carbon (represented by Mixed Plastics), biogenic carbon (represented by Mixed Organics), wood

(represented by Branches), and residue (either Bulky Waste Residue or Process Residue rejected before incineration).

For the French Island alternative scenario, it was assumed that not all waste would be landfilled if the facility did not exist – a difference from Red Wing and Wilmarth. Specifically, wood waste was assumed to be distributed across incineration (~50%), animal bedding, mulch, and compost (~34%), and landfilling (~16%) to better capture likely alternatives for this material. Rail ties are uniformly burned, so removing the French Island facility would shift that waste source to another incinerator; likely at a much further distance. In the interest of conservative assumptions (i.e., this would increase GHG emissions for the alternative scenario) and because the exact alternative WTE facility could not be identified, this additional transport was not factored into alternative calculations.

To quantify transportation emissions, route distances for waste transportation vehicles were calculated based on data provided by Xcel, including the primary county from which waste was collected. Reasonable distances from waste collection site to WTE facility or landfill were calculated, assuming round-trip transportation. CO_2 emission factors for diesel fuel sources were extracted from EPA's AP-42 reporting and applied based on weight being transported and distances traveled for both landfill and WTE scenarios (US EPA, 2023d).

Upstream recycling was applied to waste streams before processing in the WTE facilities. While methods and extent of recycling vary for each of the three facilities, negative emissions associated with recycling that would have otherwise *not* been applied in landfill scenarios were included in ultimate calculations. Note that this recycling is not the standard, curbside-sorted municipal recycling that most in the US are familiar with. Rather, to the greatest extent possible, Xcel and their fuel providers apply a sorting process to remove recyclables from the curbside *trash*

stream for energy/cost recovery and to protect their WTE systems, making the "no recycling in landfill scenario" assumption reasonable. Recycling data provided by Xcel categorized extracted materials as Ferrous Metal, Non-Ferrous Metal, Bulky Metal, White Goods, Scrap Tires, Electronics, or Mixed Metals, directly corresponding to materials categories included in WARM.

Emissions Forecasting: As noted previously, data provided to the research team by Xcel relates to facility operations in 2019. However, forecasts to 2050 were generated by assuming a few specific scenario changes.

- Consistent with internal Xcel documentation and assumptions, displaced emissions due to generated electricity (for both WTE and landfill scenarios, where relevant) are projected to decline to zero between 2019 and 2050 (a scenario representative of the transition to a carbon-free electricity grid). Xcel provided the projected annual carbon intensities of its electrical generation for the years between 2019 and 2050. Note that this carbon-free scenario is also consistent with new state-level carbon reduction goals coming online throughout the US, including the Scoping Plan for New York State which aims for zero-carbon electricity in 2050 (New York State, 2023).
- A composting facility and eventual anaerobic digester system will come online in MN (Newport Food Scraps Program), removing 30,000 tons of biogenic waste from the Red Wing (~20,000 ton) and Wilmarth (~10,000 ton) facilities (Rischar, 2020). It is assumed that the waste removal will begin shortly (2023) and proceed evenly until reaching maximum amounts in 2028. While the specific impacts of this compost facility addition remain to be determined, assumptions applied in this regard were again determined to be

conservative because removal of organics from the waste stream is expected to substantially decrease modeled GHG emissions of the landfill alternatives.

- Major changes are projected to the operation of the French Island facility. It is assumed that wood waste at French Island will be restricted in the coming years, and that the facility will switch to 24 hours a day, 7 days a week operation in 2030 (from 24/5 today), increasing total handled weight through an increase in MSW being burned.
- Consistent with reported plans, it is assumed that the alternative French Island landfill will cease to generate electricity in the coming years.

Results:

Results and corresponding discussions below are provided on a facility-by-facility basis, with comparisons to modeled landfilling alternatives using 2019 input data. Projections to 2050 are also used to compare the WTE facilities to landfilling. The objective is not to compare the facilities to one another, but rather to compare each facility, individually, to its respective alternative and forecasted scenarios described above.

2019 Waste Composition: Table 1 describes the waste composition and total weights for the three Xcel facilities. The Red Wing facility handles about 50% more weight than Wilmarth and more than 100% more weight than French Island. With that said, waste composition, including recycling rate and bio/fossil ratio, for Red Wing and Wilmarth are similar in spite of the total mass difference. Anecdotally, these two facilities also appear to be comparable to other WTE facilities in the US, especially those processing significant MSW, as opposed to wood or industrial waste.

Table 1. Waste composition and total mass handled for Xcel WTE facilities in 2019

Facility	Total Weight Handled (ton)	Biogenic Waste	Anthropogenic Waste	Recycling	Residue	Wood
Wilmarth	211,371	50%	32%	3%	15%	0%
Red Wing	305,344	47%	32%	4%	18%	0%
French Island	137,188	24%	18%	1%	12%	45%

French Island is quite different from the other facilities because nearly 50% of the waste it processes is wood, consisting of municipal tree scraps, rail ties, and a small fraction of industrial wood waste. Including this in the bio/fossil ratio calculations puts the facility at nearly 70% biogenic waste. Although the GHG implications of wood are quite different from other organic

materials, especially in the landfilling scenario, as discussed in sections below, this value remains impressive. Note that while the sources of wood waste at French Island are variable, it was assumed that "Branches" was the best representation in the WARM model for this waste – all were categorized the same way. Because recycling is not relevant for wood, recycling rates at French Island are notably lower than at the other two facilities. For the same reasons, the residue rate is lower for French Island.

The biogenic fraction of total processed waste is an important metric for WTE facilities, as it represents the fraction of waste and resulting carbon emissions that can be considered biogenic (with GWP = 0). Since the residue value includes both post-combustion and pre-combustion weights, stack testing is used by Xcel to estimate the biogenic fractions, which Xcel reports to be 0.55, 0.55, and 0.74 for Wilmarth, Red Wing, and French Island, respectively.

Lifecycle Emissions for Xcel's WTE Facilities: Figure 1 describes categorized GHG emissions for the 3 Xcel facilities based on 2019 data. Note that, because methane emissions have only minor relevance for the WTE facilities, this is not distributed across the two considered GWP scenarios – only consideration of the 28 scenario is described here to better improve clarity. With that said, these small differences with CH_4 GWP are quantified and described in Table 2, which follows in the section below.

Negative emissions are associated with "Displaced" and "Recycled" categories. "Displaced" refers to avoided emissions associated with the electricity that is produced by the WTE facilities. This research assumed that the produced electricity from the WTE systems, in 2019, would displace electricity that would have otherwise been produced using average efficiency combined cycle natural gas systems. WTE facilities provide dispatchable base load generation,

which if not available, would need to be replaced by generation with similar capabilities (i.e., natural gas generation under the current grid system). This is more conservative than assuming that coal generation or less efficient simple cycle gas combustion turbines would be displaced. In projections to 2050, Xcel's average grid intensities are used instead of any individual electricity generation type, acknowledging a planned transition to zero carbon electricity by 2050 and associated unknowns of technology deployment in later years.

"Recycled" refers to emissions savings associated with recovery and recycling of metals and other materials from the waste stream before incineration. This recycling goes beyond the traditional municipal recycling programs for the areas from which waste is collected for these facilities, recovering recycled content from the streams that are associated with household/industrial MSW (i.e., the "trash" tote instead of the "recycling" tote). The Red Wing facility has a more robust recycling system upstream of its WTE facility, resulting in disproportionately more recycling than at the other facilities. Note that while the masses recycled are fairly small (1-4% of the incoming waste streams), the GHG impacts are significant (negative emissions equaling 11-18% of total facility emissions).

All three Xcel facilities have net positive emissions, aligning (not linearly) with the amount of waste handled. Positive emissions categories include transportation, combustion, residue, and supplemental fuel.

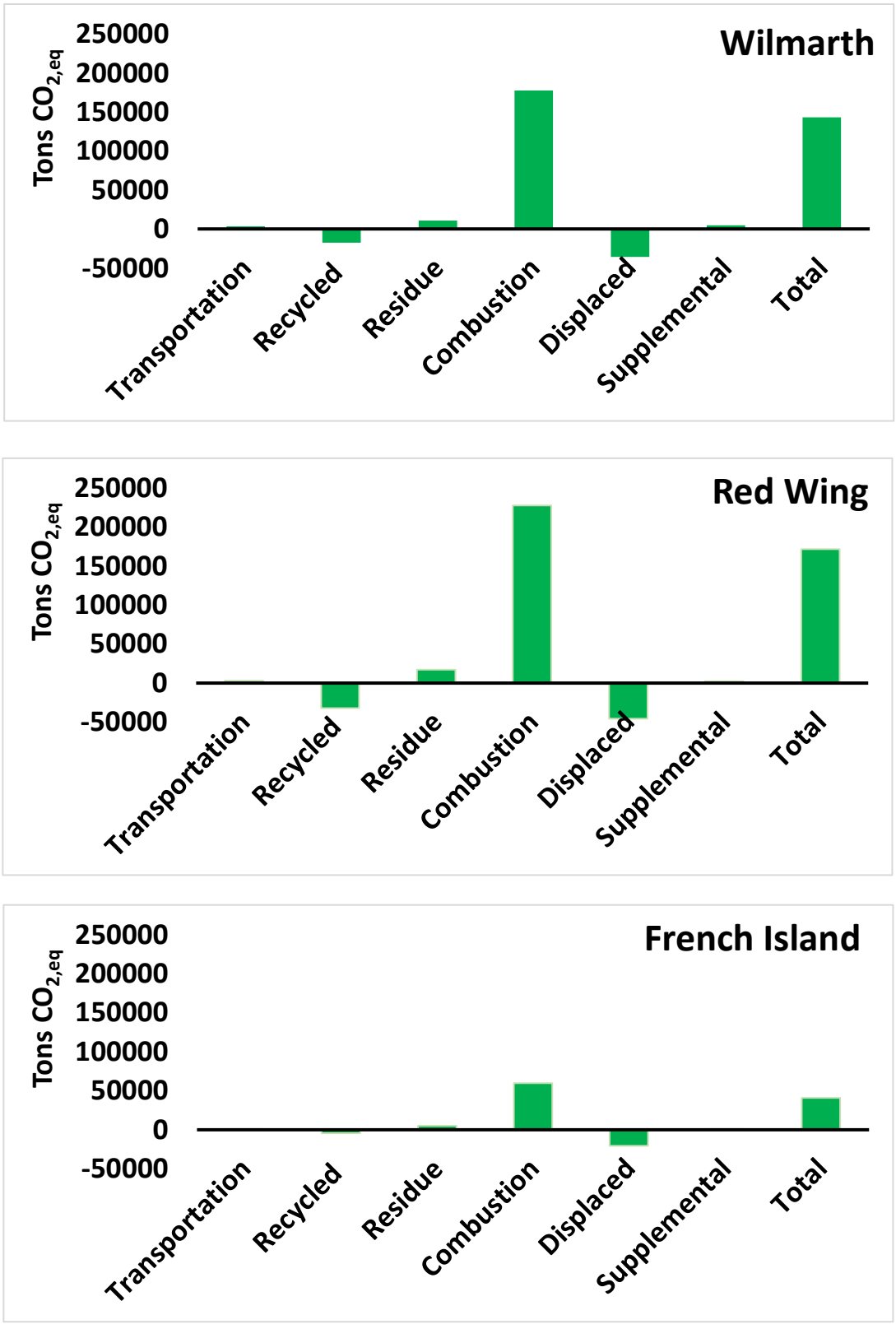

Figure 1. Lifecycle GHG emissions based on 2019 data for Xcel WTE facilities at Wilmarth, Red Wing, and French Island. Total emissions represents the sum of the six considered emissions categories.

Role of Recycling: Recycling has substantial negative impacts on total GHG emissions for all three WTE facilities. Expansion of recycling, should it be economically and logistically feasible, is recommended for two purposes: (1) displacing more emissions via materials recovery, and (2) reducing anthropogenic carbon content in the RDF streams. As noted earlier, WTE facilities are uniquely positioned, relative to other end-of-life management options, to buildout the infrastructure required for recycling. For the three considered Xcel facilities, which all have some of the infrastructure in place already, it is recommended that the company consider expanding upstream sorting capabilities even further. Plastic is particularly problematic at WTE facilities. It burns hot, creating process/engineering control challenges, and it has a high GHG emissions factor (> 3 tons $CO_{2,eq}$/ton) for combustion processes (US EPA, 2020). Plastic is not currently being removed in the recycling streams for the Xcel WTE facilities. As such, it is recommended that Xcel investigate the possibility of working with so-called "Dirty Materials Recovery Facilities (MRFs)" to source waste feedstocks and expand their already-impressive upstream recycling potential. Dirty MRFs apply recycling to residential waste streams, recovering valuable materials for reuse while simultaneously increasing the biogenic fraction of the residual waste. As discussed later in this report, from a climate perspective, this process helps WTE facilities that benefit from high biogenic fractions and hurts landfills that do not benefit from them. The use of these facilities in the recycling sector, while still new, is growing, and partnerships/expansions for Xcel may be justified based on data reported here.

Role of Biogenic Materials: The significant amount of biogenic material at the French Island site reduces its overall emissions relative to mass burned. In most sources, biogenic carbon is considered to have a GWP of zero (or close to zero) when combusted; the WARM model assumes

zero for biogenic CO_2 (US EPA, 2020). The justification is, simply, that the material was produced by photosynthesis, removing CO_2 from the atmosphere, so a combustion process that releases that CO_2 back into the atmosphere on a carbon-for-carbon basis has net zero impact. While the kinetics are a bit more variable (e.g., plants grown seasonally vs. instantaneous combustion), it is widely accepted that burning biogenic carbon has no GHG impact – WARM applies this value (GWP = 0) for mixed organic waste. Wood, while biogenic, is a bit more complicated. Trees are not seasonal plants, instead requiring decades (or in some cases centuries) to fix the carbon that makes up their structures. As such, WARM applies a small positive emissions factor for burning these materials – 0.07 ton $CO_{2,eq}$ / ton waste – which, when compared to anthropogenic carbon (> 3 ton $CO_{2,eq}$ / ton mixed plastics, for example), is quite small (US EPA, 2020). This value is determined on a lifecycle basis, but it is noted that many state/federal policies do not consider a full lifecycle and instead apply a value of zero. Because this work is using WARM inputs and making conservative assumptions, the full lifecycle value is used. The combination of 45% wood waste and 24% non-wood biogenic carbon, results in low emissions per unit mass burned at French Island. It is reiterated here that expanded upstream recycling for RDF inputs at any of the facilities would *increase* biogenic fractions further, lowering GHG emissions per unit mass burned.

Role of Transportation and Supplemental Fuel Emissions: Independent of facility, transportation emissions make up a small fraction of total emissions. This is independent of vehicle type (18-wheel truck, standard waste truck, train, etc.) and distance traveled. These results suggest that climate impacts of the combustion process vastly outweigh transportation concerns and are particularly important because they support that waste collection for incineration processes can be accomplished over a wider swath of land without significantly impacting overall GHGs released.

The argument can be used to support the *expansion* of WTE use for end-of-life materials management, also potentially overcoming dated concerns about capital costs and space requirements for landfills discussed earlier (US EPA, 2023c). Like transportation, supplemental fuel consumption has little overall impact on the three facilities' total emissions.

2019 WTE vs. Landfill Alternative Comparisons: Table 2 describes differences in 2019 GHG emissions totals for the existing WTE scenarios and landfilling alternatives.

Table 2. 2019 total GHG emissions for the three Xcel facilities and two methane GWPs, with comparison to landfill alternative scenarios.

Facility	Methane GWP	2019 Actual Emissions (ton $CO_{2,eq}$)	2019 Alternative Emissions (ton $CO_{2,eq}$)
Wilmarth	28	143,122	202,753
	35	145,520	263,033
Red Wing	28	171,240	235,447
	35	175,376	310,198
French Island	28	40,700	22,594
	35	41,810	25,028

For Red Wing and Wilmarth, the actual emissions from the WTE facilities are notably lower than the landfill-based alternatives in both GWP scenarios. This is attributed to multiple factors: (1) pre-combustion recycling at the WTE facilities (and not at the landfills) displaces emissions, (2) landfill alternatives for these two facilities do not generate power on-site (both utilize flaring), and (3) most importantly, methane emissions from the landfills' handling of biogenic materials are substantial and have a high GWP relative to WTE CO_2 emissions.

The 2019 scenario is different for French Island, where the alternative emissions are lower than the existing WTE emissions. As the composition of MSW-based fuel sources are comparable, the difference must be largely attributed to the substantial content of wood at French Island. As

discussed earlier, wood, a biogenic carbon material, has slightly positive emissions values associated with its combustion. These same emissions will apply in the alternative scenario for the rail ties that are assumed to still be combusted. However, the remainder of the wood is treated as compost, animal bedding/mulch, or landfill in the alternative scenario. Because of significant carbon storage capacity and less methane generation relative to other biogenic carbon materials, WARM attributes *negative* emissions values to all of these end-of-life options – including landfilling – lowering total GHG emissions for the alternative scenarios (US EPA, 2020). From this perspective, while the wood has minimal impact on the total WTE emissions (i.e., emission factor close to zero), it actually penalizes the French Island facility relative to the alternative scenario (i.e., emission factor less than zero). Carbon storage is a challenging parameter to model, and there is disagreement in the literature regarding its significance (Morris, 2016). For example, it is curious that calculations based purely on climate impact suggest it is *favorable* to landfill all wood that is generated. Most are not likely to assume this, but the carbon storage value of this material suggests a landfill is the preferred destination. So, while use of WARM in this study was necessary to provide consistency with GHG inventory methodology, these considerations must be noted and taken into consideration. The French Island alternative landfill currently generates electricity, reducing the impact of methane emissions by adding a displaced emissions component to the calculations (landfill alternatives for Wilmarth and Red Wing only flare methane).

WTE emissions exhibit little to no sensitivity to methane GWP. Apart from a small amount of landfilled residue (much of which has limited carbon content), inputs into the WTE calculations are independent of this value. Landfill alternative emissions, on the other hand, change by up to about 30% with the rising GWP. This is, of course, expected given the primary GHG emissions source associated with landfills is methane generation and release into the environment. At present,

there is a national push to reduce methane emissions. This is largely attributed to methane's shorter lifetime and higher impact in the atmosphere, as discussed in the introduction. Because ambient methane concentrations are low relative to CO_2, its unit impact is magnified. More specifically, band gap saturation continues to reduce the relative impact of a unit mass CO_2 emission into the atmosphere (Archer, 2011). For this reason, the GWP of methane, which is, by definition, a comparison to the relative and decreasing impact of CO_2, continues to grow from 20 in the mid 2000s, to 25 in the mid 2010s, and now 28 in the early 2020s. Growth is expected to continue, justifying use of the GWP = 35 value in this work, so this sensitivity impact is an especially relevant conversation topic for comparing waste management options that do (landfills) or do not (WTE) generate methane.

Emissions Forecasting to 2050: Figures 2 (CH_4 GWP = 28) and 3 (CH_4 GWP = 35) show emissions projections to 2050 for all three facilities (i.e., "In-Use"), modeled landfill-based alternatives, and both GWPs. These calculations assume that methane GWP is fixed (28 or 35) and not changing with time.

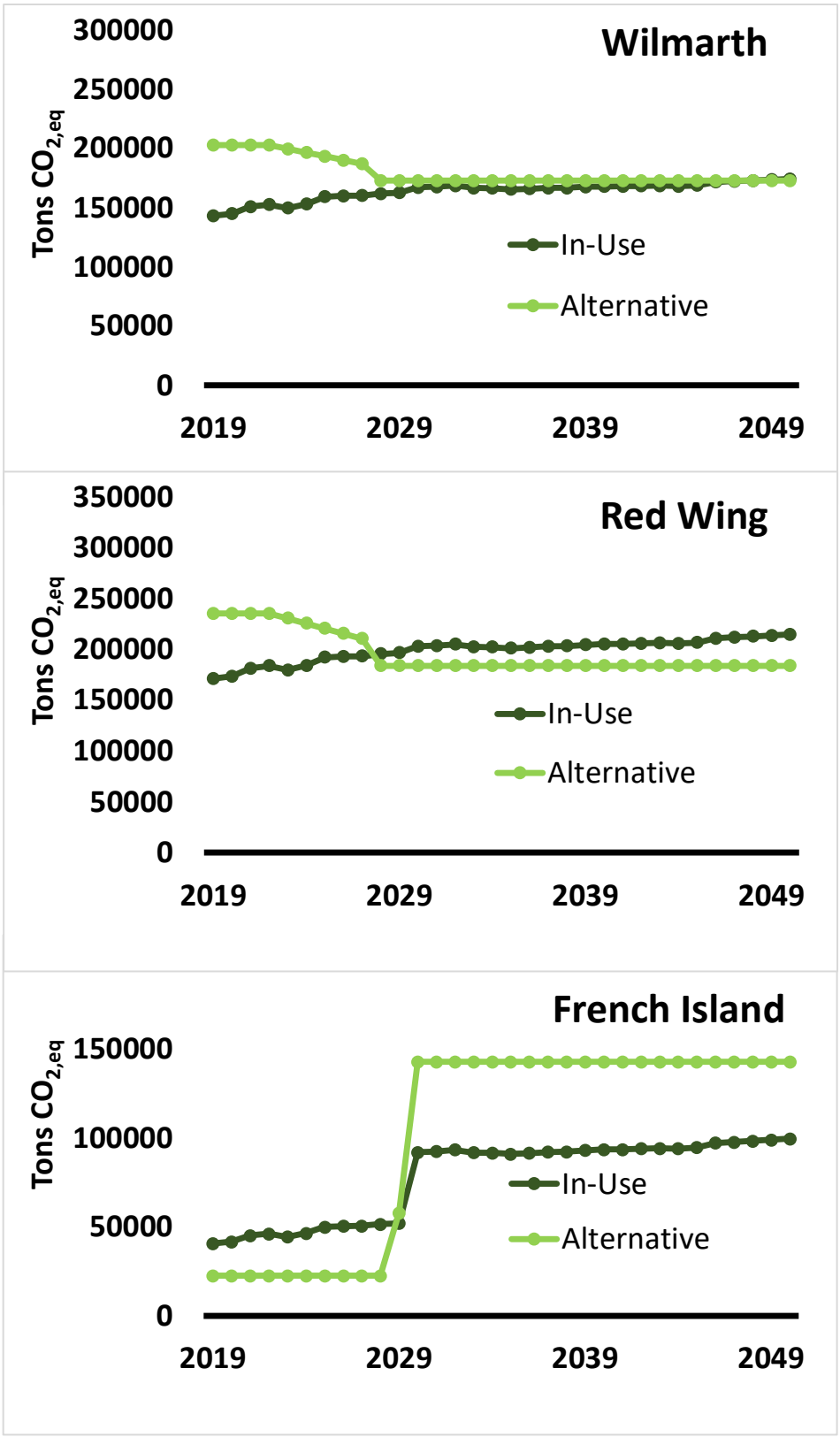

Figure 2. For CH_4 GWP = 28, emissions comparisons for facilities. Note the variable y-axis scale. "In-Use" refers to the existing WTE scenario, while "Alternative" corresponds to landfilling alternatives.

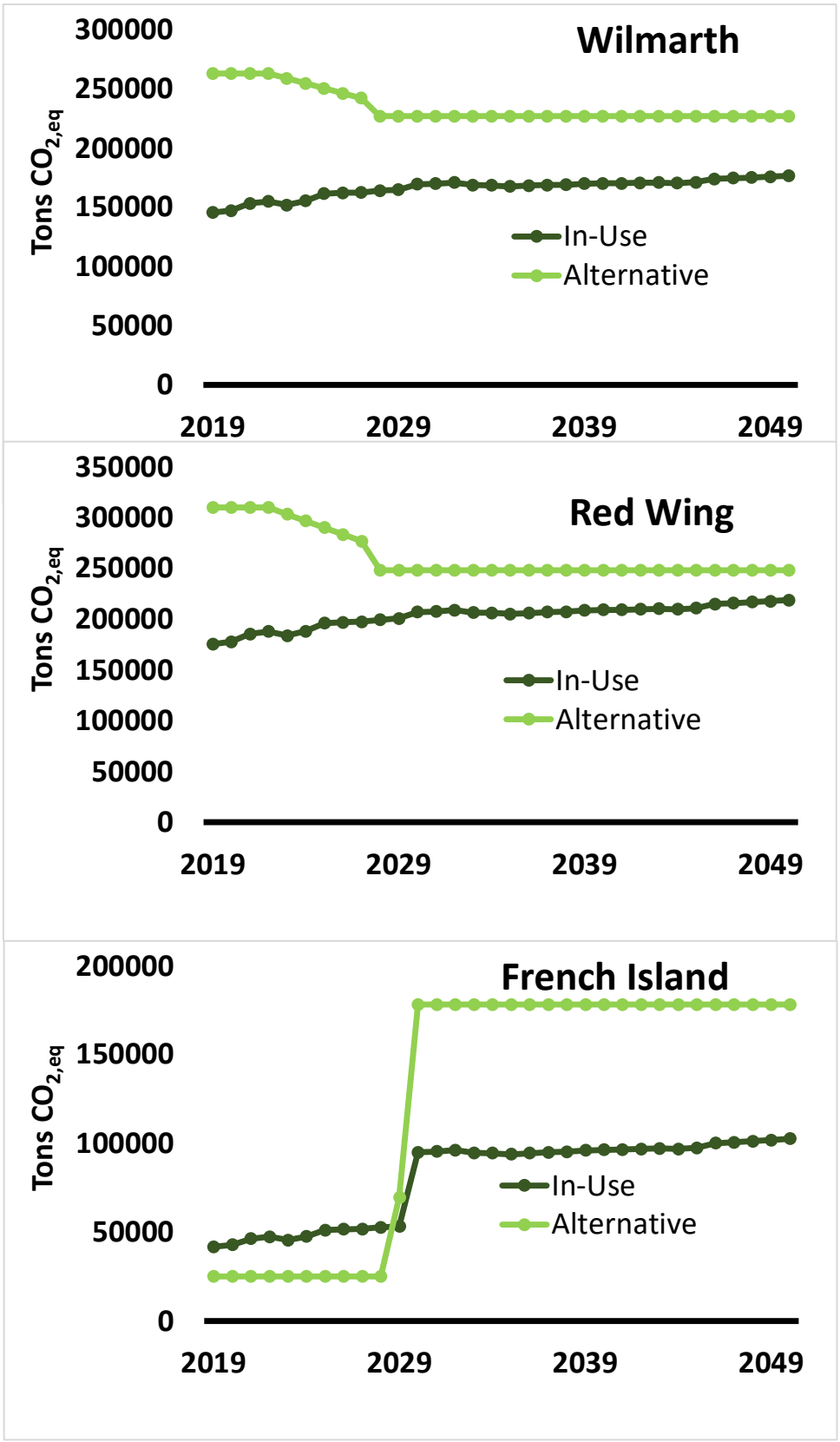

Figure 3. For CH_4 GWP = 35, emissions comparisons for facilities. Note the variable y-axis scale. "In-Use" refers to the existing WTE scenario, while "Alternative" corresponds to landfilling alternatives.

For all facilities, WTE emissions increase gradually with time in the "in-use" scenarios since, as noted, it is conservatively assumed that the value of displaced emissions due to electricity generation will decrease with time due to an increasing fraction of renewables on the overall electricity grid. In other words, WTE facilities are predicted to displace fewer GHG emissions, resulting in increased overall GHG emissions values in coming years. As the Wilmarth and Red Wing landfill alternatives in 2019 do *not* generate electricity, this gradual increase is not observed for those scenarios. The French Island landfill alternative is scheduled to stop generating electricity in the near future, so it too is not substantially impacted by this change.

From 2023-2028, Wilmarth and Red Wing landfill alternatives see substantial drops in GHG emissions. This is due to the removal of 30,000 tons of food scraps, (5,000 tons starting in 2023 and increasing by 5,000 tons for 6 years) which are expected to be composted at a nearby facility (Newport Food Scraps Program). Landfill methane is primarily generated from rapidly decomposing biogenic carbon sources, like food scraps. This reduction, which is less than 10% of the total waste anticipated, has an outsized impact because of the significant GHG effect attributed to organics. Removal of this waste from the WTE facilities, on the other hand, has negligible impact on GHG emissions because (1) transportation impacts are small and (2) food waste is biogenic carbon, which has an emission factor of 0 in the WTE scenarios. In other words, this change does not result in substantial change on total WTE GHG emissions, but it does cause the landfilling alternatives for both facilities to generate less.

Rising emissions in the alternative scenarios for French Island are dramatic. An elbow can be seen in the curve, attributed to two different factors. First, the initial rise is due to a planned transition away from electricity generation at the alternative landfill, removing the displaced emissions component for the alternative scenario to cause an increase in overall emissions. The

second change, which has almost twice as much impact, is from a proposed increase in mass processed (40%) at the facility along with a change in composition (replace wood with RDF). These changes are consistent with possible Xcel plans for this facility. Note that the increase in mass and change in composition will increase overall GHG emissions attributed to the facility, but as the forecasting model shows, it will substantially increase emissions in the alternative landfill-based scenarios. This is because, as Wilmarth and Red Wing data show, GHG emissions are lower for mixed MSW being burned versus landfilled, especially when the non-wood biogenic fraction is substantial. WARM assumes that wood is a means of carbon storage/sequestration in landfills, while the biogenic component of MSW is a primary methane source (US EPA, 2020). This is especially true in the landfilling scenario, where the negative carbon storage value associated with wood is a dramatic shift from the positive numbers linked to other biogenic waste (or, for that matter, the '0' value associated with anthropogenic materials like mixed plastics).

In the forecasting scenarios, total GHG emissions through 2050 were calculated for the different scenarios considered. Overall differences over this period between WTE and landfilling alternatives were calculated and are reported in Table 3. Positive "savings" and GHG reductions imply less total GHG emissions from the WTE process compared to landfilling; a negative reduction indicates that the landfilling generates less total GHG emissions than WTE.

Table 3. Total GHG differences (summed emissions from 2019 to 2050) for WTE compared to landfill alternative scenarios.

Facility	Methane GWP	Emissions Savings (ton $CO_{2,eq}$)	GHG Reductions vs. Landfill
Wilmarth	28	512,946	10%
	35	2,211,770	42%
Red Wing	28	-102,067	-2%
	35	1,896,148	29%
French Island	28	788,017	32%
	35	1,492,820	58%

Role of Methane GWP in Forecasting: The influence of methane GWP is significant for landfill emissions modeling. These presumed increases in GWP will have little impact on Xcel's carbon reporting and overall emissions (Table 2) compared to, say, their planned decreases in carbon intensity of electricity generation, but the GWP changes will dramatically shift the conversations around recommended end-of-life materials management. This is most clearly observed for Red Wing, where the 28 GWP scenario for methane indicates that landfilling is slightly more favorable for reducing cumulative emissions through 2050 than WTE, while the 35 GWP scenario shows the opposite. This finding should be interpreted as, when forecasting through 2050, WTE is expected to perform similar to or better than landfilling alternatives, depending on the extent to which methane GWP changes. Given the conservative nature of assumptions used and the general external trends to specifically target methane emissions reductions, these results are believed to be favorable for the WTE industry.

Role of Displaced Emissions in Forecasting: While the displaced emissions from electricity generation are impactful (i.e., in Figure 1), removing their influence does not substantially decrease the climate value of the WTE technology. In this work, the contribution of displaced emissions drops to zero by 2050. Because most of the landfills considered (all of the landfills considered after 2030) do not increase generation of electricity, this change would be expected to disproportionately impact WTE. While this is true, the total savings over the period 2019 to 2050 in all scenarios (but for the 28 GWP Red Wing case) are in favor of WTE in spite of this change. This is a surprising finding, especially given that the alternative landfills in this study are not generating electricity currently (Red Wing and Wilmarth alternatives) or in the near future (French

Island alternative). It is, of course, consistent with Figure 1 in that the released emissions due to combustion dominate the footprint of the WTE facilities.

Role of External Sources in Forecasting: Finally, the relative climate impact of these Xcel facilities is closely linked to decision making that falls outside of their immediate control. The opening of a local compost facility and eventual anaerobic digestor has substantial impact on *both* WTE and landfilling, even if the carbon accounting for Xcel will not change significantly. Again, such rules will not dramatically shift WTE GHG emissions, but widespread changes to the composition of the waste-based fuel source will *dramatically* shift the climate impact of alternatives. The waste management industry is highly dynamic, and upstream decision making associated with the sector as a whole can have downstream, potentially unexpected, consequences. Composting and anaerobic digestion are increasingly popular across the US, but their growing relevance has an immediate impact on *other* end-of-life destinations for waste, namely WTE and landfilling facilities who must now grapple with, potentially, dramatically different feed streams.

Design decisions associated with alternative landfills (e.g., installing/removing electricity generating capacity) can swing scenario modeling, as observed with the French Island alternatives. To this end, technologies like upstream recycling, waste steam displacement for heating (if customers are available), unique waste sourcing/partnerships, and more, which can be more directly controlled by Xcel and provide substantial emissions reductions for their own carbon accounting, have increased importance. Efforts to reduce plastics in the waste feedstock would be particularly impactful from a WTE GHG emissions perspective.

Conclusions and Recommendations:

Results from this study highlight the climate benefits of WTE, as 5 of the 6 modeled scenarios show substantially (10 – 58%) reduced cumulative GHG emissions from 2019 to 2050 for WTE compared to landfilling alternatives. The 6th scenario (Red Wing, methane GWP = 28) shows similar emissions for both options (2% fewer emissions for the landfill alternative). This study considered actual waste composition and mass, transportation, electricity, and supplemental fuel inputs, making it less reliant on models than much of the research efforts published in the peer-reviewed literature to date. As such, the research team believes it serves as a strong endorsement of the climate benefits of WTE compared to landfilling alternatives.

Specific recommendations from this work include the following:

- Increased emphasis on pre-combustion sorting for recycling. This is a unique advantage for WTE, and improved recycling is expected to decrease cumulative GHG emissions and, potentially, generate income.
- Increased emphasis on post-combustion sorting for recycling, including added eddy current separation for isolating non-ferrous metals. Similar to pre-combustion sorting, this is expected to decrease GHG footprints, decrease masses being sent to landfills, and, potentially, be a revenue stream.
- Xcel should explore opportunities to exert more control over their MSW streams. This is highlighted by the modeled benefits of reduced wood combustion at French Island, in favor of MSW. For Red Wing and Wilmarth, specific partnerships aimed at increasing the biogenic fraction of waste being burned (either through more biogenic content or less

anthropogenic content) are shown in these results to be favorable from a climate perspective.

- GHG reduction efforts should focus on the waste combustion process, as opposed to diesel (transportation) or natural gas (supplemental fuel) combustion processes.
- If the customers exist, the sale of residual steam to neighboring facilities currently generating their own (i.e., through combustion of natural gas) should be investigated as a possible way to further displace GHG emissions.

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Greenhouse Gas Emissions Associated with Xcel Energy Waste-to-Energy Facilities, Compared to Landfilling

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Motivation

- Waste generation (lbs per person, per day) increased 63% since 1960; approximately stable since 2010 [1]
  - Population Growth = Growth in total waste to be managed
- Waste that cannot be composted or recycled **must** be processed in waste-to-energy (WTE) facilities or landfills
  - 75% of non-recycled/composted US waste is landfilled
- Material end-of-life decisions often based on cost and public opinion; Need to consider climate and sustainability
- Climate projections state immediate need to reduce CH_4 emissions, due to short lifetime and high warming potential
  - Landfills release CH_4; WTE releases CO_2

Objectives

- For Xcel WTE facilities, determine Greenhouse Gas (GHG) performance relative to actual landfilling alternatives
- Quantify total CO_2-eqs for each scenario by considering:
  - Transportation Emissions
  - Waste Composition
  - Processing Emissions, including Recycling, Landfill Type
  - Displaced Emissions from Electricity Generation
- Forecast future emissions considering changes in displaced emission impact, composting, and landfill updates

Methodology

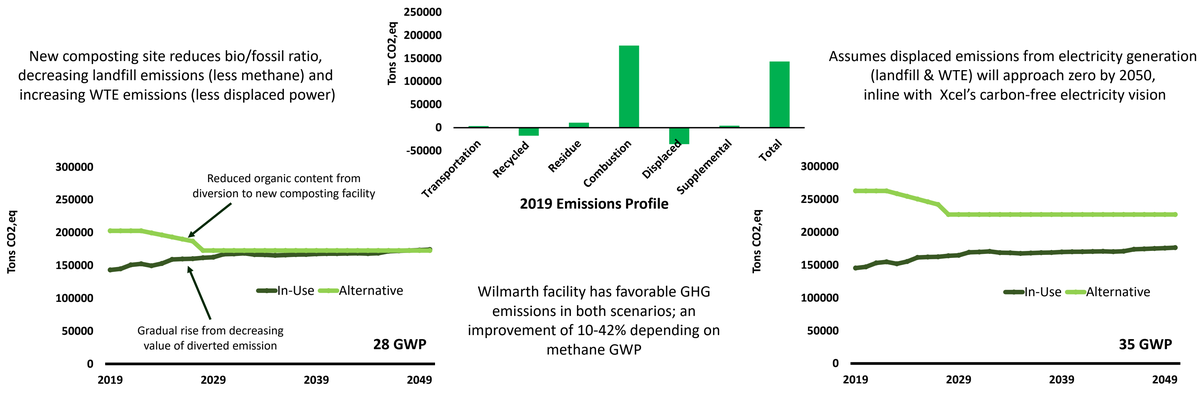
- Modeled waste from actual waste at Xcel Energy's Wilmarth (MN), Red Wing (MN), and French Island (WI) facilities:
  - Biogenic Waste (modeled as *mixed biogenic waste*)
  - Anthropogenic Waste (modeled as *mixed plastics*)
  - Wood (including rail ties and mixed wood waste, modeled as *branches*, only French Island)
  - Recyclables (including *ferrous, non-ferrous, bulky, e-waste, white goods, and tires*)
  - Processing Residue (landfilled)

Facility	Anthropogenic	Biogenic	Wood	Residue	Recycled
Wilmarth	32%	50%	0%	15%	3%
Red Wing	32%	47%	0%	18%	4%
French Island	18%	24%	45%	12%	1%

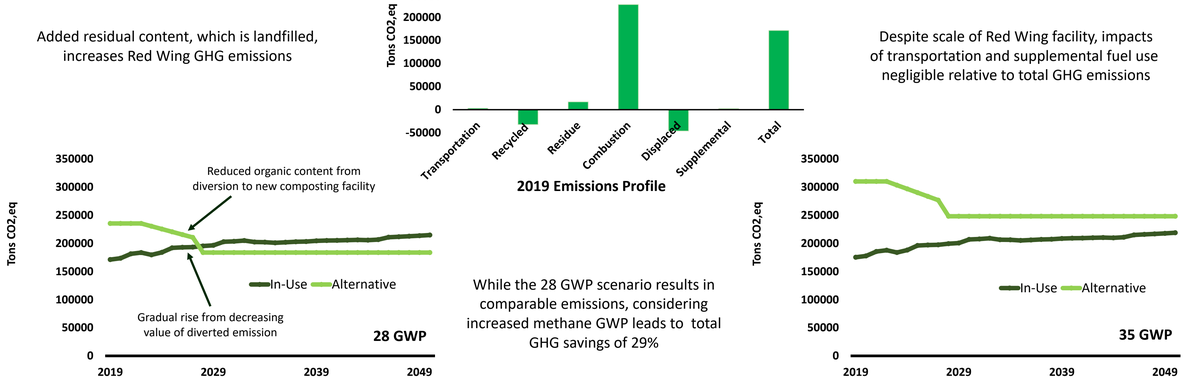
- Emission outputs modeled using emissions factors from USEPA Waste Reduction Model [2]
- Assume lifetime landfill gas capture efficiency = 60%; landfill emissions linked to full life cycle
- Assume displaced emissions initially from less natural gas electricity, at 60% efficiency; phasing out to zero displaced emissions by 2050 from growing renewable electricity
- Assume French Island facility will expand to 24/7 operation and replace wood waste with MSW in 2030
- Consider methane global warming potentials of 28 and 35 [3]

Current Emissions and Future Projections

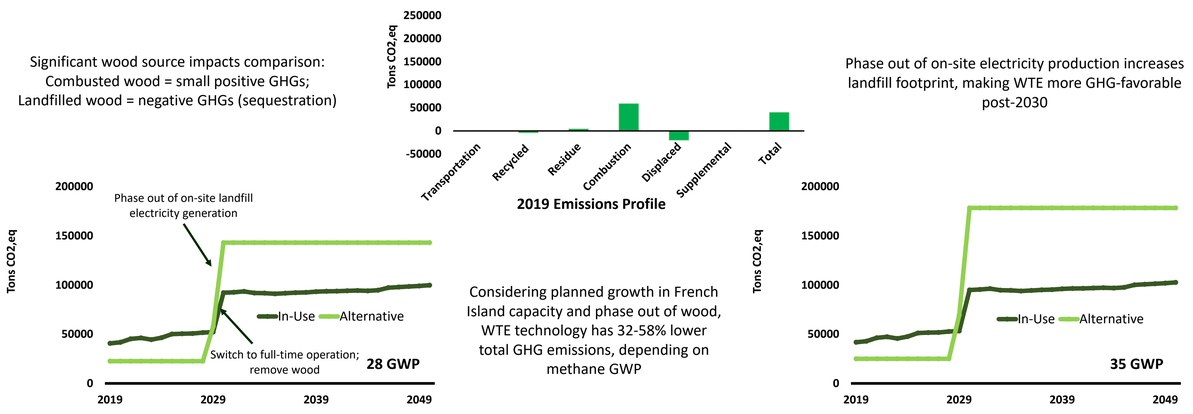
Wilmarth



Red Wing



French Island



Total Emissions Savings by 2050

Facility	Methane GWP	Emissions Savings (ton CO_2 eq)	Global Warming Savings vs Landfill
Wilmarth	28	512,946	+10%
Wilmarth	35	2,211,770	+42%
Red Wing	28	-102,067	-2%
Red Wing	35	1,896,148	+29%
French Island	28	788,017	+32%
French Island	35	1,492,820	+58%

- WTE emissions savings largely attributed to high impact of methane, which is expected to grow with time
- Even with **conservative** and **defensible** assumptions, WTE emissions generally lower that landfill

Conclusions

- Transportation emissions represent a small (<3%) contribution to total emissions, for all scenarios
- Opportunity to sort recycling before WTE handling lowers total emissions (11-18%) for WTE option
- Wood waste challenging, owing to boundary conditions and differences in emissions from burning, landfilling
- WTE remains favorable even as displaced emissions approach zero (i.e., 2050 assumptions)
- Increasing relevance and impact of CH_4 shown to increase the importance of WTE in waste handling portfolio
- Landfill type has significant impact – on-site electricity generation needed for landfill to be competitive with WTE
- Co-generation or waste heat recovery and expanded recycling programs recommended to reduce carbon footprint of facilities further

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[2] EPA, *Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model*, 2020

[3] IPCC, *6th Assessment Report*, 2022

Acknowledgements

Funding for this research was provided by Xcel Energy, Inc.

All results and methods presented in this poster were developed exclusively by the listed authors, with supplemental data and information used in calculations and assumptions originating from collaborators at Xcel's MN and WI facilities and Corporate Offices.

APPENDIX X – ADVANCED TECHNOLOGIES

I. INTRODUCTION

On June 14, 2022, in compliance with Order Point 11,[1] the Company submitted our COMPLIANCE FILING: ADVANCED TECHNOLOGY in Docket No. E002/RP-19-368, which discussed the Company's dedication to our role in advancing emerging technology as part of our 2050 vision, and to realizing benefits of advanced technologies for our customers. This appendix expands upon and provides updates about many of the topics addressed in that compliance filing, and addresses part of Order Point 12:

> *Xcel shall include in its next resource plan a deeper analysis of (1) storage options, including options combining solar generation and battery storage, and (2) the role of hydrogen and clean fuel alternatives in Xcel's resource mix.*

The balance of Order Point 12 – a discussion of supply-chain and life-cycle carbon impacts of the generation and storage resources – can be found in Appendix Y: Life Cycle Emissions Impacts.

Xcel Energy has a Company-wide vision to provide our customers in all the states we operate in with 100 percent carbon-free electricity by 2050. This vision directly aligns with the State of Minnesota's policy goals and statutes, including the state's latest standard requiring utilities to achieve 100 percent carbon-free energy by 2040. Our Preferred Plan achieves compliance with Minnesota's carbon-free energy standard and sets us on the path to realizing our 2050 carbon-free vision.

The Company recognizes that advanced and evolving technologies will play a critical role in helping us eliminate the remaining carbon emissions from our system while maintaining safe, affordable, and reliable electric service at times when renewable energy output is low. As such, we are dedicated to supporting emerging and advanced technologies that can help us meet our corporate and our states' energy goals while providing benefits to our customers. Such advanced technologies include (1) storage options, including options combining solar generation and battery storage, (2) virtual power plants (VPPs), (3) hydrogen and clean fuel alternatives, and (4) small modular nuclear reactors (SMRs) and other advanced and emerging nuclear technologies. Each

[1] Within 60 days, Xcel shall file a report discussing the work it is doing to support the integration of advanced technologies (including, but not limited to, hydrogen fuel and utility scale energy storage) into its system.

of these advanced and emerging technologies has the potential to play a key role in helping the Company achieve our carbon free goals, and we will continue looking for ways to support the integration of advanced technologies into our system to help accelerate the clean energy transition.

II. PRIORITIZING ADVANCED TECHNOLOGY

While "leading the clean energy transition" has long been one of Xcel Energy's strategic priorities, the nature of that leadership itself continues to evolve as we reduce carbon emissions, retire legacy generation assets, and add more renewable energy to our system. As a company, we are also evolving to meet the new and changing needs of our customers, communities, and stakeholders.

The Company has implemented the Carbon-Free 2050 (CF2050) initiative, which develops the strategy for and deployment of technology solutions for the carbon-free goals in generation. CF2050 leverages capabilities across the Company, including individuals from policy, energy supply, finance, resource planning, regulatory, and innovation. The CF2050 meets regularly to track and identify opportunities in the clean energy transition that are being enabled by policy and emerging technology. For example, recent actions by the federal government for grant funding and tax credits may significantly reduce the cost of hydrogen produced from clean resources. The Company tracks these and other federal initiatives with help from CF2050 and other channels.

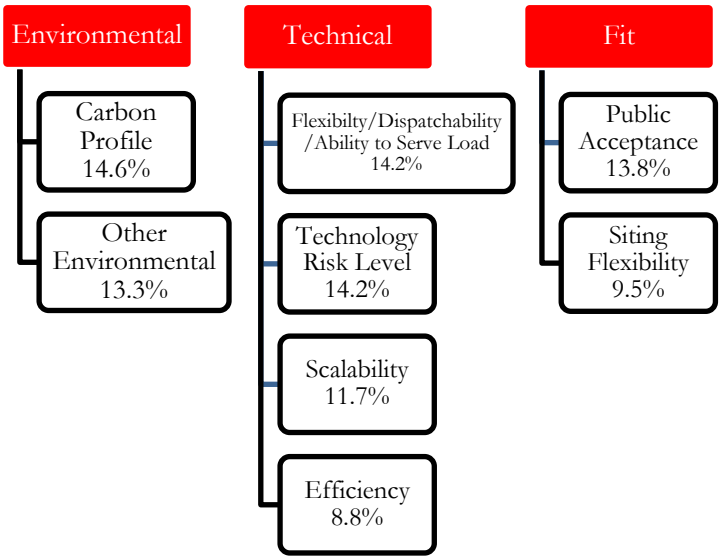
The CF2050 initiative is responsible for tracking, assessing, promoting, and prioritizing emerging technologies that have the potential to help the Company achieve our carbon-free electricity vision.

- Tracking refers to efforts to identify new technologies and developers, hold introductory meetings, and record the information using channels from our investment pipeline, Electric Power Research Institute (EPRI), and networking with accelerators, national labs, and other means.
- The task of assessing technologies is led by a dedicated group within the Company that is also part of the CF2050 initiative. The process determines the viability of a technology, its maturity, projected cost, ability to scale, and in some cases demonstrating the technology on our system. These activities also benefit from information from our investment pipeline, EPRI, research institutions, and collaboration with industry associations.

- Promoting technologies that may help achieve our net-zero energy provider goals includes sponsoring EPRI research initiatives, applying for grant funding that can further our goals, and investing in venture capital funds that serve the utility industry (e.g., Energy Impact Partners).

Prioritizing technology is a semiquantitative process that emerges from a technology assessment designed to rank technologies, identify policy mechanisms for support, and determine strategies that account for customers, carbon goals, and our investors. We rank technologies by having subject matter experts (policy, finance, and technology) score technologies on the criteria of "environmental", "technical", and "fit" (see Figure X-1). The rankings are then used to determine the next steps based on policy support and strategy.

Figure X-1: Emerging Technology Prioritization Criteria



The Company is constantly evaluating advanced and emerging technologies for attractive and potentially viable options. Through our evaluations of myriad technologies, the Company has identified three categories that will likely be key in helping achieve our carbon-free electricity vision. These categories are detailed in Table X-1 below.

Table X-1: CF2050 Emerging Technology Categories

Category	Description
Zero-Carbon Generation	• Advanced and emerging renewable generation: geothermal, new solar panel technology, power from waste streams, … • Advanced nuclear: small modular reactors, molten salt/metal reactors, fusion, … • Carbon capture fossil generation: combine cycle gas with carbon capture.
Clean Fuels	• Renewable natural gas from various sources. • Clean hydrogen from water electrolysis powered by renewables or nuclear OR form hydrocarbon reforming with carbon capture. • Other molecules from renewable sources: ammonia, methanol, …
Storage	• Battery: lithium, iron-air, calcium-antimony, … • Thermal: water, solid media (bricks, rocks, sand,…), molten salt, … • Chemical (clean): hydrogen, ammonia, … • Mechanical: pumped hydro, compressed/liquid air, flywheel, …

III. INDUSTRY COLLABORATION AND OPPORTUNITIES

As discussed in our June 2022 filing, in addition to our internal efforts, we work with various coalitions, nonprofits, and research organizations to gain a deeper understanding of the emerging technology landscape and to help move promising technologies toward commercial viability, with the aim of putting these new technologies to work for our customers and communities. Our sponsorship and collaboration with the EPRI is one that has played an important role in helping us keep abreast of technological innovations in the areas of grid modernization, reliability, integrated planning, solar integration, advanced generation, battery storage, and distributed energy resources (DER) interconnection. We participate in several EPRI research programs, including the Low-Carbon Resources Initiative (LCRI) – which is led by EPRI – and GTI Energy.

LCRI is a five-year, focused research and development initiative that is committed to creating the pathways needed to advance low-carbon technologies for large-scale deployment. The goal is to create risk-informed understanding of options and technologies for enabling a clean energy future from 2030 and beyond through global partnerships and demonstrations, applied engineering developments, and technology acceleration of the most promising options.[2] We also sponsor and support

[2] *See* https://www.epri.com/research/sectors/lcri.

Incubatenergy, which is a startup incubator that EPRI organizes and offers emerging technology developers opportunities to engage, demonstrate, and learn with utility industry collaborations.

Further, we are the lead electric utility on the steering committee of the Carbon-Free Technology Initiative (CFTI), a partnership between investor-owned utilities (through the Edison Electric Institute), the Clean Air Task Force, and other nonprofits and industry stakeholders. CFTI seeks to "achieve net-zero emissions in the U.S. electricity sector by promoting policies to ensure the commercial availability of affordable, carbon-free, 24/7 power technologies by the early 2030s."[3] Through CFTI, we recommend policies that would increase federal funding for energy innovation R&D and create dedicated programs and initiatives at the U.S. Department of Energy (DOE) focused on technologies like advanced renewables, long-duration energy storage, advanced geothermal, zero-carbon fuels, advanced nuclear, and carbon capture. CFTI was instrumental in the Bipartisan Infrastructure Law (Infrastructure Investment and Jobs Act or BIL), which – among other things – created the new DOE Office of Clean Energy Demonstrations (OCED).[4]

OCED is tasked with implementing several multibillion-dollar demonstration programs funded through the BIL and, importantly, partnering with the private sector. We support OCED's mission and see a host of opportunities in the programs and projects created by the BIL, which include projects to support long duration energy storage, carbon capture, hydrogen, advanced nuclear reactors, energy storage, grid reliability and resiliency, and more. We will continue to work with DOE, including OCED and other offices, and will evaluate all funding and partnership opportunities as they become available.

In addition, in April of 2023, Breakthrough Energy Catalyst (Catalyst) agreed to commit $20 million in contingent grant funding to support our long duration energy storage pilots with Form Energy, to be split between Minnesota and Colorado. With this grant, Breakthrough Energy will be a valuable partner in technology demonstrations we are developing. Additionally, Catalyst is accepting project proposals for a range of technologies until December 31, 2027. We will continue to evaluate pilots and projects that we may submit to Catalyst's request for proposals (RFP) to drive commercialization of new technologies while improving the economics of demonstration projects and pilots.[5]

[3] *See* https://www.carbonfreetech.org/.
[4] *See* https://www.energy.gov/office-clean-energy-demonstrations.
[5] U.S. Request for Proposals https://www.breakthroughenergy.org/catalyst-us-rfp.

Xcel Energy also uses shareholder resources to invest in strategic venture capital funds that are serving the utility industry. They include Energy Impact Partners, Energize Ventures, Buoyant Ventures, and MSP Equity. These funds provide thought leadership, access to promising new technologies, and the ability for the Company to invest in this ecosystem at a reduced risk position. Energy Impact Partners in particular, is a leader in the field and invests directly in hardware solutions.

We also look forward to working collaboratively with emerging technology companies to evaluate and potentially to develop new pilot projects. As part of our process in vetting and evaluating new technologies and industry collaborations, we work to ensure that any potential technologies we intend to implement exceed our high threshold for operational viability, system benefits, cost effectiveness, customer benefits, and stakeholder acceptance. Further, external funders such as DOE or Breakthrough Energy also require their own rigorous application and due diligence processes before awarding funding. Such due diligence and high standards would be reflected in a subsequent proposal to the Commission.

IV. BATTERY STORAGE

As previously stated, Xcel Energy has a Company-wide vision to provide our customers in all states we operate in with 100 percent carbon-free electricity by 2050. This vision directly aligns with the State of Minnesota's policy goals and statutes, including the state's latest standard requiring utilities to achieve 100 percent carbon-free energy by 2040, and we are on track to achieve the new clean energy standard. We recognize that advanced and evolving technologies, including energy storage, will play a critical role in helping us eliminate the remaining carbon emissions from our system while maintaining safe, affordable, and reliable electric service at times when renewable energy output is low. As such, we are dedicated to supporting emerging technologies that can help us meet the Company's and the state's energy goals while providing benefits to our customers. Battery technologies continue to advance, and the Company is actively monitoring the industry and evaluating new battery technologies, such as the 10 MW/1,000 MWh, long-duration energy storage system pilot project at Sherco, which the Commission approved on August 1, 2023.[6] Long-duration energy storage will be especially crucial in futures with high penetrations of variable renewable energy, and batteries that can store multiple days' worth of electricity are in development with encouraging early-stage results.

[6] Docket No. E002/M-23-119

Applications for grid-scale battery storage are typically categorized by the dispatchable duration, or just duration, the storage asset can provide at its nameplate capacity rating. Thus, a four-hour, 10 MW lithium-ion battery can dispatch 10 MW of electricity for four hours but *could* alternately dispatch 5 MW of electricity for eight hours. The two main categories for storage are short duration – approximately four hours or less – and long duration – anything over eight hours. The concept of long duration storage and its applications are still emerging, which provides some reasoning for the broad range of duration ranging from eight to 100 hours and beyond. Short duration storage serves applications in load management including peaking, frequency modulation, mitigation of renewable curtailment, and uninterrupted power. Long duration energy storage (LDES) is under consideration to be paired with renewable generation to provide reliability, firm capacity, seasonal storage, and mitigation of curtailment. We classify storage by the principal types of energy: battery (electrochemical), thermal, mechanical, and chemical. There are several technologies employed or being developed for grid-scale battery storage applications as described below.

A. Battery Energy Storage System (BESS)

BESSes are rechargeable batteries that can store and distribute energy from different sources (grid, solar power, etc.). They can be used for myriad purposes, such as balancing the electric grid, providing backup power, and improving grid stability. BESSes are the most direct way to store electricity for both short and long duration applications. Lithium-based batteries, the most dominant type, are used in shorter duration applications (0-4 hours) for peak demand response and grid services. Lithium battery manufacturing is the most mature which has made it the primary technology for batteries today. Lithium-based batteries have the highest energy density of all batteries and consequently they are the primary technology for transportation and mobility. This presents a possible bottleneck on the lithium supply chain and has driven some innovation around lithium chemistries and considering repurposing used electric vehicle batteries for grid applications.

Grid batteries, however, can be deployed in a way to reduce the need for the high energy density of lithium batteries which has sprouted a vibrant ecosystem of new battery chemistries and designs like flow batteries. The common themes of these technologies are earth-abundant materials, reducing safety risks relative to lithium batteries, and targeting longer-duration use cases. The iron-air battery is a great example, where technology developers like Form Energy offer a product that can provide 100 hours of dispatch duration. Lead-acid, sodium, calcium-antimony, vanadium, organic, and BESSes are other battery types being pursued by the industry.

B. Thermal Energy Storage (TES)

One of the simplest, lowest-cost, and most versatile solutions for energy storage is to use heat. It is both a mature technology and one that is undergoing substantial innovation. TES solutions can use hot water, molten salt, rocks, bricks, concrete, graphite, and sand as the medium that stores heat. TES requires an energy conversion device that is most often a steam turbine, but photovoltaic and thermoelectric devices are also being employed in newer technologies.

TES can be used in several ways to benefit our customers. For example, coal plants can be converted into heat batteries when the coal boiler is replaced with a TES system. The plant is charged by renewables and can be used to reduce curtailment, congestion, and power generation from "spinning mass". Steam turbines, grid connection infrastructure, and other aspects of the plant can be kept in service, maximizing their economic investment. As a converted heat battery plant needs essentially the same workforce as a coal plant and can provide a similar tax base, it can be an excellent solution to enable a stable, just energy transition. TES can also serve our customers who have steam or industrial process heat contracts with the Company, and are interested in decarbonizing their operations.

TES for heat and power is still an emerging solution and needs time for demonstrations and pilots to prove out the concept and develop best practices. For example, the Company conducted an extensive assessment using molten salt as a solution to "repower" coal plants as thermal batteries. Molten salt was selected because it was considered commercially mature. While molten salt has some commercial deployment, costs of the salt medium and insights from operators of the technology suggested a simpler solution would be more beneficial. Thus, the results of the assessment indicate the Company should continue to pursue TES, but with a different technology. While there is currently no standout technology alternative, small commercial deployments using bricks, rocks, sand, or even water are emerging. The Company will continue to monitor these developments and their potential to add benefit for our customers.

C. The Company's Role in Advancing Battery Technologies

The Company is advancing the prevalence of utility scale battery technologies on our grid through a partnership with Form Energy and through our acquisition processes. We are additionally looking to continue utilizing customer-owned batteries to support the grid, as discussed in Section IV of this appendix.

1. Form Energy

On August 1, 2023, the Commission approved our petition for a long-duration energy storage system pilot project at Sherco, using Form Energy's cutting-edge iron-air battery storage technology.[7] The Pilot – which will be a 10 MW/1,000 MWh, fully integrated modular energy storage system offering 100-hour (multi-day) duration that can deliver grid-scale reliable capacity year-round – is on track to meet the planned in-service date of before the end of 2025. The expected life of Form Energy's energy storage system is 10 years.

This Pilot proposes to gain experience and insights related to the operation of energy storage systems on our grid. Specifically, we hope to better understand the value of energy storage systems with:

- Dispatching during extended renewable droughts;
- Controlling frequency or voltage;
- Mitigating transmission congestion;
- Providing emergency power supplies during outages;
- Reducing curtailment of existing renewable energy generators;
- Reducing peak power costs; and
- Reducing carbon emissions by facilitating the efficient integration of new renewables.

Beyond these Pilot learnings, we hope to help advance a more just energy transition by siting the project in a community directly impacted by the clean energy transition.

Iron-air batteries offer distinct economic and technical benefits when compared to lithium-ion battery technologies. For example, the duration of its output is far greater than is available from lithium-ion batteries, a characteristic that is needed to ensure reliability during extended renewable energy droughts. Additionally, the battery's technology is based on iron—which is extremely prevalent—as opposed to rare-earth elements.

The Company proposed developing the Pilot at the Sherco facility site to further support the Becker community's economic transition, support new solar resources, and qualify for the ITC bonus credit, which will further reduce costs to customers. Under the Inflation Reduction Act (IRA), the Pilot will not only qualify for the standard 30 percent investment tax credit (ITC), but also an additional 10 percent bonus for being

[7] Docket No. E002/M-23-119.

developed at our Sherco facility site, which qualifies as an "energy community." Form Energy's commitment to meeting domestic content requirements may also qualify the Pilot for an additional 10 percent bonus.

To further reduce project costs, we pursued competitive grants from DOE and others. The Company was awarded a grant of up to $70 million in funding from the DOE for Xcel Energy's two long-duration energy storage pilot projects with Form Energy, including the Commission-approved Pilot at the Sherco site. The DOE grant is contingent on negotiation and project logistics; therefore, the specific amount to be directed to the Pilot at Sherco is still yet to be determined. However, we will continue to update the record in Docket No. 23-119 as more details are made available. We are pleased that this grant will help keep bills low for customers as we lead the clean energy transition and deploy innovative new technologies that will provide reliable, low-cost renewable energy to our customers.

2. Firm Dispatchable Resources

On May 14, 2023, the Company issued a Notice Petition in compliance with the Commission's April 15, 2022, Order, regarding the Company's 2020-2034 IRP. The Notice Petition initiated a competitive resource acquisition process seeking proposals for up to 800 MW of Firm Dispatchable Resources in accordance with the IRP order and the Xcel-Bid Contested Case/Track 2 bidding process. As part of the IRP Order, the Commission found that the Company more likely than not needs up to 800 MW of firm dispatchable resources to provide capacity and energy to the Company's system. The firm dispatchable resources will assist the Company in achieving state and Company decarbonization goals. The resources acquired through this process will also provide several attributes, such as availability over extended durations, support for system restoration, and renewable integration in addition to the 800 MW of capacity and energy.

Assessing individual resource attributes has become an increasingly vital component of resource planning as capacity adequacy decouples from energy and other attributes. As we transition to a system with greater shares of variable renewable resources and fewer baseload resources, it is essential that new firm dispatchable resource additions be evaluated with respect to a broader set of attributes required to ensure the grid is stable, reliable, flexible, and has sufficient energy to serve customers in every hour of every day. To ensure sufficient availability, we request that the Commission require that proposals include data on the ability to provide energy adequacy over long duration events.

3. Acquisition Process

To increase the amount of battery storage on our system, the Company has included storage as a parameter in our last two RFPs. The 2022 RFP was unique in its breadth and scope.[8] The first of its kind in NSP, the RFP sought distribution- and transmission-interconnected projects, as well as solar and solar-plus-storage hybrids, and evaluated all projects against the same criteria to solicit the best value projects for our customers. While the response was robust, due to market conditions and through negotiations with counterparties, only two projects – neither of which included storage – were viable and ultimately chosen. However, the Company is committed to including storage in our resource mix and will likely look to include storage in our future RFPs across our jurisdictions.

V. VIRTUAL POWER PLANTS

Our electric grid is becoming more complex and increasingly will need to leverage DER. The use of the term "Virtual Power Plant" (VPP) has become more prominent in the energy industry over the past few years as the number of distributed and connected energy resources has increased. Today, the Company in fact operates its DR programs much like a VPP, and has recently launched its Renewable Battery Connect program in Colorado, which is specifically identified as a VPP.[9] The Company is in the process of developing and deploying a similar program in Minnesota.

A. What is a Virtual Power Plant?

While there is no uniform definition across the industry, the Company shares our interpretation of VPPs here. The Company considers a VPP to be:

> An aggregation of controllable DERs managed at a scale that provides grid services or attributes, including energy and negative energy, ancillary services, and capacity. DERs aggregated to create a VPP could be utility or customer owned, in-front of or behind the meter. DER assets in a VPP could include, but are not limited to, photovoltaic solar, energy storage, electric vehicles, and demand-responsive devices such as water heaters, air conditioning units, thermostats, and appliances. A VPP has benefits, such as the ability to deliver peak load electricity or load-following power generation on short notice.

[8] Docket No. 22-403.
[9] See SolarEdge joins Xcel Energy's virtual power plant incentive program in Colorado, PV Magazine, available at: https://pv-magazine-usa.com/2023/08/24/solaredge-joins-xcel-energys-virtual-power-plant-incentive-program-in-colorado/.

> Such a VPP could replace a conventional power plant while providing higher efficiency and more flexibility, which allows the system to react better to load fluctuations. Resources that are part of a VPP may also be able to provide local grid benefits (to the extent that the resources are in close proximity to a local constraint) such as reducing loading on a distribution feeder.

The "virtual" component of the term indicates that the resources that compose a VPP are not a singular piece of infrastructure, such as a traditional power plant. Instead, the observed and desired outcome of the VPP results from the aggregation of many heterogeneous and geographically diverse resources (typically aggregated through a software control platform). The net performance observed by the aggregation is what we consider to be the impact of the VPP. As noted in the above definition, VPPs can provide different types of products and solve different system needs. Therefore, it is important that design and requirements for VPPs be tailored to specific grid use cases, such as reducing bulk system peak demand or targeting locational constraints.

In the IDP, the Commission defined DER as "*supply and demand side resources that can be used throughout an electric distribution system to meet energy and reliability needs of customers; can be installed on either the customer or utility side of the electric meter.*' *This definition may include, but is not limited to, distributed generation, energy storage, electric vehicles, demand side management, demand response, and energy efficiency.*" The Company can contemplate VPP scenarios that could include all or some of the DER resources the Commission has defined.

DER assets aggregated to create a VPP could be utility or customer-owned, or in-front of or behind the meter. Such assets could include, but are not limited to, photovoltaic solar, energy storage, electric vehicles, and demand-responsive devices, such as water heaters, air conditioning units, thermostats, and appliances. A VPP has benefits, such as delivering peak-load electricity or load-following power generation on short notice. Such a VPP could replace a conventional power plant while possibly providing higher efficiency and more flexibility, allowing the system to react more robustly and quickly to load fluctuations. Resources that are part of a VPP may also be able to provide local grid benefits (to the extent that the resources are located close to a local constraint), such as reducing loading on a distribution feeder.

B. Demand Response Programs

The Company currently operates our demand response programs much like a VPP, as our customer-sited resources are aggregated to react to specific management calls. Examples of existing aggregated resources include Electric Rate Savings, AC Rewards, and Saver's Switch, as well as pay-for-performance programs such as Peak Partner

Rewards. In addition, the Company expects to launch a specific VPP program – as part of our Demand Response portfolio in 2024 – like our Renewable Battery Connect program in our Colorado Service Territory. We provide additional details regarding the pilot below.

C. Distributed Energy Resources Management System (DERMS)

The Company considers the popularity of the VPP term to be associated with emerging applications such as DERMS, which are more sophisticated management systems that provide greater capabilities to enable a broader set of DER aggregation scenarios. They include but are not limited to, combining multiple technology types in an aggregation, establishing platforms and protocols that provide more interoperability and ease of execution, more beneficial groupings of DER, and more flexible settings and scheduling that can be adjusted to reflect changing system conditions.

The purpose of a DERMS is to enhance the integration and utilization of DER to meet the needs of the grid, customers, the market, and regulatory entities. A DERMS would serve to enable the growing interactions between customers and the distribution grid, and our journey to utilize and manage DER will occur over the next decade. A phased implementation approach for DERMS enables the Company to meet policy, regulatory, customer, and business needs. This also balances our investment pacing with the technology launch and performance validation. We are also anticipating FERC Order 2222 to drive new business requirements, new operational dynamics between distribution and transmission, and potential market implications between retail and wholesale markets. We expect DERMS to be a part of the solution to meet FERC Order 2222. The deployment of DERMS is an emerging approach to connect and manage DER on the utility system. As penetration levels of DER increase on our system, there is an increasing need to have more visibility and active management and coordination with DER to maintain a secure, reliable, and resilient distribution system.

Technology vendors provide DERMS software, which help provide underlying logic and or capabilities that allow utilities to manage a group of DERs to better support distribution or bulk system needs. A DERMS would interact with other systems, such as ADMS and devices in the field through two-way communication including, but not limited to, FAN, AMI, and the internet. DERMS can be viewed as a system that can aggregate and group DER in ways that provide more value to the grid and to customers who participate in programs that support the grid, such as APP programs. Potential use cases could involve leveraging energy storage to reduce peak usage or integrating more renewables, or managed charging scenarios for electric vehicles. More sophisticated DER forecasting capabilities may help us evaluate how to integrate higher levels for

DER as adoption increases, particularly for larger DER on the distribution system. Additionally, DERMS would help enable the centralized control and optimal dispatch of flexible interconnections and would aid Operations in the coordination and management of NWAs.

There is a timing balance of whether technology systems are mature enough to meet evolving and growing system needs, but the Company believes the implementation of DERMS is a necessary step to integrate higher levels of DER. Currently, we are examining DERMS capabilities in the market and will explore vendor capabilities in more detail through at least the first half of 2024. The Company is working with Electric Power Research Institute (EPRI) on a research project to gain feedback on the Company's proposed use cases, develop an overall conceptual control and communication system architecture, and determine overall system capabilities and interfaces with our planning and operational systems (such as ADMS). EPRI has been working with utilities to understand DERMS for over a decade, and we are excited to leverage their expertise to develop an overall DERMS roadmap. All this research will help support our technology assessment and the results are also expected to expand industry knowledge on leveraging DER to serve the needs of the grid and the customer. More work also needs to be done to understand some of the new fulfillment requirements for a DERMS system, including understanding start-up requirements, resource and training needs, and ongoing operational teams needed to support DERMS once in operation.

To support the goals for increasing DER and electrification, balancing DERMS deployment and infrastructure investment is critical. For example, the Company anticipates using DERMS and leveraging DER flexibility to extend utilization of existing grid infrastructure. However, the ability to reach long-term goals will also depend on infrastructure investments.

D. Battery Connect

The Residential Battery Connect Demand Response Pilot (marketed to customers as Renewable Battery Connect) ran in Xcel Energy's Colorado service territory between March 2021 and September 2022. The Pilot provided an incentive to customers who agreed to let Xcel Energy control the functionality of their battery storage systems. The primary objectives of the Pilot, which is a VPP program, included understanding battery performance on days with and without intervention from the Pilot, exploring the demand management capabilities of battery storage systems, and gathering feedback from participants about the Pilot.

Participants in the Pilot had solar panels and battery storage systems installed at their residences, which were generally charged in the morning from solar energy. The batteries were discharged during peak usage periods in the afternoon to lessen the demand of energy from the grid. When the batteries were forced to be dispatched, they provided an incremental increase in charging or discharging, even if the batteries were already engaged in those activities. Additionally, discharge events did not necessarily leave our customers without any remaining battery energy. In fact, there were many event days when customers were able to utilize their batteries after the discharge event was complete.

The Pilot was successful in achieving its objectives of obtaining analysis in 1) customer interest and satisfaction, 2) assessment of the battery baseline, and 3) evaluation of battery performance. Customer interest and satisfaction were primarily evaluated using respondent surveys and Pilot stakeholder interviews. Overall, most respondents were satisfied with the enrollment for the Pilot, had a high satisfaction (94 percent) rate with the Pilot overall, and would recommend the program to family and friends. More details about the learnings and takeaways from the Pilot can be found in our forthcoming 2024-26 Colorado DSM Triennial plan.[10]

Because of the Pilot's success, the Company is looking to bring the program to Minnesota through a modification of our Energy Optimization and Conservation 2024-2026 Triennial Plan. The Company intends to pair these rebates with our Solar-Powered Storage Incentive Program (Storage Program) filed with the Department on November 1, 2023.[11] Using the Colorado program as a proxy, the Company estimates that about 10 percent of customers with batteries will participate in the Storage Program. Additionally, the Company has found that a typical customer battery can provide about 1kW of load relief for the duration of an event. It is worth noting that there are more batteries in the Company's Colorado territory than there are in the Company's Minnesota territory (about 1,800 vs. 500), and as such the impact of a battery demand response program in Minnesota will likely be negligible during the short-term planning period of this IRP.

VI. HYDROGEN

A versatile fuel for energy production and storage, hydrogen is expected to play a strategic role in the energy transition. Clean hydrogen can be produced in one of two ways. The most common way clean hydrogen is produced is through chemical reforming from

[10] Docket No. 23A-0589EG.
[11] Docket No. E002/M-23-459.

natural gas (steam methane reforming or autothermal processes) when carbon capture is also employed. The other way clean hydrogen can be produced is by using electricity that was generated with carbon-free resources (renewables, nuclear) to split water with (a process known as "electrolysis"). Electrolysis is the method that the Company is focused on exploring for use on our system when paired with renewable and nuclear energies.

Hydrogen can be used to produce electricity through combustion in gas turbines (alone or blended with natural gas), fuel cells (not combustion), and other devices. Hydrogen can also be blended with natural gas to help decarbonize the heating of homes and businesses. It can help decarbonize the manufacture of chemicals, fuels, plastics, steel, and other industries that are referred to as 'hard to decarbonize', as it can replace traditional, emissions producing fuels that are used to power these processes.

Hydrogen can also be used to store energy through using renewable energy that exceeds the instantaneous system load – and would therefore otherwise be curtailed or create congestion on the transmission system – to make clean hydrogen. However, hydrogen stores energy less efficiently than natural gas (although substantially more than current battery technologies), so there are challenges to storing and transporting surplus amounts. Therefore, converting hydrogen into ammonia is being explored as a possible solution to address the storage and transportation challenges. This is accomplished by reacting the hydrogen with nitrogen extracted from the air to ammonia. This ammonia can be more efficiently and cost effectively stored and transported. That ammonia could be used by the fertilizer industry; alternate uses by other industries are in research and development as well.

The Company is invested in developing this advancing technology to serve our customers and help meet Company and state decarbonization goals. The federal government has provided several opportunities for grants using clean hydrogen, which we have successfully pursued and discuss below, and the Inflation Reduction Act provides for a $3 per kilogram production tax credit for clean hydrogen. Hydrogen was modeled as part of a special study, which is discussed in Chapter 5: Economic Modeling Framework, with assumptions outlined in Appendix F: EnCompass Modeling Assumptions and Inputs.

A. Heartland Hydrogen Hub/MN Hydrogen Vision

Xcel Energy applied for funding through the DOE's Office of Energy Efficiency and Renewable Energy (EERE) Regional Clean Hydrogen Hubs initiative. The application was filed by the Energy & Environmental Research Center (EERC) with Xcel Energy as one of the hub partners. The DOE reviewed applications and notification of awards were announced in October 2023. The Heartland Hydrogen Hub (HH2H) was selected for an award of up to $925 million dollars, subject to contract negotiations with the

DOE and between HH2H partners. The diversity of hydrogen supply in our proposal, including utilizing wind, solar, and nuclear, as well as the potential to utilize hydrogen in the Minnesota agricultural sector as ammonia and as a fuel in the power sector, were strengths in the application.

Xcel Energy's proposed two 'nodes' (as described in the application) for hydrogen production and use in the hub application. The first node takes advantage of the large amount of wind energy in southwestern Minnesota and eastern South Dakota, which are often curtailed, due to constraints on the transmission system. The Company's plan is to use this congested, low-cost wind to produce green hydrogen. The hydrogen would be sold to a Minnesota ethanol producer. The hydrogen would be converted to ammonia and then combined with captured CO2 (from the ethanol production) converted to urea fertilizer and sold to local MN farm coops. This area is heavily agricultural and uses large quantities of anhydrous ammonia and solid urea for fertilizer and commodity farming.

The second node of the hub utilizes the combined wind, solar and nuclear (Monticello Nuclear Generating Plant) resources to produced green hydrogen at strategic locations within Xcel Energy's MN territory. The locations, determined during the early detailed planning of the hub, will optimize connection to the clean energy resources, as well as proximity to various offtake options.

The HH2h timeline spans over 10 years and proposes investments, by Xcel Energy, of up to $2 Billion dollars. Project detailed design will begin after award negotiations – which are a staged process – are complete. There are four successive funding phases through 2035. The DOE will review and evaluate deliverables in each phase. Based on these evaluations, the DOE will decide whether each hub can advance to the next phase. With multiple hydrogen production and end-use initiatives included in the Heartland Hydrogen Hub, the Company expects to receive a large portion of the federal award. The total amount, how it's distributed across projects and timing will depend on additional negotiations and the outcomes of the normal regulatory process.

VII. NEXT GENERATION NUCLEAR TECHNOLOGIES

Nuclear power is a clean source of energy because it does not produce carbon dioxide and other air pollutants. Nuclear generating plants are operated such that the output is nearly constant, and several are currently licensed by the Nuclear Regulatory Commission for 80 years of operation. This makes it a strategic supply of reliable power to serve as base load capacity. The cost of nuclear power is high compared to other generating technologies, but the long lifetime of plants and the reliable, constant power are substantial benefits. The Company has organized a task force, that includes

members of the CF2050 initiative, evaluating emerging trends in the nuclear energy industry in both fission and fusion.

A. Fission Based Technologies and Small Modular Nuclear Reactors

Small Modular Nuclear Reactors (SMRs) are a popular technology in the nuclear space. These scaled-down – between 50 to 300 MW – employ the familiar nuclear fission process (splitting atoms to generate heat for steam turbines) employed by the Company's Prairie Island and Monticello nuclear generating stations. A new (or repowered) SMR facility would typically have three to ten SMRs, instead of the one or two large reactors found at traditional light water nuclear sites. An advantage of SMRs over traditional nuclear plants is that SMRs can lower the cost of nuclear power by increasing the number of factory-built components that can be used, thereby enabling more efficient construction. Because they are also designed to be dispatchable, they are also more flexible than traditional nuclear plants– as the operating utility can choose how many to turn on and when – and can therefore better integrate with wind and solar generation. Additionally, because of their size, SMRs can be located on sites that would not support traditional nuclear units, brownfield industrial sites, and sites closer to electric demand centers.

Two approaches to fission-based SMRs have emerged which can be summarized as Generation (Gen.) III+ and Gen. IV. Gen. III+ are reactor designs that emerged in the early 1990s that are in use today but have been scaled down to the SMR size. The advantage of this approach lies in the speed of adoption of a known technology and obtaining approval by the Nuclear Regulatory Commission (NRC). Gen IV reactor designs apply novel concepts in fuel use, coolants, and "fast" reactors that provide benefits in safety and fuel management.

Nuclear fission has challenges with public acceptance, permitting with NRC, and fuel supply and disposal. A significant endeavor to increase safety in all SMR designs is essential to convince the public that nuclear power should be considered for investment. It is expected in the industry that the NRC will become more efficient in processing permits based on signals from policymakers in this ecosystem. The challenges with fuel lie both in the supply chain and with spent fuel. Currently, some nuclear fuel is supplied by companies in Russia and the Ukraine. Also, Gen IV reactors are being designed with new types of fuel that will require development of a supply chain. Spent fuel will always require long-term storage. However, the Gen IV reactors are designed to use fuel more efficiently that produces a waste product with lower hazards. Fuel recycling is not allowed in the US but changes to that policy could also unlock substantial benefits for nuclear fission.

In 2023, several utility companies in the U.S. announced planning phases that include SMRs being deployed in the 2030s as part of their carbon-free plans. These utilities include PacifiCorp, Idaho Power, Duke Energy Carolinas, Duke Energy Progress, and the Tennessee Valley Authority.

B. Fusion Based Technologies

Nuclear fusion is the same process that occurs in our Sun and all stars. Fusion happens when two atoms combine to form a new, single atom. For electricity producing purposes, two atoms of hydrogen will be fused to produce helium and heat, the latter being a byproduct of the process, which can be used to power steam turbines to produce electricity.

The expectation with nuclear fusion is that it will be safer than fission, as the requisite fuel is safer to handle, and the process does not produce long-lived radioactive waste. However, the technology for nuclear fusion is a challenge, as containing the nuclear fusion reaction is as akin to containing a very small star. A solution to this hurdle has been sought since the 1950s, and recently, due to increased investment and innovation, some breakthroughs have occurred. In late 2022, DOE announced that sustained nuclear fusion was achieved at the National Ignition Facility housed at Lawrence Livermore National Laboratory. On July 30, 2023, the National Ignition Facility achieved another fusion ignition breakthrough, producing a higher yield in net energy gains than what was achieved in December of 2022. Also in 2022, a few other key milestones were announced by leading fusion energy developers that indicates progress in the field. All the progress is centered on sustaining and containing fusion, yet a significant amount of work is needed to engineer a system that can extract the produced energy once it can be sustained and contained. Commercially viable fusion energy may be decades away from reality, but the recent progress in this field and the technology's potential for clean energy warrant giving fusion attention and support.

C. The Company's Role in Advancing Next Generation Nuclear Technologies

A buildout of advanced nuclear plants provides many opportunities to provide new, reliable baseload generation, as well as challenges to building these first-of-a-kind plants, including ensuring adequate supply chains for major components and equipment and reliable fuel availability. The DOE has aggressively supported and provided funding for the development of advanced nuclear technologies, with a goal of ensuring that the U.S. remains the global leader in the industry. The biggest program to date is the Advanced Reactor Demonstration Program (ARDP), which announced awards in 2020

(i.e., 50 percent cost-share funding). The ARDP was originally designed as a seven-year program; currently the reactors that received the demonstration awards are expected to be online by 2030.

In addition to ARDP, the IRA, which was signed into law in August 2022, directs new federal spending toward reducing carbon emissions. It contains new tax credits that provide incentives for utilities to build and operate advanced nuclear plants. The clean electricity production tax credit (PTC) or investment tax credit (ITC) is available for any new plant that produces zero greenhouse gas emissions placed into service after December 31, 2024. Advanced nuclear plants, with reliable, clean, and zero-carbon generation, qualify for this technology-neutral PTC or ITC. For more detail on each tax credit, see the full text of the IRA.

The Company has engaged in activities to ensure we are prepared to learn from advanced nuclear projects that will benefit our customers and help the Company reach state and corporate decarbonization goals, one of which was the Utah Associated Municipal Power Systems (UAMPS) and NuScale Power's Carbon Free Power Project (CFPP). Unfortunately, UAMPS and NuScale made the decision to end the project because the small number of municipal power systems that intended to invest in the project did not need the full power output the plant would have provided, yet they would have been responsible for covering the full cost of commissioning the project. This placed significant financial risk on those municipal power systems that remained, and this risk outweighed the reward for them. Additionally, the project was facing increased costs and challenging market dynamics.

While it is disappointing that the project was terminated, the work associated with the project has brought the industry closer to the next generation of nuclear energy being available. The Company was excited to be part of the project in a non-ownership, consulting, and advising role, as it placed us at the cutting edge of new nuclear technologies. As the Company continues to pursue our carbon-free electricity vision and the standards set forth by the State of Minnesota, we are committed to evaluating emerging clean energy technologies that hold potential to provide safe, reliable, and affordable electricity on a 24/7 basis. While the CFPP has ended, this is not the end of new nuclear initiatives, as nuclear will remain an important part of the clean energy future. We will continue to follow advanced nuclear technologies, including SMRs, and evaluate the role they may play within our larger energy portfolio in the future, including how they can complement renewable resources, like solar and wind.

VIII. SUMMARY OF TECHNOLOGY STATUS

As we have discussed in this appendix, the advanced technologies the Company is monitoring are in various stages of development, with some being ready to provide value to our system and customers and others needing extensive research and development. Table X-2 below summarizes the status of each technology discussed in this appendix.

Table X-2: Status of Advanced Technologies

Technology	Feasibility
BESS	Being deployed on our system.
TES	Emerging solution. Needs time for demonstrations and pilots to prove out the concept and develop best practices.
VPP	The Company currently offers demand response programs and is looking to add more VPP programs. A DERMS system is needed to enhance integration and utilization.
Hydrogen	The Company received Federal funding for the development of the Heartland Hub, subject to contract negotiations with the DOE.
Fission and SMR	Several utilities have expressed plans to utilize SMRs on their systems. The technology is ready, but faces policy challenges.
Fusion	Commercially viable fusion is likely decades away.

IX. CONCLUSION

The integration of battery storage, VPPs, hydrogen, and next generation nuclear technologies onto our system has the potential to provide our customers with safe, reliable, and cost-effective benefits while helping the Company and the State of Minnesota achieve decarbonization goals. While each of these technologies are in different stages of development, the Company is committed to working with industry partners in the exploration and ultimate integration of these existing and emerging technologies to accelerate the clean energy transition.

APPENDIX Y – LIFE CYCLE EMISSIONS IMPACTS

I. INTRODUCTION

Order Point 12 of the Commission's April 15, 2022 Order in Docket No. E002/RP-19-368 requires the Company in its next Resource Plan to work with stakeholders to develop a fair basis for comparing the full supply-chain and life-cycle carbon impacts of the generation and storage options to help the Commission evaluate the "adverse socioeconomic effects and adverse effects upon the environment" of each resource option under consideration, pursuant to Minn. R. 7843.0500, subp. 3.C. Further, Order Point 23.I. requires a discussion of the full supply chain and life cycle carbon impacts of the ongoing nuclear generation and storage at each facility.

A thorough analysis of life cycle carbon impacts allows for a fair comparison between different electricity generation and storage technologies. Focusing solely on the operational phase of electricity generation can overlook significant carbon emissions associated with other stages of the technology's life cycle. Understanding the complete carbon footprint of a technology involves considering emissions not only during electricity generation but also throughout the entire supply chain, including raw material extraction, manufacturing, transportation, and end-of-life. By examining the carbon impacts throughout the life cycle of different electric generation alternatives, we can obtain a comprehensive assessment of the environmental footprint. This enables us to make informed decisions, foster innovation, and more effectively address climate change.

We conducted a literature review to gather data and insights on the full supply-chain and life cycle carbon impacts of different generation and storage technologies. Further, this review explores the specific case of nuclear generation and storage to evaluate its life cycle carbon impacts. When conducting a comprehensive review, it is important to understand the variety of assumptions, methodologies, and scopes in the literature studies to ensure that potential bias and limitations of the studies are considered. Moreover, the available body of literature is less robust for emerging technologies.

At our November 15, 2022 stakeholder workshop, we discussed our approach to life cycle analysis and received no feedback or suggestions for alternative approaches.[1]

[1] This approach also aligns with the discussion during the Commission's February 8, 2022 Deliberations. *See* Transcript at pp. 113-115.

Table Y-1 summarizes the scope and background of the studies reviewed.

Table Y-1: Studies Reviewed

Study	Publication Date	Technology Scope	Notes
NREL Life Cycle GHG Emissions from Electricity Generation	September 2021	Renewables; Storage; Non-Renewable, Thermal with Carbon-Capture	Reviewed and harmonized hundreds of GHG life cycle assessments
IPCC WGIII AR5 Energy Systems	2014	Renewables; Storage; Non-Renewable, Thermal with Carbon-Capture	Comparative life cycle GHG emissions
CARB-GREET Technical Support Document	2018	Renewables; Non-Renewable	Summary of carbon intensities – one-time emissions associated with manufacturing and construction are excluded
UW-Madison – Life Cycle Air Emissions from Utility-Scale Energy Storage Facilities	2003	Utility-Scale Storage	Life cycle GHG emissions from utility-scale advanced battery energy storage systems including manufacturing and operation
Hydrogen Council – Hydrogen Decarbonization Pathways	January 2021	Hydrogen	Analysis of the full life cycle of blue hydrogen combustion with a 95 percent capture efficiency used as a conservative assumption as a representative scenario for green hydrogen is not available
Life Cycle Greenhouse Gas Emissions of Nuclear Electricity Generation - Systematic Review and Harmonization, Ethan S. Warner (NREL), Garvin A. Heath	2012	Nuclear	Systematic review and harmonization of life cycle assessment literature of nuclear electricity generation technologies

The studies show that renewable energy sources generally exhibit much lower life cycle emissions compared to fossil fuel-based technologies. The reviewed literature also suggests that nuclear power, with carbon emissions comparable to renewable resources, can contribute to reducing carbon emissions when compared to fossil fuel-based alternatives. Finally, the studies on energy storage technologies show significantly less emissions than any fossil resource when paired with renewable resources or other carbon-free energy sources. It is important to note that the carbon emissions associated with storage technologies are heavily dependent on the source and carbon intensity of the energy stored.

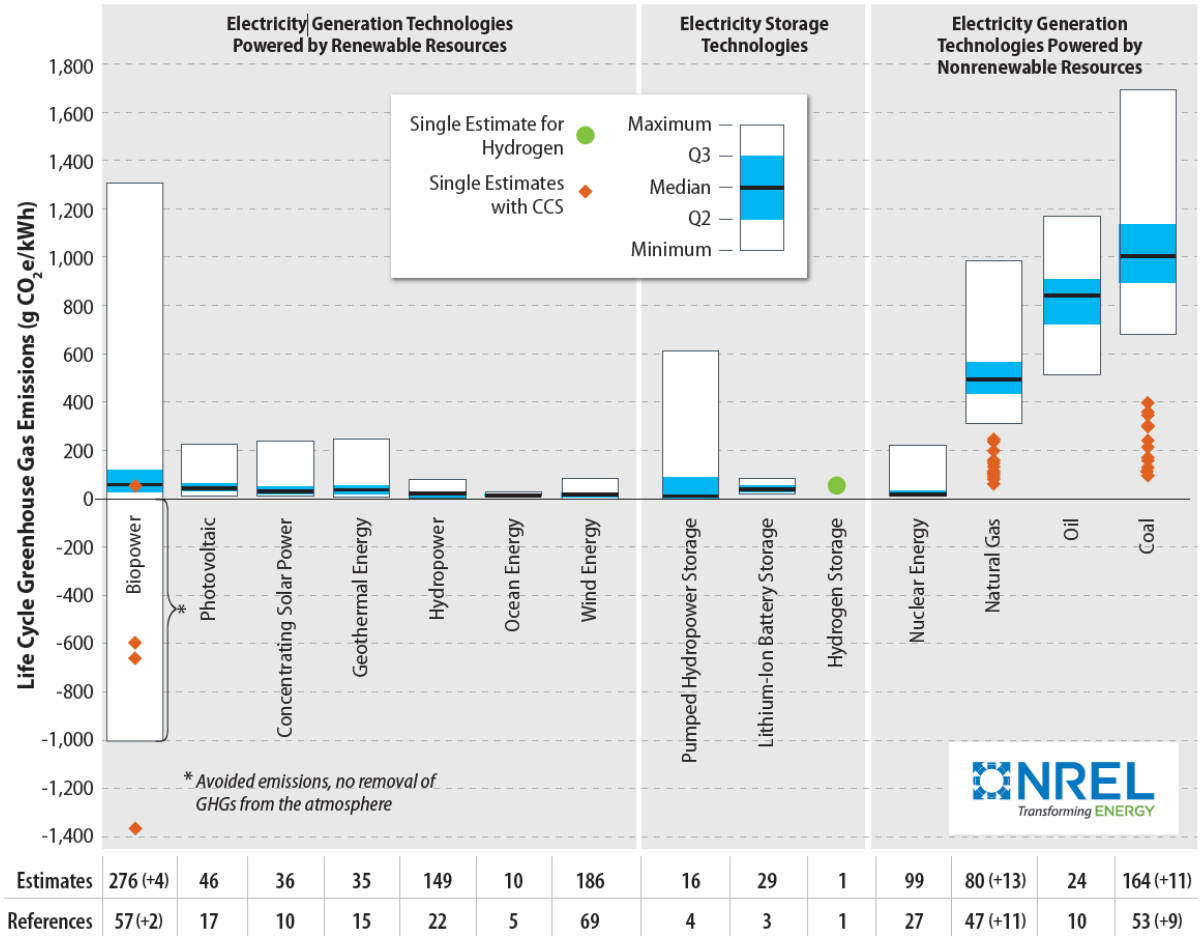
II. LIFE CYCLE CARBON EMISSION INTENSITIES OF GENERATION RESOURCE OPTIONS IN REVIEWED LITERATURE

A. National Renewable Energy Laboratory (NREL)[2]

NREL's "Life Cycle Greenhouse Gas Emissions from Electricity Generation: 2021 Update" reviews and harmonizes hundreds of greenhouse gas (GHG) life cycle assessments (LCAs) for electricity generation technologies to reduce uncertainty around estimates and increase the value of these assessments to the policymaking and research communities. The harmonized data shows that life cycle GHG emissions from solar, wind, and nuclear are considerably lower and less variable than from unabated natural gas and coal, even when including one-time upstream emissions associated with manufacturing and construction in addition to fuel cycle.

[2] NREL, "Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update." Available at https://www.nrel.gov/docs/fy21osti/80580.pdf.

Figure Y-1: NREL – Life Cycle Greenhouse Gas Emission Estimates[3]



	Biopower	Photovoltaic	Concentrating Solar Power	Geothermal Energy	Hydropower	Ocean Energy	Wind Energy	Pumped Hydropower Storage	Lithium-Ion Battery Storage	Hydrogen Storage	Nuclear Energy	Natural Gas	Oil	Coal
Estimates	276 (+4)	46	36	35	149	10	186	16	29	1	99	80 (+13)	24	164 (+11)
References	57 (+2)	17	10	15	22	5	69	4	3	1	27	47 (+11)	10	53 (+9)

[3] *Id.* at Figure 2.

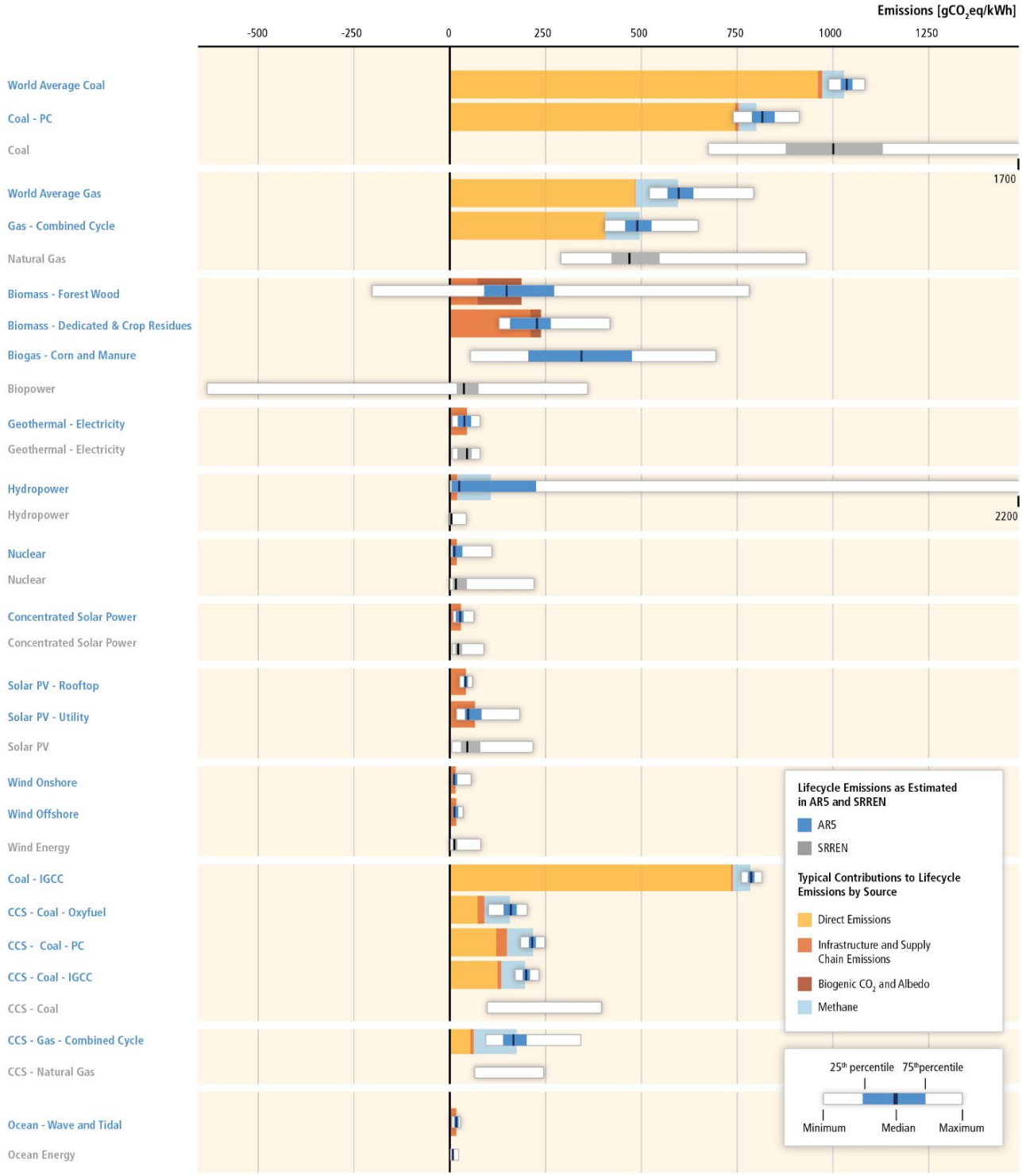
B. Intergovernmental Panel on Climate Change (IPCC)

In the IPCC's 2014 Fifth Assessment Report (AR5), the Working Group III (WGIII) assessed literature on the scientific, technological, environmental, economic, and social aspects of mitigation of climate change since 2007, when the Fourth Assessment Report (AR4) was released.[4] "Chapter 7: Energy Systems" includes a comparative life cycle GHG emissions from electricity supplied by commercially available technologies (fossil fuels, renewable, and nuclear power) and projected emissions of future commercial plants of currently pre-commercial technologies (fossil systems with carbon capture and storage [CCS] and ocean energy).[5] Subsequent IPCC reports have not included a life cycle analysis of GHG emissions for energy systems. Figure Y-2 below shows distributions of life cycle emissions with harmonization of literature values for WGIII AR5 (blue) and the full range of published values for Special Report on Renewable Energy Sources and Climate Change Mitigation (SRREN) (gray) for comparison. In this analysis, life cycle includes manufacturing and fuel cycle.

[4] Climate Change 2014, Mitigation of Climate Change, "Working Group III Contribution to the Fifth Assessment Report of the International Panel on Climate Change." Available at https://www.ipcc.ch/report/ar5/wg3/.

[5] Bruckner T., I.A. Bashmakov, Y. Mulugetta, H. Chum, A. de la Vega Navarro, J. Edmonds, A. Faaij, B. Fungtammasan, A. Garg, E. Hertwich, D. Honnery, D. Infield, M. Kainuma, S. Khennas, S. Kim, H.B. Nimir, K. Riahi, N. Strachan, R. Wiser, and X. Zhang, 2014: Energy Systems. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Chapter 7 at p. 539. Data available at ipcc_wg3_ar5_annex-iii.pdf.

Figure Y-2: IPCC – Comparative Life Cycle GHG Emissions from Generation Resources[6]



[6] *Id.* at Figure 7.6.

C. California Air Resources Board (CARB)

The California Air Resources Board's Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) Technical Support Document includes a summary of carbon intensities by electric generation type from Argonne National Laboratory (ANL).[7] GREET's initial use was for the transportation sector, however, it also contains robust information to calculate the carbon intensity of electricity. Its use case has been expanding to other sectors. A summary of carbon intensities by generation type are shown in Table Y-2 below. One-time emissions associated with manufacturing and construction are excluded in this analysis. These emissions are generally of similar magnitude across technologies and much smaller than emissions from ongoing operations and thus are not as essential to inform comparison.

Table Y-2: Summary of Carbon Intensities for California Average Grid Electricity Used as a Transportation Fuel in California[8,9]

	Electricity Resources Mix	Energy Inputs, Btu/MMBtu	Feedstock Production		Power Generation	
			Emission Factor, gCO2e/MMBtu	Contribution to CI, gCO2e/MMBtu	Emission Factor, gCO2e/MMBtu	Contribution to CI, gCO2e/MMBtu
Residual Oil	0.15%	4,714	14,820	69.86	253,578	402.28
Natural Gas	50.87%[10]	1,130,708	13,824	15,631	123,600	67,249
Coal	4.13%	127,364	5,515	702.39	289,776	12,807
Biomass	2.25%	106,711	2,242	239.22	8,713	210.13
Nuclear	9.18%	98,167	3,625	355.84	0	0
Hydro	11.87%	126,907	0	0	0	0
Geothermal	4.38%	46,805	0	0	26,669	1,248
Wind	9.06%	96,886	0	0	0	0
Solar PV	8.11%	86,771	0	0	0	0
Subtotal	100%			16,998		81,916
Tailpipe Emissions				0		0

[7] California Air Resources Board, "CA-GREET3.0 Lookup Table Pathways, Technical Support Documentation." August 13, 2018. Available at https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/ca-greet/lut-doc.pdf.
[8] *Id.* at Table E.2.
[9] Values may not round to sum due to rounding.
[10] In the CA-GREET3.0 model, all undefined energy resources are assumed to be from natural gas. This value represents the sum of the reported natural gas used in the electricity mix (36.48%) and the undefined energy categories (14.39%), as the total share of natural gas (50.87%) in the CA Electricity Resources Mix.

	Electricity Resources Mix	Energy Inputs, Btu/MMBtu	Feedstock Production		Power Generation	
			Emission Factor, gCO2e/MMBtu	Contribution to CI, gCO2e/MMBtu	Emission Factor, gCO2e/MMBtu	Contribution to CI, gCO2e/MMBtu
Total CI, gCO2e/MMBtu			**98,914**			
Total CI, GCO2e/MJ			**93.75**			

D. Utility-Scale Energy Storage Life Cycle Carbon Emissions

The U.S. Department of Energy (DOE) funded a study from the University of Wisconsin-Madison on life cycle emissions from utility scale storage.[11] Life cycle carbon emissions, including manufacturing and operation, from utility-scale advanced Vanadium-Redox and Polysulphide battery energy storage systems (BESS) along with pumped hydro and compressed air storage evaluated in this study are summarized in Table Y-3.

Table Y-3: Life Cycle GHG Emission for Utility-Scale Energy Storage Systems[12]

Parameter	Pumped Hydro Storage (PHS)	Compressed Air Energy Storage (CAES)	Vanadium-Redox Battery Energy Storage System (BESS)	Polysulphide BESS
Estimated Plant Life (years)	60	40	20	20
Estimated Capacity Factor (%)	20	20	20	20
Generation Emission Multiplier (Energy Ratio)	1.35	0.735	1.33	1.54
Construction and O&M Related Emission Rate (kg CO_2e/MWh)	6	4	40	33
Fuel Related Emissions Rate (kg CO_2e/MWh)	0	288	0	0

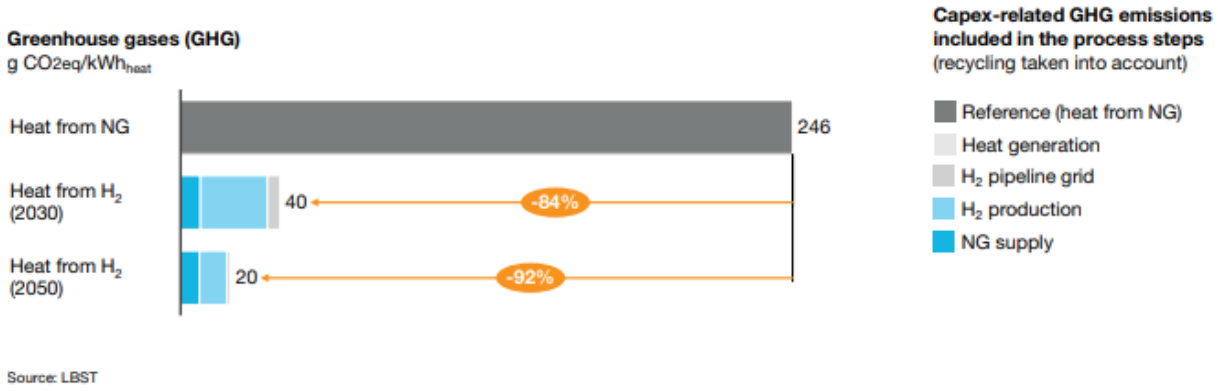
[11] Paul Denholm and Gerald L. Kulcinski, University of Wisconsin, Madison, WI. "Life-Cycle Air Emissions from Utility-Scale Energy Storage Facilities: Comparative Analysis and Policy Implications." Available at https://www.sandia.gov/ess-ssl/EESAT/2003_papers/Denholm.pdf.
[12] *Id.* at p. 1.

CAES is a hybrid storage/generation system that requires natural gas fuel. As such, for carbon emissions unrelated to stored electricity, CAES exhibits the highest emissions among the considered storage options. BESS involve energy-intensive manufacturing resulting in a higher construction and operations-related carbon emission rate as compared to other storage systems. When paired with renewable energy resource, BESS rank second in terms of carbon emissions. PHS paired with renewable energy resources has the lowest carbon emissions because of long-lasting components, among other factors.

E. Life Cycle Assessment of Hydrogen Decarbonization Pathways

The Hydrogen Council's report on decarbonization pathways provides an analysis of the full life cycle of blue hydrogen combustion with a 95 percent capture efficiency used as a conservative assumption as a representative scenario for green hydrogen since green hydrogen is not available.[13] This analysis considered use of blue hydrogen in a heating boiler but is appropriate for consideration to assessing impacts from combustion turbines as simple cycle combustion turbines have similar efficiencies. As shown below in Figure Y-3, the GHG emission intensity per kWh produced using hydrogen is estimated to be over 80 percent lower than the fossil fuel reference (natural gas used in boiler or furnace) by 2030. In the future, the emissions intensity of low-carbon hydrogen will be driven by the Inflation Reduction Act (IRA) Production Tax Credit (PTC) threshold of 4kg CO2e/kg H2 production.

Figure Y-3: Industrial Heat from Blue Hydrogen in Northern Europe[14]



[13] Hydrogen Council, "Hydrogen decarbonization pathways, A life-cycle assessment." January 2021. Available at https://hydrogencouncil.com/wp-content/uploads/2021/04/Hydrogen-Council-Report_Decarbonization-Pathways_Part-1-Lifecycle-Assessment.pdf.
[14] *Id.* at Exhibit 7.

III. NUCLEAR FUEL STORAGE

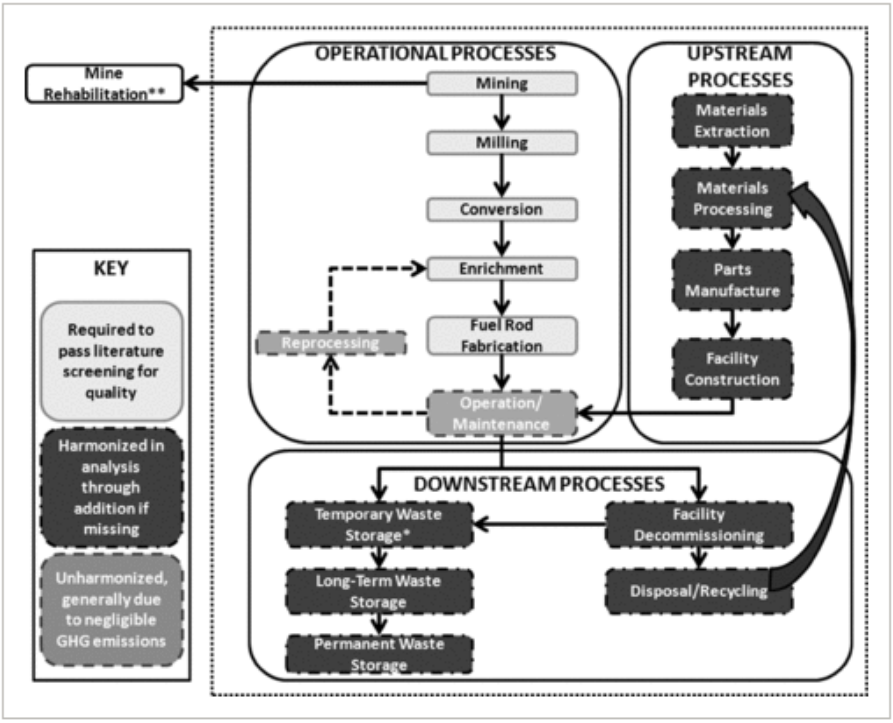
The DOE, Office of Energy Efficiency and Renewable Energy, funded a systematic review and harmonizaton of LCA literature of nuclear electricity generation technologies to examine and reduce, if possible, the variability in life cycle GHG estimates to better inform decision making.[15] Results were included in NREL's "Life Cycle Greenhouse Gas Emissions from Electricity Generation: 2021 Update" described above.

Figure Y-4 below illustrates the life cycle of electricity generated from nuclear power, as defined in this study. The dotted box defines the system boundary achieved through harmonization. The life cycle phases are grouped into three aggregate categories:

- Upstream processes: One-time processes occuring prior to operation – includes facility construction and material supplies.
- Operational processes: GHGs continuously emitted during generation of electricity – includes uranium mining and rehabilitation, milling, conversion, enrichment, fuel rod fabrication, transportation, facility operation and maintenance, and reprocessing.
- Downstream processes: Processes that occur after the facility retires – includes facility decommissioning; nonradioactive waste disposal/recycling; and temporary, long-term, and permanent spent fuel storage.

[15] Life Cycle Greenhouse Gas Emissions of Nuclear Electricity Generation - Systematic Review and Harmonization, Ethan S. Warner (NREL), Garvin A. Heath. Available at https://doi.org/10.1111/j.1530-9290.2012.00472.x.

Figure Y-4: LCA Harmonization System Boundaries (dotted line box) for Nuclear Power Electricity Generation[16]

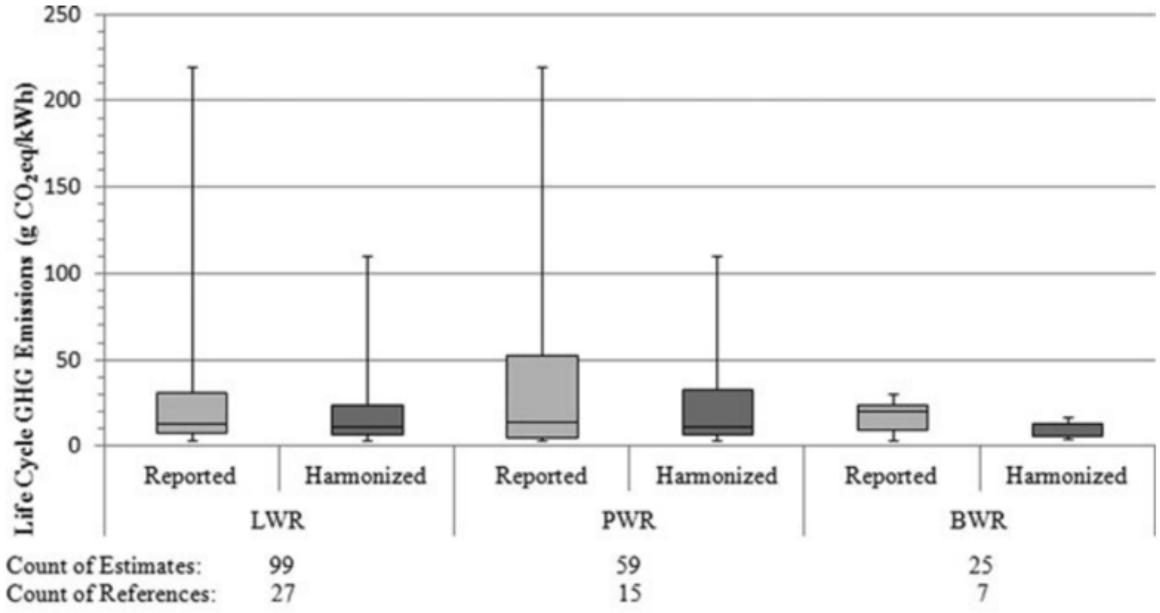


*Applies only to highly radioactive waste.
** Occurs once, but its impact on electrcity generaton is tempered by fuel demand.

Figure Y-5 below displays published and harmonized life cycle GHG emissions by nuclear reactor type. Whiskers represent minimums and maximums. Boxes represent 25th percentile, median estimate and 75th percentile. As shown on Figure Y-5, harmonized life cycle GHG emissions from PWRs and BWRs (including fuel storage), such as those operating at the Prairie Island and Monticello nuclear plants, are well below fossil fuel-based electricity generation sources summarized in Section IV.

[16] *Id* at Figure 1.

Figure Y-5: Nuclear Life Cycle GHG Emissions[17]



*LWR = light water reactor; PWR = pressurized water reactor; BWR = boiling water reactor

While the study reports results for LWRs, PWRs, and BWRs, the discussion focuses on the broader LWR category. Life cycle emissions of PWR and BWR systems employing similar performance characteristics (e.g., lifetime, thermal efficiency, and capacity factor) showed minimal differences from LWRs. For LWRs, "operational processes contribute a majority of life cycle GHG emissions (78 percent). Life cycle GHG emissions for upstream processes and downstream processes make up 14 percent and 8 percent of published estimates of total life cycle GHG emissions, respectively."[18] Several recommendations for further study were given, including more detailed assumptions for electricity use and waste storage; however, it was noted that consequential analyses are unlikely to fundamentally change the comparison of nuclear power to fossil fuel-based electricity generation sources.

IV. CONCLUSION

As shown in Table Y-4 below, the literature reviewed provides valuable insights into the full supply-chain and life cycle carbon impacts of energy generation and storage resource options.

[17] *Id* at Figure 2.
[18] *Id.* at p. S82.

Table Y-4: Literature Review Summary of Resource Life Cycle Carbon Intensities

Life Cycle Carbon Intensity	NREL Study[19]	IPCC AR5[20]	GREET[21]	UW-Madison	H2 Council
Resource	**gCO2e/kWh**	**gCO2e/kWh**	**gCO2e/kWh[22]**	**gCO2e/kWh**	**gCO2e/kWh**
Natural Gas (avg.)	486	490	422	-	-
Nuclear[23]	13	12	1.2	-	-
Biomass	52	230	29	-	-
Wind	13	11	0	-	-
Solar PV	43	48	0	-	-
Hydropower	21	24	0	-	-
Battery Storage[24]	33	-	-	33-40	-
Low-C Hydrogen[25]	38[26]	-	-	-	20-40

Renewable energy sources and storage paired with renewable generation generally exhibit much lower life cycle emissions compared to fossil fuel-based technologies. Nuclear power is often considered a low-carbon energy option due to its minimal carbon emissions during the operational phase; the life cycle carbon impacts of nuclear power depend on several factors, including uranium mining, fuel processing, plant construction, and waste management. In conclusion, our literature review suggests that nuclear power can contribute to reducing carbon emissions when compared to fossil fuel-based alternatives.

[19] Median results shown.
[20] Median results shown.
[21] GREET default assumptions do not include the imbedded one-time emissions from manufacturing and construction of equipment.
[22] Life cycle GHG emission from each type of generation converted from values provided in Table Y-2 to a per KWh basis using the conversion of 293.07 kWh/MMBtu from example equations.
[23] Nuclear life cycle in NREL and IPCC studies includes temporary, long-term, and permanent waste storage; GREET includes fuel production.
[24] Available studies are not as robust for these emerging technologies. Generally, the carbon intensity (CI) of storage is dependent on the associated electricity generation, and the CI of low-carbon hydrogen in the future will be driven by the IRA PTC threshold of 4kg CO2e/kg H2 production.
[25] *Id.*
[26] Value from one 2005 fuel cell study.

APPENDIX Z – NON-TECHNICAL SUMMARY

I. INTRODUCTION

The 2024-2040 Upper Midwest Integrated Resource Plan (the 2024 Plan or Preferred Plan) builds on the strong foundation of cost-effective carbon reduction that we have been working toward since our Commission approved 2019 Plan. The 2024 Plan documents how the Company will provide for the capacity and energy needs of our customers over the course of the planning period. It is comprised of a portfolio of forward-looking projects and resources designed to continue providing safe, reliable, and affordable service to our customers while continuing our ambitious carbon-reduction strategy, even as we forecast significant increases in customer load from electrification and other sources.

Here, we provide an overview of our 2024 Plan. The 2024 Plan demonstrates that we are well positioned to meet our customers' needs over the next fifteen years in a reliable, environmentally responsible, and cost-conscious manner. Specifically, the 2024 Plan models an 88 percent reduction in carbon emissions by 2030; $464 million in Present Value of Revenue Requirements (PVRR) savings by 2040; $785 million in Present Value of Societal Cost (PVSC) savings by 2040 and over $1 billion by 2050; results in sufficient firm dispatchable resource additions to ensure reliability; and leads to less than a one percent average annual increase in rates based on generic market pricing of new generation.

The Company has been thoughtfully planning and executing the transition of our power supply portfolio for more than a decade, rapidly decarbonizing, maintaining a reliable transmission system, and providing customers with affordable electricity rates. These benefits build off the progress made in our last resource plan (2019 Plan). Following Commission approval of the 2019 Plan, the Company has taken a number of steps needed to transform our energy system into one that will provide cleaner energy to our customers, while remaining safe, reliable, and affordable.

Since our 2019 Plan, we have achieved several notable accomplishments. First, we successfully retired Sherco Unit 2. Second, we have added additional dry cask storage at our Monticello Nuclear Generating Plant. This addition will enable the facility to continue providing carbon-free, reliable baseload power. Third, we have started the construction of Sherco Solar 1, 2, and 3. These projects will add a combined capacity of 710 MWs of solar energy. Fourth, we have initiated a long-duration energy storage pilot. This pilot will test a new 10 MW long duration iron-air storage technology.

Lastly, the Company has also initiated proceedings to construct transmission lines for replacement generation at both Sherco and King, which will allow for the cost-effective integration of thousands of megawatts of additional renewable resources on our existing system.

Building on our ongoing efforts to transform our energy system, and based on extensive collaboration with our stakeholders, the key components of our Preferred Plan include:

- Adding thousands of megawatts of additional renewable resources to our system, including customer-sited DERs;
- Integrating and investing in energy storage systems, including adding short-duration storage systems to our fleet;
- Extending the life of our nuclear fleet;
- Ensuring reliability through additional firm dispatchable generation; and
- Continuing to increase Energy Efficiency and Demand Response resources to help reduce overall system demand.

The 2024 Plan leverages existing grid connections and proven technologies, as well as emerging technologies like battery storage to provide a balanced mix of resources while preserving our fundamental commitment to reliability at nominal cost to customers. The 2024 Plan demonstrates how the Company's power supply strategy reflects the value of our customers, balances the priorities of a carbon-free future against reliability and affordability, and supports Minnesota's energy priorities.

II. CHANGING PLANNING LANDSCAPE

The 2024 Plan builds on our previous 2019 Plan and extends our resource planning to 2040. Over the last several years, the Company has witnessed a number of changes and developments that have impacted our planning process. Several of these developments, such as policy changes at the federal and state level, present greater opportunities to meet our carbon-reduction goals. Others, such as MISO's adoption of a seasonal resource adequacy construct, are directed at different policy ends like ensuring that we and other utilities continue to maintain a reliable system. Collectively, these changes provide different considerations that the Company needed to navigate as we developed our Preferred Plan.

Some of the key planning developments over the planning period that impact our resource needs and operations, include changes in:

- Market Constructs,
- Federal and State Policies,
- Community & Employee Considerations,
- Customer Preferences, and
- Supply & Technology Trends.

First, we note the change in resource adequacy in regional market constructs leading from an annual resource accreditation to seasonal resource accreditation. The new seasonal construct is designed to address significant increases in emergency events that occur year-round, driven by factors including generation retirements, reliance on intermittent resources, seasonal variations, outages resulting from extreme weather events, and declining excess reserve margin. The 2024 Plan has incorporated the seasonal construct into the planning process and modeling, allowing for more precise planning and resource allocation based on the specific needs and resource availability of each season. Modeling tools have been adjusted, and our models have become more complex because they now have to ensure sufficient capacity across system peaks in all four seasons as opposed to the single peak hour in a year. We have also adjusted our long-term planning assumptions because our models use trends or averages from several years of data in order to accurately predict what will happen in the future. However, we only have one year of data for existing generation assets to use when figuring out how much capacity we will need for each season.

Second, the impacts of evolving environmental regulations and diverse regional and state policies will continue to require us to be responsive to new policy directives. Federal incentives for decarbonization in both utility generation as well as residential use are driving an enormous increase in the renewable market. The Inflation Reduction Act (IRA)—the largest climate investment ever by the US government—is expected to more than triple US clean energy production in less than 10 years, which would result in about 40 percent of the country's energy coming from renewable sources such as wind, solar and energy storage by 2030. However, carbon-free energy requirements are not exclusive to federal policy. As noted, state policy goals also influence our planning. Minnesota enacted new legislation requiring utilities serve 100 percent of their state retail load with carbon free energy by 2040. Besides the new carbon-free goal, Minnesota has seen other significant legislative developments since our 2019 Plan that impact how we conduct our resource planning. In particular, the cost of carbon, distributed solar energy standard, the updated renewable energy standard, and new carbon-free energy standard each impact our 2024 Plan. We see similar 100 x 2040 goals in Wisconsin and Michigan.

Third, community and employee considerations are impacting our planning process by causing us to rethink how we make decisions. We have taken efforts to engage and elicit community and stakeholder feedback and incorporate that feedback into how we do business, such as working to enhance equitable outcomes and broaden participation in energy decision-making by the communities we serve. We also know that our decarbonization goals impact the communities we work in and serve. We are also committed to transitioning our system while proactively working with the communities where plants are located and the employees who work in those plants.

Fourth, our planning recognizes customer preferences. The NSP System continues to serve a diverse mix of customers with varied interests and preferences. While most customers continue to prioritize affordability, we have seen increasing interest in customer choice around how and from where they consume energy, sustainability, carbon reduction, and other clean energy objectives. We are taking these interests into consideration in planning our resource mix for the future, recognizing and incorporating the energy preferences of our municipal, commercial and industrial, and residential customers through program development and offerings.

Finally, we are planning and incorporating technology and supply trends around generation and energy storage. The 2024 Plan assumes that wind and solar capital costs will continue to decline. We also expect technological advancements to continue to improve capacity factors, as tracking and PV module technologies have continued to improve and inverter loading ratios have increased with falling capital costs. We continue to monitor industry activity around other emerging technologies that may contribute to achievement of our goals.

At the same time, the planning for, and managing of, the integrated NSP System requires us to balance the needs and policy goals of all stakeholders and jurisdictions we serve. It is important to recognize that not all states we serve have the same energy policies and environmental goals. We believe that proactive leadership in the face of new and proposed environmental regulation, customer expectations, emerging technologies, and changes to the NSP System will allow us to both meet our customer and stakeholder goals as we affirmatively address these trends rather than being shaped by them.

III. MINIMUM SYSTEM NEEDS

Our planning process requires that we identify the minimum number of resources our system will need throughout the planning period. This provides a baseline upon which

we have developed the Reference Case, our modeling scenarios, and our Preferred Plan.

Our forecast begins with the capacity or peak demand, which indicates the total generating capacity (in MWs) needed to meet our customers' needs during the highest demand hour each year. We also evaluate the total energy (in MWhs) that we anticipate our customers will use annually. The peak demand and total energy requirements together guide us in identifying the best generating resources to meet customer needs. We include a "reserve margin" as prescribed by MISO to account for potential uncertainties in resource availability or demand level. By subtracting the resources, we currently have or expect to have from this "reserve margin," we can identify our net surplus or need. Each of these components are illustrated below in Figure Z-1:

Figure Z-1: Net Resource Need/Surplus Calculation

Customer Needs Forecast
Plus MISO Reserve Margin
Equals **Total Capacity Obligation**
Minus Demand Response Capability
Minus Generation Capacity (measured by seasonal accredited capacity)
Minus Generation Adjustments
Equals **Net Resource Need/Surplus**

We anticipate a net surplus through 2026 and a deficiency thereafter, starting first in the spring and summer of 2027. From this point, our modeling underlying our resource planning identifies the best combination to meet any net resource deficiencies and the resulting energy mix.

A. Reference Case Expansion Plan and Energy Mix

We incorporate all the relevant elements into the EnCompass modeling tool, which allows us to explore how we best meet our customer and policy requirements under a variety of conditions and at a reasonable cost. We work with internal and external subject matter experts to develop starting assumptions that reflect their expert opinion of likely future conditions. We then test the robustness of the plan through sensitivity analysis and special studies by individually changing key assumptions and re-running the plans under these changed assumptions.

IV. THE PREFFERRED PLAN

Our Preferred Plan continues to deliver on our obligations to provide safe, reliable, and affordable service to our customers while furthering our ambitious carbon-reduction strategy. Specifically, our 2024 Plan was developed to respond to emerging load growth that we anticipate, while providing a reliable and affordable system that furthers our carbon reduction goals. The result is a plan that will add thousands of megawatts of additional renewable resources, retire emitting baseload generation, and add flexible, dispatchable generation and storage resources to support the shift to renewables. We will also extend the lives of our carbon-free baseload nuclear generators.

A. Planning Objectives.

The 2024 Plan was developed to address the planning landscape in which we operate based on three key considerations: (1) load growth, (2) reliability; and (3) affordability. Each planning objective is addressed below.

1. Load Growth

The last several decades of our industry can be characterized as a period of relatively flat annual growth for electric consumption. However, we anticipate that the period of slow consumption growth is ending, and we expect to see the demand for our service increase at a greater pace. While further improvements in energy efficiency and demand response capabilities will continue to provide substantial value to our customers, we anticipate that emerging uses of electricity will result in greater consumption growth than we have needed to plan for in recent years. Specifically, our base case forecasts now anticipate average annual growth rates of 1.8 percent in our peak demand and 2 percent for our energy forecast over the 2024-2040 planning period. This is a marked divergence from what we have anticipated in the past. This expected growth in demand from electrification coincides with our aggressive goals to decarbonize our system.

2. Reliability

This anticipated increase in the growth of electricity consumption comes amid renewed attention to the reliability of the electric system. The foundational service we provide to our customers is safe and reliable electricity, and we must be prepared to meet our customers' energy demands twenty-four hours a day, 365 days a year. The closing of our (and other utilities') baseload coal units and substantial additions

of intermittent renewable resources has and will continue to provide many benefits to our customers and communities. Because of these retirements and changing resource accreditation methodologies, overreliance on the market creates substantial risk of high prices and the possibility that sufficient resources simply will not be available when they are needed.

To address these risks while continuing to optimize the cost-effectiveness of our fleet, we used a modified analysis to develop our 2024 Plan, and we did not allow our model to rely on the MISO market to meet our capacity obligations. We did, however, set those capacity obligations using MISO's coincident peak and planning reserve margin (PRM), and we allowed the model to benefit from access to the MISO market to optimize the dispatch of resources to serve our customers. This two-step analysis results in an expansion plan that takes advantage of the potential cost savings of participating in the MISO market, while not being reliant on the MISO market to meet our resource needs. In addition, by continuing to plan to MISO's coincident peak and PRM, our analytical approach ensures that we are not adding resources that are not necessary to meet our customers' needs.

In addition to planning to meet our planning obligations without reliance on MISO, we have taken steps to further refine our energy adequacy analysis. We conducted an energy adequacy back casting analysis to ensure our system has the reliable energy it needs to serve all customers at every hour, of every day. Further, we examined the inertial floor of our system to assess how the grid would perform in the absence of traditional baseload generation. Our studies go beyond traditional EnCompass modeling to verify the need for firm dispatchable resources and inertia to ensure reliable service for our customers.

3. Affordability

We understand the importance of keeping the cost of our service reasonable for our customers and providing cost-effective solutions for our energy needs. That is why we plan our expansion with stakeholders in mind with an expansion plan that can be implemented at reasonable cost to our customers. Our average residential customer's electricity bill has remained below the national average, and our goal continues to be that our customers will experience average annual bill increases that are below the rate of inflation. In order to keep costs low for our customer, we took care to leverage additional policy incentives that will benefit our customers. In particular, the passage of federal tax incentives that lowers costs, saving customers a projected $5.7 billion in tax credits in renewable savings over the course of the expansion plan.

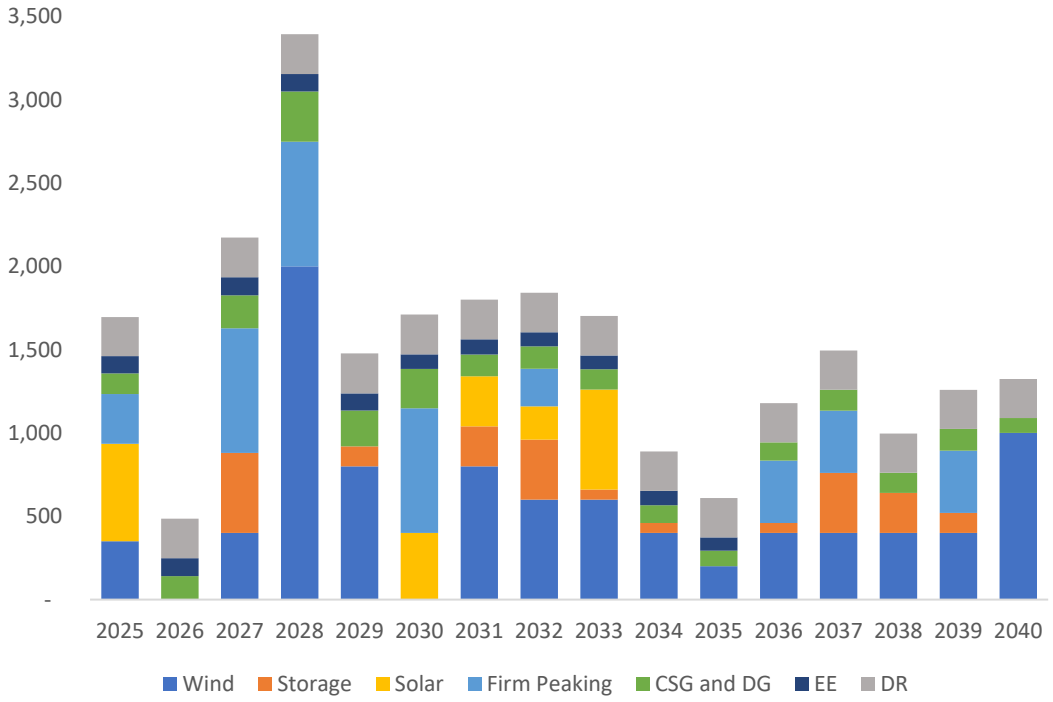
B. Preferred Plan

As stated, proactive investments to maintain a reliable and resilient regional power grid are necessary as more low-cost renewable energy is brought online, existing power plants are retired, electrification continues to grow, and extreme weather events become more frequent. The 2024 Plan is designed to accelerate our carbon-reduction efforts while maintaining a safe, reliable, and affordable system for our customers and communities throughout the planning period.

Key Components of our Preferred Plan include adding thousands of megawatts of additional renewable resources to our system and incrementally retiring emitting baseload generation, while also incorporating flexible, dispatchable generation to enable grid reliability throughout this transition. We propose extending operations of our carbon-free nuclear units and extending operations of our Refuse Derived Fuel (RDF) waste to energy generating plants. Finally we are supporting the beneficial electrification of certain end uses and enabling demand flexibility, which will help to reduce carbon emissions in other sectors while also allowing for load shifting to help integrate more renewables.

Figure Z-2 below outlines the proposed timing, type, and size of resource additions comprising our Preferred Plan.

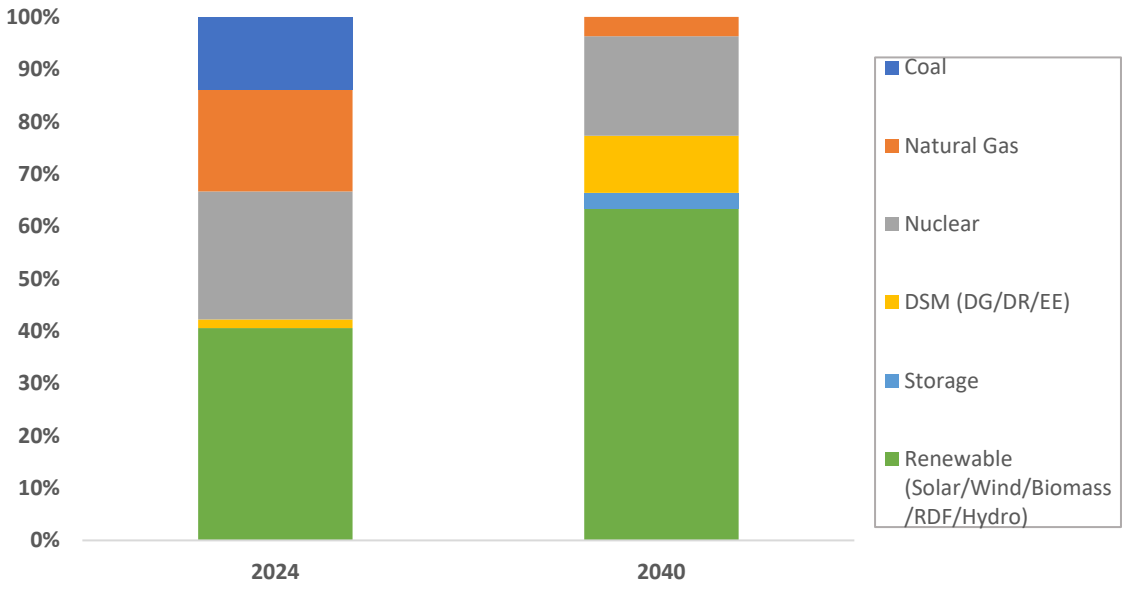
Figure Z-2: Preferred Plan Resource Additions (MW)



	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Wind	350	0	400	2,000	800	0	800	600	600	400	200	400	400	400	400	1,000
Storage	0	0	480	0	120	0	240	360	60	60	0	60	360	240	120	0
Solar	585	0	0	0	0	400	300	200	600	0	0	0	0	0	0	0
Firm Peaking	298	0	748	748	0	748	0	225	0	0	0	374	374	0	374	0
CSG and DG	124	140	198	301	215	237	131	134	123	106	94	110	125	121	130	90
EE	103	108	108	105	103	87	91	85	82	86	80	0	0	0	0	0
DR	234	237	238	239	239	239	238	237	237	236	236	235	235	235	234	234

Our Preferred Plan outlined above would result in the energy mix shown in Figure Z-3 below.

Figure Z-3: NSP System 2024 and 2040 Preferred Plan Energy Mix



C. Action Plans

1. Five-Year Plan (2024-2030)

Our 2024 Plan does not identify any incremental capacity needs until 2027. However, from 2027 through 2030, our Preferred Plan contemplates adding over 6,000 MWs of incremental generation. Below, we discuss the near-term actions by resource type that underly expansion plan, recognizing that the resource additions may need to be smoothed during the implementation process to create a portfolio of projects that can be constructed effectively within the constraints of the market for equipment and labor.

a. Wind

Our 2024 Plan proposes to add 3,200 MWs of wind additions through 2030. 2,800 MWs of the 3,200 MWs near-term wind total is attached to the MN Energy Connection Sherco Generation tie line, which was proposed in our 2019 Plan. We are pursuing 1200 MWs of this wind through the recently approved MN Development Transfer Resource Acquisition Process. We expect to begin further procurement activities and the proceedings through a Commission approved bidding process in the next year. The remaining 400 MWs of generation is generic and non-location specific.

b. Solar

Our 2024 Plan adds 400 MWs of solar using the King Interconnection in 2030. Beyond these additions, we do not include any new utility scale solar projects between 2024 through 2030, other than those already approved by the Commission and included in our Base Case. On the distributed solar side, we have incorporated forecasted growth into our 2024 Plan using the maximum possible level of non-legacy community solar gardens and levels of three percent distributed solar energy standard solar.

c. Firm Dispatchable

Our 2024 Plan calls for 2,244 MWs of firm dispatchable resources by 2030. These resources are split between 748 MWs in 2027, 748 MWs in 2028, and 748 MWs in 2030. Approximately 374 MWs of the 2028 need is located on our re-optimized Sherco Generation tie line and is pending regulatory approvals from the Commission. The rest of the firm dispatchable additions are generic.

We have already opened a proceeding before the Minnesota Commission to consider up to 800 MWs of firm dispatchable resources.[1] The 800 MWs are included in the 2,244 MWs proposed in our 2024 Plan, however our modeling for this plan identifies a need exceeding 800 MWs of firm dispatchable resources. As part of the proceeding, the Company has submitted three proposals totaling in excess of 800 MWs. Third party providers have also submitted proposals.

d. Battery Energy Storage Systems

We plan to add approximately 600 MWs of storage by 2030. The 600 MWs of storage is comprised of a modeled 480 MWs of generic storage in 2027, and 120 MWs as part of our re-optimized Sherco Generation tie line in 2029. We expect to solicit these resources as part of a request for proposals under a commission approved bidding process.

e. Nuclear Extension

In order to support the extension of our nuclear generation plants to at least 2050, steps will need to be taken in the near future. We plan on filing a certificate of need with the Commission on February 7, 2024, for additional dry fuel storage to support

[1] Docket No. E002/CN-23-212.

continued operation of Prairie Island through 2053/2054. We plan to submit our application in 2026 with the Nuclear Regulatory Commission to extend the Prairie Island Nuclear Generating Plant operating license from 2033/2034 to 2053/2054.

With respect to Monticello, we plan to begin construction of the concrete pad at Monticello in 2026. Shortly after a Commission decision on the 2024 Plan, we will also seek another certificate of need for the dry fuel storage necessary to support the additional 10-year life extension of Monticello.

Throughout the planning process, we continue to collaborate with the Prairie Island Indian Community, the City of Red Wing, the City of Monticello, Goodhue County, Wright County, and other community interests to ensure transparency and continuous partnership.

f. Refuse Derived Fuel Waste to Energy Extension

Finally, all three of our renewable RDF waste to energy generating plants are slated for retirement in 2027, and we plan to extend the life and operations of our Red Wing, Mankato, and French Island RDF plants to 2037, 2037, and 2040 respectively. These plants not only add significant value to our system and help us achieve our renewable energy goals with reliable power, but also provide value to the local communities they serve. We plan to address the extension of these plants in our upcoming annual remaining lives filing.

2. Long-Term Plan

In addition to our immediate five-year action plan, our 2024 Plan relies on model-selected resources in the 2031-2040 period that we envision could be part of our energy future including that include:

- Adding an additional 1,100 MWs of incremental utility-scale solar;
- Adding an additional 5,200 MWs of incremental wind and repowering existing wind resources when economical;
- Adding an additional 1,500 MWs of incremental Battery Energy Storage Systems;
- Adding approximately 1,347 MWs of incremental firm peaking resources;
- Developing additional regional transmission infrastructure;
- Growing our DR portfolio to approximately 1,385 MW by 2040; and
- Continuing plans to achieve average annual energy savings, through our energy efficiency programs between 2031-2040.

Our 2024 Plan presents a pathway to achieve Minnesota's 100 percent carbon free by 2040 law. While these modeled additions project what our system would look like in 2040, we note that ingenuity, new technologies, and transmission will be necessary in order to ensure we can achieve our longer-term goals of 100 percent carbon-free electricity across the NSP system by 2050.

While our 2024 Plan examines the generation side of the equation, the Company is working on creating a long-term Vision study to examine the 2040 and 2050 timeframes to determine what transmission investments might be needed to achieve a 100 percent carbon free energy plan. The study will include a comprehensive look at load growth, including varying electrification and adoption rates, generation profiles and locational data, and finally, transmission needed to accommodate the future carbon goals. We look forward to leveraging these studies to inform our planning as they become available.

V. ECONOMIC MODELING FRAMEWORK.

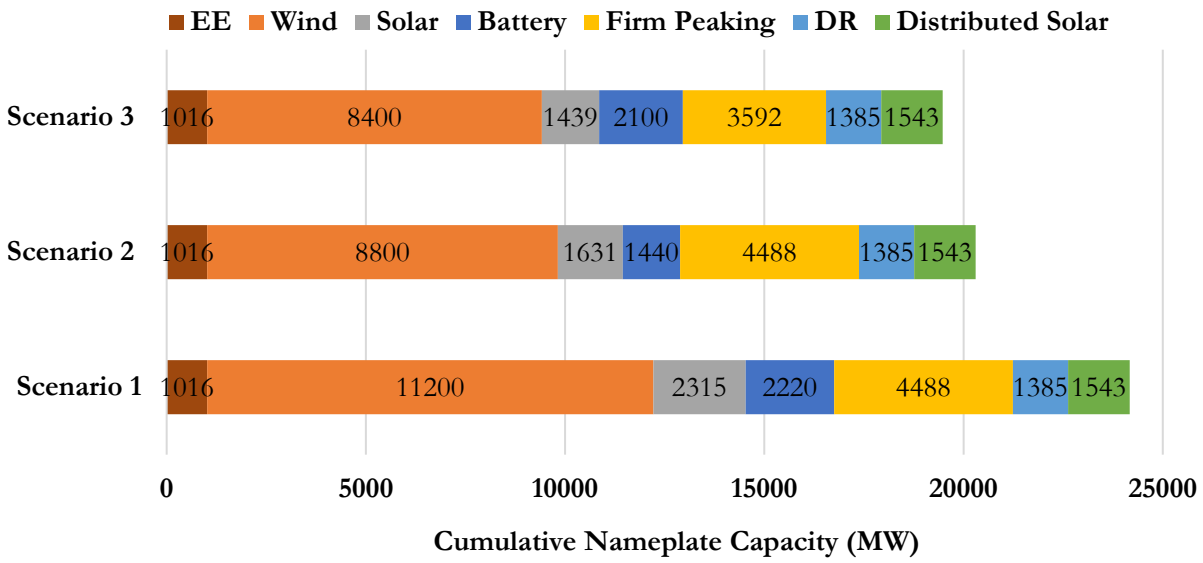
To develop the 2024 Plan, we use a modeling tool called Encompass. EnCompass is a software tool that estimates the costs of various resource expansion plan options, evaluates specific capacity alternatives, and measures the potential risks of new environmental legislation and other policy scenarios. This tool allows us to assess different scenarios under a variety of possible futures to help us meet customer and policy requirements cost-effectively under various conditions. We create starting assumptions with the help of internal and external experts, reflecting likely future conditions. We test the robustness of the plans through sensitivity analysis.

Starting with our Reference Case, we created scenarios that examine different potential life extensions and retirement dates for our nuclear units and the resulting new resources needed to meet customers' needs, achieve our policy goals and obligations, and maintain affordable rates. The scenarios include analysis of:

- Scenario 1: Reference Case; Retire Prairie Island in 2033/34, Monticello in 2040 (updates all baseline resources, including Wheaton and Blue Lake repowers, RDF extension, Inver Hills extension);
- Scenario 2: Prairie Island Extension; Retire Prairie Island in 2053/54, Monticello in 2040; and
- Scenario 3: Extend All Nuclear; Retire Prairie Island in 2053/2054, Monticello in 2050.

After identifying the scenarios, we used EnCompass to identify the expansion plans for each of the three primary scenarios, and their resulting cost and emissions impacts. Completing baseload scenario runs, as described above, allows us to examine scenario outcomes side-by-side, to evaluate their benefits and drawbacks. Among other factors, we examine the resource expansion profile and carbon emissions outcomes, present value costs, and several indicators of risk for each scenario. The cumulative expansion plan additions through the planning period for the three scenarios are shown below in Figure Z-4.

Figure Z-4: Expansion Plans by Scenario (MW, Cumulative Nameplate Capacity Resource Additions by Resource Type, 2024-2040)



As shown above in Figure Z-4, Scenario 3 results in fewer additions of firm peaking and wind capacity relative to both Scenarios 1 and 2. The extension of the nuclear units offset additions of other resources need for capacity and energy. While Scenario 2 includes the same amount of cumulative firm peaking resources through 2040, those additions are delayed by the extension of Prairie Island, and few firm peaking resources are needed over the 20-year life extension. Moreover, the nuclear extensions provide a certain and stable source of energy to our system as we transition our generation fleet.

The cost impact of the three scenarios is shown below in Table Z-1. The table shows the net present value (NPV) delta of modeled costs compared to Scenario 1 (the

Reference Scenario), with negative values representing customer savings relative to the Reference Scenario.[2]

Table Z-1: Scenario PVSC/PVRR Deltas from Reference Case ($2024 millions)

PVSC Production Cost	Delta in NPV ($m) 2024-2040	NPV ($m) 2024-2040	Delta in NPV ($m) 2024-2047	NPV ($m) 2024-2047	Delta in NPV ($m) 2024-2050	NPV ($m) 2024-2050
Scenario 1 PVSC	$0	**$51,037**	$0	**$63,635**	$0	**$68,788**
Scenario 2 PVSC	($413)	**$50,624**	($437)	**$63,198**	($513)	**$68,275**
Scenario 3 PVSC	($785)	**$50,252**	($941)	**$62,695**	($1,025)	**$67,762**
PVRR Production Cost	**Delta in NPV ($m) 2024-2040**	**NPV ($m) 2024-2040**	**Delta in NPV ($m) 2024-2047**	**NPV ($m) 2024-2047**	**Delta in NPV ($m) 2024-2050**	**NPV ($m) 2024-2050**
Scenario 1 PVRR	$0	**$34,678**	$0	**$44,948**	$0	**$48,927**
Scenario 2 PVRR	($97)	**$34,581**	$291	**$45,239**	$391	**$49,317**
Scenario 3 PVRR	($464)	**$34,215**	$46	**$44,994**	$239	**$49,166**

The Scenario 3 plan was the lowest cost plan in terms of PVSC in all time periods assessed. As our nuclear plants provide a source of carbon-free energy to our system, extension of these resource results in overwhelming benefits due to the avoidance of carbon emissions from other resources. It also is the lowest cost plan in terms of PVRR through 2040, and nearly breakeven through 2047 compared to the Reference Case. The only outlier is when PVRR is assessed through 2050, which shows Scenario 3 adds $239 million in NPV compared to the Reference Case. We note, however, that the replacement capacity added at the end of the expansion plan to replace Prairie Island in Scenario 2 and Prairie Island and Monticello in Scenario 3, significantly impacts overall cost.

Given current technologies, the model makes significant additions of firm dispatchable resources in the late 2040s in anticipation of the retirement of the nuclear fleet. Under the PVRR assumptions, no cost is included on the emissions from these resource additions. We expect technological advancements will provide resource options that are not currently available when the plants near the end of their extended lives. Therefore, the significant firm dispatchable additions in the late 2040s may not

[2] Note that these PVRR and PVSC deltas shown depict NPV for 2024-2040.

provide a reliable indication of the costs that far out in time. As a result, we provide cost comparisons over three different time horizons. The most relevant of these horizons—through 2040, when resource and cost assumptions are most known—shows the extension of our nuclear fleet provides significant economic benefits even when the benefits of avoided emission are not included.

A final step in our analysis process evaluated the performance of the baseload study plans under different sensitivities. A summary of examined sensitivities is presented in Table Z-2 below.

Table Z-2: Sensitivities

Category	Scenario Descriptions
Standard	PVSC – Base, i.e., with Mid Reg Cost ($40) >2028 + Mid Draft EPA <2028 + (Draft EPA - Reg Cost) starting in 2028
	PVRR – Base, i.e., no carbon cost and environmental externality
Sensitivities on All Three Nuclear Scenarios	
Fuel prices	High Fuel/Market Price
	Low Fuel/Market Price
Load	High Load
	Low Load
Technology cost	High Technology Cost
	Low Technology Cost
	Edison MISO Market Prices for wind and solar
Cost of carbon	High Reg Cost ($75) >2028 + High Draft EPA <2028 + (Draft EPA - Reg Cost) starting in 2028
	Low Reg Cost ($5) >2028 + Low Draft EPA <2028 + (Draft EPA - Reg Cost) starting in 2028
	Draft EPA - High ($0 Reg Cost)
	Draft EPA - Mid ($0 Reg Cost)
	Draft EPA - Low ($0 Reg Cost)
Market Access	Market access off in dispatch runs
Environmental Policy	Good Neighbor Rule applied in both Minnesota and Wisconsin + EPA Rule 111
Combination	High technology cost + high load
	Low technology cost + low load
Carbon Free 100x50	Carbon constraint to reach 100x50 carbon free goal

The PVRR and PVSC for each sensitivity consistently shows the Preferred Plan, Scenario 3, as yielding the most customer benefits on a PVSC basis across nearly all sensitivities. Based on these analyses, we believe our Preferred Plan meets all our key planning objectives, balances outcomes and costs, and provides us with the strategic flexibility to address the planning landscape.

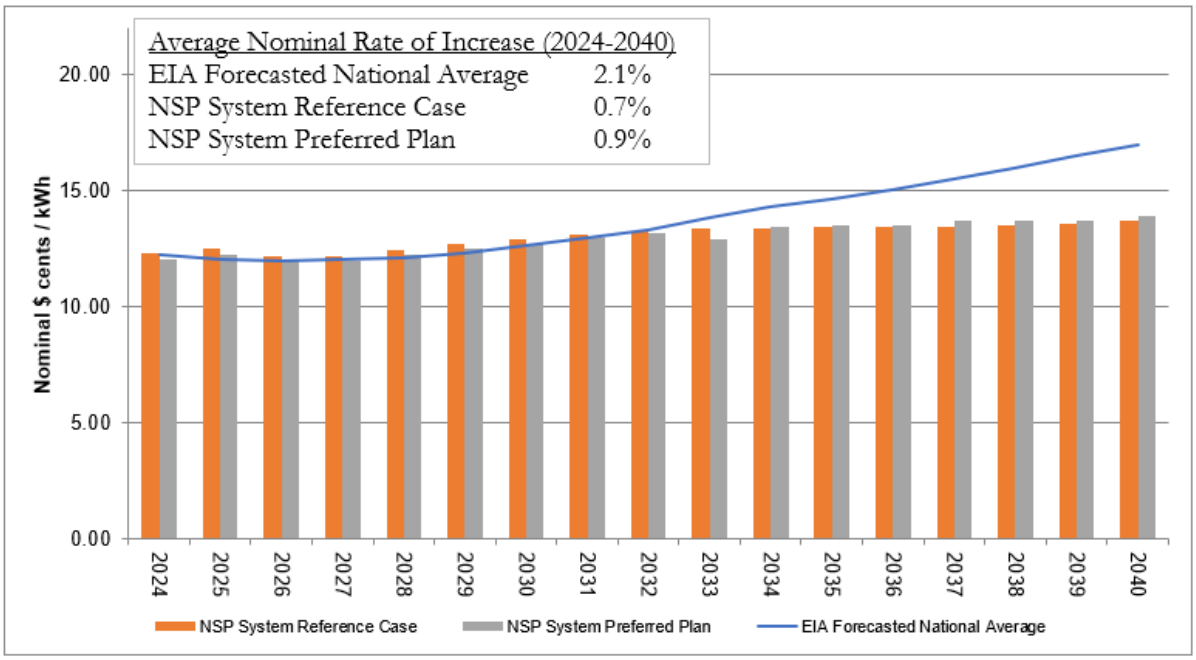
VI. RATE IMPACTS

Resource plans, among other things, are evaluated in part on their ability to keep the customers' bills and the utility's rates as low as practicable, given regulatory and other constraints. Our analysis of the present rate and bill impacts of our Preferred Plan shows that while the Preferred Plan's rate impact is higher than the reference case, it is lower than the national average forecasted by the Energy Information Administration.

Our Preferred Plan results in an estimated average annual increase in revenue requirements less than the Base Case and just over 1 percent overall. With our Preferred Plan, we can achieve significant CO_2 emissions reductions, with cost impacts that are roughly half of the expected national average increase in electricity prices. Both the Base Case and The Plan are designed to meet the Company's clean energy goals, and state policy objectives.

As shown in this report, our Preferred Plan maintains affordability and reliability while continuing our trend of carbon reduction benefits relative to our Base Case. See Figure Z-5 below.

Figure Z-5 Preferred Plan Average Rate Impact for the NSP System



We have been adding cost-effective renewable resources to our system to reduce emissions. We believe that our Preferred Plan keeps customers' bills and rates as low as practicable while continuing our transition to a carbon-free system. As we continue our transition to a carbon-free system, we remain committed to being the energy provider of choice for our customers, and keeping rates low is a key part of that commitment.

VII. CONCLUSION

The backbone of resource planning is ensuring we have the right resources in place to keep the lights on for our customers and to be ready to accommodate customer load growth reliably and in a timely fashion. We continue to take measured and thoughtful action to balance the key factors of load growth, reliability, and affordability to ensure our customers receive the greatest value both now and over time, and that the fundamentals of our electric business remain sound.

The Company has led the clean energy transition for nearly two decades. We share the state's vision to deliver 100 percent clean energy in Minnesota by 2040. By planning ahead and charting an orderly, gradual transition of our generation fleet, we believe we can achieve our stated goals while managing impacts to host communities and

employees, preserving the reliability and stability of our system, and maintaining affordability for our customers.

We have presented a Preferred Plan that seeks to (1) maintain or improve the adequacy and reliability of utility service; (2) keep the customers' bills and our rates as low as practicable, given constraints; (3) minimize adverse socio-economic effects and adverse effects upon the environment; (4) enhance our ability to respond to changes in the financial, social, and technological factors affecting our operations; and (5) limit the risk of adverse effects from financial, social, and technological factors outside of our control. For these reasons and as discussed throughout our 2024 Plan filing, we believe our Preferred Plan is in the public interest and merits the Commission's approval.

414 Nicollet Mall
Minneapolis, MN 55401

**PUBLIC DOCUMENT –
NOT PUBLIC DATA HAS BEEN EXCISED**

June 30, 2023

—Via Electronic Filing—

Anne Sell
Minnesota Department of Commerce
85 Seventh Place East, Suite 280
St. Paul, MN 55101

RE: ELECTRIC UTILITY ANNUAL REPORT
DOCKET NO. E999/M-23-11

Dear Ms. Sell:

Northern States Power Company, doing business as Xcel Energy, submits the enclosed 2022 Electric Utility Annual Report required under Minn. Rule 7610.0130. Our Annual Report consists of the enclosed pages as well as individually uploaded live spreadsheets.

Private and Trade Secret Data Justification
Please note that this report contains Trade Secret information protected by the Minnesota Data Practices Act, including private data—including names, addresses, and usage—for our largest electric customers. That information has economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by other persons and is subject to efforts by the Company to protect the information from public disclosure. Xcel Energy maintains this information as a trade secret based on its economic value from not being generally known and not being readily ascertainable by proper means by other persons who can obtain economic value from its disclosure or use. For this reason, we ask that the data be treated as non-public data pursuant to Minn. Stat. § 13.37, subd. 1(b).

The forecast purchase and resale energy information has economic value to Xcel Energy, its customers, suppliers, and competitors. Because Xcel Energy competes for purchased energy, fuel and transportation services in a competitive marketplace,

disclosure would directly harm Xcel Energy by making its delivered supply costs less competitive. For this reason, pursuant to Minn. Stat. § 13.37, subd. 2, we have removed this data from the public version of our filing.

We have electronically filed this document with the Minnesota Public Utilities Commission. Please feel free to contact Gail Baranko at (612) 330-6935 or gail.baranko@xcelenergy.com or Christine Schwartz at (612) 330-6193 or Christine.E.Schwartz@xcelenergy.com if you have any questions regarding this report.

Sincerely,

/s/

GAIL A. BARANKO
REGULATORY MANAGER

Enclosures

Docket No. E999/M-23-11
June 30, 2023
7610.0600 Subpart C

Northern States Power Company-Minnesota
Electric Utility Annual Report

MINNESOTA COMMUNITIES SERVED BY XCEL ENERGY

INFORMATION SHEET
MINNESOTA

U = Unincorporated E = Electricity only G = Gas only EG = Electricity and Gas W = Wholesale

A
Ada W
Afton EG
Albany E
Albany Township E
Albertville E
Alma City UE
Almelund UEG
Alton Township E
Altura E
Amador Township EG
Annandale E
Anoka County EG
Apple Valley E
Arden Hills EG
Arlington Township E
Ashland Township E
Atwater E
Averill UE
Avon E
Avon Township E

B
Baker UE
Balaton E
Baldwin Township G
Bancroft Township E
Barclay Township G
Barnesville Township*** G
Bath Township E
Baxter G
Bayport EG
Baytown Township EG
Beauford UE
Beauford Township E
Becker EG
Becker Township E
Belgrade E
Belle Creek Township E
Belle Plaine E
Belle Plaine Township E
Bellechester E
Bellevue Township G
Belvidere Township E
Belview E
Benton County EG
Benton Township E
Bergen Township E
Bernadotte Township E
Big Lake EG
Big Lake Township E
Birch Cooley Township E
Birchwood EG
Bird Island E
Bird Island Township E
Blaine EG
Blakely Township E
Blomkest E
Blooming Grove Township E
Bloomington E
Blue Earth County EGW
Blue Hill Township EG
Bombay UE
Bongards UE
Borup E
Brainerd G
Breezy Point G
Bridgewater Township E
Briggs Lake G
Brighton Township E
Brockway Township EG
Brooklyn Center E
Brooklyn Park E
Brooten E
Brownton E
Brown County E
Buffalo EGW
Buffalo Lake E
Buffalo Township EG
Burnsville E
Butterfield E
Byron E

C
Camden Township E
Canisteo Township E
Cannon City UE
Cannon City Township E
Cannon Falls E
Cannon Falls Township E
Carver E
Carver County EG
Cass County G
Castle Rock Township E
Center City EG
Centerville EG
Champlin E
Chandler E
Chanhassen E
Chaska E
Cherry Grove Township E
Chester Township E
Chickamaw Beach G
Chippewa County E
Chisago City EG
Chisago County EG
Chisago Lake Township EG
Circle Pines E
Clara City E
Claremont E
Claremont Township E
Clarkfield E
Clarks Grove E
Clay County EG
Clear Lake EG
Clear Lake Township E
Clearwater EG
Clements E
Cleveland EG
Cleveland Township G
Clinton Falls UE
Clinton Falls Township E
Coates E
Cobden E
Cokato E
Cokato Township E
Cold Spring E
Collegeville EG
Collins Township E
Collinwood Township EG
Cologne E
Columbia Heights E
Columbus Township EG
Comstock E
Concord UE
Concord Township E
Coon Rapids E
Corcoran E
Cordova Township EG
Corinna Township E
Cornish Township E
Cosmos EG
Cosmos Township EG
Cottage Grove EG
Cottonwood E
Courtland E
Courtland Township E
Credit River Township E
Crosslake G
Crow Lake Township E
Crow Wing County UG
Crystal E
Currie E

D
Dahlgren E
Dakota E
Dakota County EG
Danube E
Danville Township E
Darwin G
Darwin Township G
Dassel EG
Dassel Township EG
Dayton E
Deephaven E
Deerfield Township E
Delano EGW
Delavan Township E
Delhi E
Dellwood EG
Denmark Township EG
Dennison E
Dilworth EG
Dodge Center E
Dodge County E
Douglas County E
Dresbach UE
Dresbach Township E
Dryden Township E
Dundas EGEagan G

E
Eagle Lake E
East Bethel EG

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U = Unincorporated E = Electricity only G = Gas only EG = Electricity and Gas W = Wholesale

East Grand Forks* GW
East Gull Lake G
Echo E
Echo Township E
Eden Lake Township E
Eden Prairie E
Eden Valley E
Edgerton E
Edina E
Edwards Township E
Elba E
Elko New Market E
Ellington Township E
Ellsworth Township G
Elmwood Township E
Elysian EG
Elysian Township EG
Empire E
Essig UE
Evan E
Excelsior E
F Fairfield G
Fairview Township G
Falcon Heights EG
Faribault EG
Faribault County E
Farmington EG
Faxon Township E
Featherstone Township E
Felton E
Fifty Lakes G
Fletcher E
Florence E
Florence Township E
Foley EG
Forest Lake EG
Forest Lake Township EG
Fort Snelling E
Franconia Township EG
Franklin E
Franklin Township EG
Freeborn County E
Freedom Township E
Freeport E
Fridley E
Frontenac UE
G Garden City Township E
Garvin E
Gaylord E
Gem Lake EG
Gibbon E
Gillford Township E
Gilmanton Township E
Glasgow Township E
Glencoe EW
Glencoe Township E
Glenwood E
Glenwood Township E
Glyndon EG
Glyndon Township E
Golden Valley E
Good Thunder E
Goodhue E
Goodhue County EG
Goodhue Township E
Goodview* EG
Gordon Township E
Grafton Township E
Granite Falls Township EW
Grant EG
Grant Township G
Green Isle EG
Green Isle Township EG
Green Lake UEG
Greenfield E
Greenfield Township E
Greenvale Township E
Greenwald EG
Greenwood E
Grey Cloud Island Township EG
Grove Township E
H Hadley E
Hale Township E
Ham Lake G
Hamburg EG
Hamel UE
Hammond E
Hampton E
Hampton Township E
Hanley Falls E
Hanover E
Hartland E
Harris E
Hartland Township E
Hastings E
Hatfield E
Haven Township EG
Hawk Creek Township E
Hay Creek Township EG
Hayfield E
Hector E
Helen Township E
Helena Township E
Henderson E
Hennepin County EG
Hillsdale Township E
Hilltop E
Hitterdal G
Hokah E
Holding Township E
Holdingford EG
Holland E
Holland Township E
Hollywood Township E
Holy Cross Township E
Homer Township EG
Hopkins E
Houston County E
Howard Lake E
Hugo EG
Hyde Park Township E
Ideal Township G
Ihlen E
I Independence EG
Inver Grove Heights EG
Iona E
Iosco Township E
Irving Township EG
Isanti G
Isanti County G
Jackson Township EG
Jamestown Township E
J Janesville EW
Janesville Township E
Jasper E
Jenkins G
Jenkins Township G
Jessenland Township E
Jordan E
Kalmar Township E
Kandiyohi County EG
K Kandiyohi Township G
Kandiyohi G
Kasota Township EW
Kasson W
Kellogg E
Kenyon Township EW
Kilkenny E
Kilkenny Township E
Kimball E
Kingston E
Kingston Township E
Krain Township E
La Crescent E
La Crescent Township E
L Lac Qui Parle County E
Lafayette E
Lake City EGW
Lake Crystal W
Lake Edward Township G
Lake Elmo EG
Lake Henry E
Lake Henry Township E
Lake Lillian E
Lake Lillian Township E
Lake Shore G
Lake St. Croix Beach E
Lake Township EG
Lake Washington G
Lake Wilson E
Lakeland EG
Lakeland Shores EG
Laketown Township E
Lakeville E
Landfall EG
Lanesburgh Township E
Lauderdale EG
Le Sauk Township EG
Le Sueur County EG
LeHillier E
Lemond Township E
Lent Township EG
LeRay Township E
Lester Prairie E
Leven Township E
Lexington E
Lilydale EG
Lime Township E
Lincoln Township E
Lindstrom EG
Lino Lakes EG
Linwood Township EG
Little Canada EG
Long Beach E
Long Lake E
Lonsdale E
Loon Lake Township G
Loretto E
Louisville Township G
Lowry E

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Lura Township E
Luxemburg Township E
Lydia UE
Lynden Township EG
Lyon County E
Lyra Township E
M Madelia W
Madison Lake EG
Mahtomedi EG
Maine Prairie Township E
Manchester E
Manhattan Beach G
Mankato E
Mankato Township E
Mantorville E
Mantorville Township E
Maple Grove E
Maple Lake E
Maple Plain E
Mapleton E
Mapleton Township E
Maplewood EG
Marine on St. Croix EG
Marshall W
Marysville Township EG
May Township EG
Mayer E
Mazeppa E
Mazeppa Township E
McLeod County E
McPherson Township EG
Medford E
Medford Township E
Medicine Lake E
Medina E
Medo Township E
Meeker County EG
Meire Grove E
Melrose W
Mendota EG
Mendota Heights EG
Meriden UE
Meriden Township E
Middleville Township G
Mille Lacs County G
Millville E
Milton Township E
Minden Township EG
Minneapolis E
Minneapolis–St. Paul International Airport E
Minneiska E
Minneola Township E
Minnesota City EG
Minnesota Falls Township E
Minnesota Lake E
Minnetonka E
Minnetonka Beach E
Minnetrista EG
Minnewaska Township E
Moltke Township E
Montevideo E
Monticello E
Monticello Township E
Montrose EG
Moorhead EG
Moorhead Township G
Morgan E
Morgan Township E
Morrison County G
Morristown E
Morristown Township E
Morton E
Mound E
Mounds View EG
Mountain Lake W
Mount Pleasant Township E
Mount Vernon Township E
Mower County E
Munson Township EG
Murray County E
Navarre E
Nerstrand E
New Auburn E
N New Brighton EG
New Germany E
New Hartford Township E
New Haven Township E
New Hope E
New London EG
New London Township EG
New Market Township E
New Munich E
New Prague E
New Richland E
New Richland Township E
New Scandia Township EG
New Sweden Township E
New Ulm W
Newport EG
Nicollet E
Nicollet County E
Nicollet Township E
Nininger Township E
Nisswa G
Nobles County G
Nodine UE
Norman County E
North Branch EG
North Branch Township G
North Mankato E
North Oaks EG
North St. Paul G
Northfield EG
Northfield Township E
Norwood Young America E
Oak Center UE
Oak Park Heights EG
Oak Township E
O Oakdale EG
Oaklawn Township G
Oakport Township EG
Oakwood Township E
Olmsted County E
Orono E
Orrock Township G
Osakis E
Oshawa Township E
Osseo E
Otisco UE
Otsego E
Ottawa Township E
Otter Tail County G
Owatonna E
Oxford Township G
Palmer Township G
Paxton Township E
Paynesville E
P Paynesville Township E
Pelican Township G
Pemberton E
Pepin Township E
Pequot Lakes G
Pillager** G
Pine Island E
Pine Island Township E
Pine River G
Pine River Township G
Pine Springs EG
Pipestone E
Pipestone County E
Plato E
Pleasant Hill Township EG
Pleasant Lake G
Plymouth E
Point Douglas Park E
Polk County G
Pope County E
Princeton G
Prinsburg E
Prior Lake E
Ramsey County EG
Randolph E
Randolph Township E
R Rapidan UE
Raymond E
Reads Landing UE
Red Wing EG
Redwood County E
Redwood Falls W
Regal E
Renville E
Renville County E
Rheiderland Township E
Rice EG
Rice County EG
Rich Valley E
Richfield E
Richmond E
Ridgeway UE
Robbinsdale E
Rock County E
Rockford E
Rockford Township EG
Rockville EG
Rogers E
Rollingstone EG
Rollingstone Township E
Roscoe E
Roscoe Township E
Roseland UE
Rosemount EG
Roseville EG
Royalton G
Ruthton E
Sabin E
Sacred Heart E
Sacred Heart Township E
S Salem Township E
San Francisco Township E
Sand Creek Township E

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June 30, 2023
7610.0600 Subpart C

Northern States Power Company-Minnesota
Electric Utility Annual Report

U = Unincorporated E = Electricity only G = Gas only EG = Electricity and Gas W = Wholesale

Santiago G
Sartell EG
Sauk Center W
Sauk Rapids EG
Sauk Rapids Township E
Savage E
Scandia UEG
Scott County EG
Sedan E
Severence Township E
Shafer EG
Shafer Township EG
Shakopee EG
Sherburne County EG
Sherman Township E
Shieldsville Township E
Shoreview EG
Shorewood E
Sibley County EG
Sibley Township EG
Silver Lake E
Skyberg UE
Skyline E
Slayton E
Sleepy Eye W
Smiths Mill UE
South Bend UE
South Bend Township E
South Haven E
South St. Paul EG
Southside Township E
Sparta Township E
Spencer Brook Township G
Spicer EG
Spring Hill E
Spring Lake Park E
Spring Lake Township E
Spring Park E
Springfield W
St. Anthony Village E
St. Augusta EG
St. Bonifacious E
St. Clair EG
St. Cloud EG
St. James W
St. Joseph EG
St. Joseph Township E
St. Lawrence Township E
St. Louis Park E
St. Martin E
St. Mary Township E
St. Mary's Point E
St. Michael EG
St. Paul EG
St. Paul Park EG
St. Peter W
St. Stephen G
St. Wendell Township G
Stacy EG
Stanton UE
Stanton Township E
Starbuck E
Stearns County EG
Sterling Township E
Stewart E
Stillwater EG
Stillwater Township EG
Stockholm Township E
Stoneham Township E
Stony Run Township E
Sumter Township E
Sunfish Lake EG
Sunrise UEG
Sunrise Township EG
Swedes Forest Township E
Sylvan Township** G

T
Taylors Falls EG
Timothy Township G
Todd County E
Tonka Bay E
Tracy E
Trosky E
Tunsberg Township E
Tyrone Township E

U
Ulen
Union Grove Township E

V
Vadnais Heights EG
Vermillion E
Vermillion Township E
Veseli UE
Victor Township EG
Victoria E
Villard E

W
Wabasha EG
Wabasha County EG
Waconia E
Waconia Township E
Wacouta Beach
Wacouta Township EG
Waite Park EG
Wakefield Township E
Walcott Township E
Walden G
Waldorf E
Waltham E
Waltham Township E
Wanamingo E
Wanamingo Township E
Warsaw UEG
Warsaw Township EG
Waseca EW
Waseca County E
Washington County EG
Washington Lake Township EG
Washington Township G
Wasioia UE
Wasioia Township E
Watab Township EG
Waterford UEG
Watertown EG
Watertown Township EG
Waterville E
Waterville Township E
Watkins E
Watonwan County E
Watopa Township E
Watson E
Waverly EG
Wayzata E
Weaver UE
Webster UE
Webster Township E
Wegdahl UE
Welch Township E
Wells Township E
West Concord E
West Lakeland Township EG
West St. Paul EG
West Union E
Westport E
Westport Township E
Wheatland Township E
Wheeling Township E
White Bear Lake EG
White Bear Lake Township E
White Bear Township EG
Wilken County E
Willernie EG
Wilson UEG
Wilton Township E
Windom W
Winona EG
Winona County EG
Winona Township E
Winsted
Winsted Township E
Witoka UE
Wolverton E
Wood Lake E
Wood Lake Township E
Woodbury EG
Woodland E
Woodland Township EG
Woodstock E
Woodville Township E
Wright County EG
Wyanett Township G
Wyoming EG
Wyoming Township EG
Yellow Medicine County E

Y
Young America Township E

Z
Zimmerman G
Zion Township E
Zumbro Falls E
Zumbrota E
Zumbrota Township E

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7610.0320 - Forecast Methodology

NSP Electric – Minnesota Annual Report
Peak Demand and Annual Electric Consumption Forecast

OVERALL METHODOLOGICAL FRAMEWORK

Xcel Energy prepares its forecast by major customer class and jurisdiction, using a variety of statistical and econometric techniques. The NSP System serves five jurisdictions. Minnesota, North Dakota and South Dakota are served by Northern States Power Company (NSPM). Wisconsin and Michigan are served by Northern States Power Company, a Wisconsin corporation (NSPW). The NSPM and NSPW Systems operate as an integrated system. The forecast is referred to as the 2023v1.0 Forecast (completed in March 2023).

SPECIFIC ANALYTICAL TECHNIQUES

1. Econometric Analysis. Xcel Energy used econometric analysis to develop jurisdictional MWh sales forecasts at the customer meter for the following sectors (exceptions to this are noted in bullet 2):
    a. Residential without Space Heating;
    b. Residential with Space Heating;
    c. Small Commercial and Industrial;
    d. Large Commercial and Industrial (Minnesota only);
    e. Public Street and Highway Lighting (Minnesota only);
    f. Sales to Public Authorities (Minnesota only).

    Xcel Energy also used econometric analysis to develop the total system MW peak demand forecast.
2. Trend analysis was used for all other sectors, which includes Large Commercial and Industrial, Public Street and Highway Lighting, Other Sales to Public Authorities for all jurisdictions except Minnesota; and Interdepartmental sales for all jurisdictions.
3. Loss Factor Methodology. Loss factors by jurisdiction were used to convert the sales forecasts into system energy requirements (at the generator).
4. Judgment. Judgment is inherent to the development of any forecast. Whenever possible, Xcel Energy used quantitative models to structure its judgment in the forecasting process.

The sales forecasts are estimates of MWh levels measured at the customer meter. They do not include line or other losses. The various jurisdictional class forecasts were summed to yield the total system sales forecast. Native energy requirements are measured at the generator and include line and other losses. Xcel Energy created the native energy requirements based on the sales forecasts. A system loss factor for each jurisdiction, developed based on average historical losses, is applied to the sales forecast to calculate total losses. The sum of the MWh sales and the MWh losses equals the native energy requirements. The native energy requirements, along with peak producing weather and binary variables, then were used as independent variables within an econometric model to forecast MW peak demand for the Xcel Energy North System.

MODELS USED

1. ***Residential Econometric Models.*** Sales to Residential customers represent 31.5% of NSP System electric sales in 2022. Residential sales are divided into with space heating and without space heating customer classes for each NSPM jurisdiction. NSPW jurisdictions only have a total Residential customer class. Regression models using historical data are developed for each Residential sector. A variety of independent variables were used in the models, including:
    - Real Personal Income or Real Personal Income per Capita for the respective jurisdiction;
    - Average price (reported revenues/reported sales) for the respective jurisdiction;
    - Gross Metro Product for the respective jurisdiction;
    - Total population for the respective jurisdiction;
    - Average price of West Texas Intermediate crude oil;
    - Actual heating (HDD) and temperature humidity index (THI) degree days;
    - Number of customers;
    - Number of monthly billing days;
    - Month specific binary variables;
    - Other binary and or trend variables;
2. ***Small Commercial and Industrial Econometric Models.*** The small commercial and industrial sector represents 42.75% of NSP System electric sales in 2022. The models are econometric regressions using historical data. The models include a combination of variables, including the following:
    - Number of small commercial and industrial customers;
    - Gross State/Metro Product for respective jurisdiction;
    - Employment for respective jurisdiction;
    - Actual heating (HDD) and temperature humidity index (THI) degree days;
    - Number of monthly billing days.
    - Month specific binary variables
    - Other binary and or trend variables.
3. ***Large Commercial and Industrial Econometric Model.*** Sales to the large commercial and industrial sector represent 25.2% of NSP System electric sales in 2022. The regression model uses historical data and the following explanatory variables:
    - Industrial Production Index;
    - Number of monthly billing days.
    - Month specific binary variables;
    - Other binary variables.
4. ***Others.*** Sales to the "Others" sector represent 0.6% of NSP System electric sales in 2022. This sector includes Public Street and Highway Lighting (PSHL), Sales to Public Authorities (OSPA) and Interdepartmental (IDS) sales. Regression models are used to estimate sales for the PSHL and OSPA classes (Minnesota only), using historical data and a combination of variables, including the following:
    - Population for the respective jurisdiction;
    - Gross Metro Product for the respective jurisdiction;
    - Number of monthly billing days;

- Month specific binary variables;
- Other binary and or trend variables.

5. ***Municipals.*** As of 2014 there are no longer any municipal customers for whom NSP or NSPW provides firm service.
6. ***Peak Demand Model.*** An econometric model was used to develop the base peak demand forecast for the entire planning period. The model includes a combination of variables, including the following:
    - Weather normalized native energy requirements adjusted for the impacts of historical DSM programs and without adjustments for future DSM, future distributed solar generation behind the customer's meter, and future electric vehicle charging;
    - Peak producing weather by month weighted by customer counts;
    - Binary variables.

METHODOLOGY STRENGTHS AND WEAKNESSES

The strength of the process Xcel Energy used for this forecast is the richness of the information obtained during the analysis. Xcel Energy's econometric forecasting models are based on sound economic and statistical theory. Historical modeling and forecast drivers are based on economic and demographic variables that are easily measured and analyzed. The use of models by class and jurisdiction gives greater insight into how the NSP System is growing, thereby providing better information for decisions to be made in the areas of generation, transmission, marketing, conservation, and load management.

With respect to accuracy, forecasts of this duration are inherently uncertain. Planners and decision makers must be keenly aware of the inherent risk that accompanies long-term forecasts. They must also develop plans that are robust over a wide range of future outcomes.

MODELING DATA

Xcel Energy uses internal and external data sources to create its MWh sales and MW peak demand forecast.

Historical MWh sales are taken from Xcel Energy's internal company records, fed by its billing system. Historical coincident net peak demand data is obtained through company records. The load management estimates are added to the net peak demand to derive the base peak demand.

Monthly weather data is collected for the Minneapolis/St. Paul, Fargo, Sioux Falls, and Eau Claire metropolitan areas. The heating degree-days and THI degree-days are calculated internally based on this weather data.

Economic and demographic data is obtained from the Bureau of Labor Statistics, U.S. Department of Commerce, and the Bureau of Economic Analysis. Typically, they are accessed from IHS Markit, and reflect the most recent values of those series at the time of modeling.

DEMAND-SIDE MANAGEMENT PROGRAMS

The Company sponsors demand-side management ("DSM") programs in the Minnesota and South Dakota jurisdictions. There are no Company-sponsored DSM programs in the North Dakota, Michigan, or Wisconsin jurisdictions. For Minnesota and South Dakota, the regression model results for the Residential and Commercial and Industrial classes are reduced to account for the expected impacts of DSM programs.

The DSM methodology utilizes a transparent method for projecting the impacts of energy efficiency and load management on sales forecasts. There are three distinct steps to this process:

- Collect and calculate historical and current effects of DSM on observed sales;
- Project the forecast using observed data with the impact of DSM removed (i.e. increase historical sales to show hypothetical case without DSM);
- Adjust the forecast to show the impact of all planned DSM in future years.

The first step involves collecting data involving any measure that would cause an impact on the time period utilized in the sales forecast. In this model, we use the time period from 2008 to December 2022 and therefore the historical DSM would include any measure that results in decreased sales in any (or all) years from 2008 through December 2022. Since the vast majority of DSM measures have a lifetime greater than one year (exceptions include but are not limited to behavioral energy savings programs), the impact on sales will include the year that a measure is installed as well as any years that follow until the measure has reached the end of its useful life. For example, a residential lighting measure that was installed in 2008 and has a life of 6 years will result in a sales reduction from 2008 to 2013 (6 full calendar years). Though a measure may be installed in June of 2008 and would persist until May of 2013, the Company believes that the simplifying case in which all measures are installed for the entire calendar year is sufficient.

Due to the wide variation of measures available to customers, the Company sums the savings for each year by DSM program to optimize the level of detail and depth of history included in the model. Achievement data are from the approved Conservation Improvement Program (CIP) Status Reports filed annually for each year since 1996.

The Company's Saver's Switch program results in short-term interruptions of service designed to reduce system capacity requirements rather than permanent reductions in energy use, so it is not considered here.

Adjustments equivalent to those made to sales have also been made to the historical monthly energy and peak demand used in the peak demand regression model and to the resulting peak demand forecast.

BEHIND-THE-METER DISTRIBUTED SOLAR GENERATION

In response to the establishment of a Solar Energy Standard (SES) by the Minnesota Legislature an increased emphasis has been placed on distributed solar generation. A forecast of the expected behind-the-meter solar generation impact on demand and energy has been developed based on new programs designed to meet goals established for the SES. Impacts of customer sited behind-the-meter solar installations on the NSP system were

extracted from this forecast and used to develop adjustments to reduce the class level sales for Minnesota and the NSP System peak demand forecast. This process of adjusting the sales and peak demand forecasts for behind-the-meter solar generation is similar to the adjustments made for DSM programs. There are three distinct steps to this process:

- Collect and calculate historical and current effects of behind-the-meter solar generation on observed sales and peak demand;
- Project the forecast using observed data with the impact of behind-the-meter removed (i.e. increase historical sales to show hypothetical case without behind-the-meter solar generation);
- Adjust the forecast to show the impact of all current and planned behind-the-meter solar generation in future years.

Xcel has calculated and metered the historical impact of distributed solar generation on customer sales and peak demands.

Once the total impact of DSM in effect and distributed solar generation is calculated for each year, a hypothetical sales data set is created. This series consists of the observed sales from 2008 through December 2022 plus the effective DSM calculated for all DSM measures installed in that year as well is achieved savings from programs in prior years that are still within the useful measure life, plus the historical distributed solar generation.

In the second step, the hypothetical sales data is used to generate a sales forecast that has entirely excluded the impacts of Company-sponsored DSM and distributed solar generation. It is important to note that customer-initiated DSM or DSM due to codes and standards (naturally occurring DSM) is not calculated as part of the CIP. The methodology to account for codes and standards changes is described below.

In the third step, once the sales forecast based on hypothetical sales has been generated, the Company adjusts the forecast to account for future DSM and future distributed solar generation. The forecast of future distributed solar generation is developed by Xcel Energy's Load Research Department. A monthly forecast of the impact of new DSM programs (excluding Saver's Switch) is developed by Xcel Energy's DSM Regulatory Strategy and Planning Department. The future DSM sales volumes are combined with the continuing impacts of historical DSM measures and future solar generation and used to reduce the class level sales forecasts that result from the regression modeling process to determine the DSM and solar-adjusted sales. Impacts from all program installations through December 2022 are assumed to be imbedded in the historical data, so only new program installations and the continuing impact of historical programs are included in the DSM-solar generation adjustment. The source for Company-sponsored DSM adjustments is based on the CIP Plan in effect at the time of the forecast.

PLUG-IN ELECTRIC VEHICLE CHARGING

The residential sales and peak demand forecasts also are adjusted to account for the use of plug-in electric vehicle charging. The penetration of electric vehicles in Xcel Energy's service territory has been increasing over the past few years and is expected to continue increasing. Because this trend of increasing electric vehicle penetration is expected to continue, the Residential sales forecasts have been adjusted for to account for future

electricity usage from home charging of electric vehicles. In addition, the Small Commercial and Industrial and Large Commercial and Industrial sales forecasts have been adjusted to account for future electricity usage from the charging of medium-duty and heavy-duty electric vehicles. The forecast adjustment for the monthly consumption of electricity for electric vehicle charging is based on a model that incorporates the stock of electric vehicles, electricity consumption per vehicle, an adoption rate for this technology, and financial incentives.

Because the peak demand forecast was developed with an energy forecast that had the adjustments for electric vehicle charging removed, the peak demand forecast includes a post-modeling adjustment to account for future electric vehicle charging impacts at the system peak. The peak demand forecast adjustment is based on monthly electric vehicle energy consumption, daily consumption profile, and the time of day the monthly peak hour occurs.

The electric vehicle assumptions for the expected MWh sales impacts and MW peak demand impacts were developed by Xcel Energy's Risk Management department.

DATA ADJUSTMENTS AND ASSUMPTIONS

1. Weather Adjustments. Xcel Energy adjusted its monthly weather data to reflect billing schedules. Therefore, the monthly weather data corresponds exactly with the billing month schedule.
2. Economic Adjustments. All price data and related economic series were deflated to 2012 constant dollars.
3. Large Customer Adjustments. The large commercial and industrial sales model results have been adjusted to account for announced changes in operations for large customers.
4. Demand Forecast Wholesale Adjustment. An adjustment to account for terminating firm wholesale customer contracts was incorporated into the development of the peak demand forecast. Estimated historical coincident peak demand and energy for all firm wholesale customers were removed from the regression model data to create a consistent data series for retail demand and energy.
5. COVID Pandemic Assumptions. The COVID-19 pandemic has had an impact on Xcel Energy sales. The Residential class experienced an increase in sales resulting from an increase in working-from-home and social distancing measures. Over the next few years Residential sales are expected to experience declining sales growth, in part due to more employees return to the workplace. Residential regression models use the Google Mobility Index to explain the historical change in consumption due to COVID-19. Conversely, the Small Commercial and Industrial and Large Commercial and Industrial customer classes have experienced a sharp decline in sales resulting from pandemic related economic weakness and business shutdowns. Recovery from this downturn is expected with Small Commercial and Industrial and Large Commercial and Industrial sales growth over the next few years. This recovery is driven by the economic explanatory variables in the Commercial and Industrial regression models. The COVID-19 pandemic impacts on the peak demand forecast are driven by the energy forecast.

ASSUMPTIONS AND SPECIAL INFORMATION

Xcel Energy believes that its process is a reasonable and workable one to use as a guide for its future energy and load requirements. The underlying assumptions used to prepare Xcel Energy's median forecast are as follows:

1. Demographic Assumption. Population or household projections are essential in the development of the long-range forecast. The forecasts of customers are derived from population and household projections provided by IHS Markit, Inc., and reviewed by Xcel Energy staff. Xcel Energy customer growth mirrors demographic growth over the forecast period.
2. Weather Assumption. Xcel Energy assumed "normal" weather in the forecast horizon. Normal weather is defined as the average weather pattern over the 20-year period from 2003-2022. The variability of weather is an important source of uncertainty. Xcel Energy's energy forecasts are based on the assumption that the normal weather conditions will prevail in the forecast horizon. Weather-related demand uncertainties are not treated explicitly in this forecast.
3. Loss Factor Assumptions. The loss factors are important to convert the sales forecast to energy requirements. Xcel Energy uses a historical average loss factor for each jurisdiction, and assumes it will not change in the future.

FORECAST COORDINATION

Xcel Energy reports its energy and peak demand forecasts to the Midwest ISO (MISO). MISO then combines the forecasts of all its member utilities. Xcel Energy also reports its forecast to the Public Service Commission of Wisconsin as part of its Strategic Energy Assessment (SEA) process. In this process, the Wisconsin portion of the total Xcel Energy System load is combined with other Wisconsin electric utilities to form a statewide Wisconsin forecast.

7610.0410 – Future Facility Additions
7610.0420 – Future Facility Retirements

The Company's most recent, completed, Resource Plan (Docket No. E002/RP-19-368) was approved by Minnesota Public Utilities Commission (MPUC or the Commission) through an Order issued April 15, 2022. The Alternate Preferred Plan, filed June 25, 2021, was approved for the purposes of planning.

The Order to close the 2020-2034 Upper Midwest Resource Plan docket identified the Company shall:

- Retire the AS King Generating Station in 2028 and the Sherco County Generation Station Unit 3 in 2030.
- Acquire an average of 780 GWh energy efficiency, annually.
- Acquire 400 MW of additional Demand Response by 2023, consistent with the previous IRP order.
- Repower existing resources as needed for black start purposes.
- Acquire, by 2026, 1300 MW of solar resources to replace the capacity following the retirement of Sherburne County Generation Station Unit 2, prioritizing the use of associated interconnection rights, some of which could be fulfilled by the Company's pending proposal for a 460 MW solar installation near the existing Sherco site ("Sherco Solar").
- Between 2027-2032 add an additional 600 MW solar and 2,150 MW wind powered generation at Sherco, and an additional approximately 600 MW to reutilize the A.S. King interconnection rights.
- Commence the Certificate of Need and route permitting proceedings for 345 kV transmission lines extending from both Sherburne County Generation site and AS King Generation site. This transmission is intended to develop new energy resources and be connected to the MISO transmission grid through the existing interconnection points.
- Submit the next resource plan by February 1, 2024.

The 2020 Review of Remaining Lives (Docket No. E,G002/D-19-723) – an annual review of the remaining lives depreciation of its electric and gas production and gas storage facilities service lives and salvage rates – updated the Remaining Life forecast for all Northern States Power Company – Minnesota (NSPM) units. This remaining life is associated with Financial End of Life for rate making purposes. Projections for the 2023-2033 timeframe are listed below. This is a tentative schedule, subject to change, pending the

outcome of future Annual Review of Remaining Lives filings and the next Resource Plan filing.

Projected Plant Retirements*			
Year	**Unit/Site**	**Size (MW)*** **	**Fuel Type**
2022	Sherco Unit 2**	765	Coal
2023	Blue Lake Units 1 thru 4	160	Oil
2025	Sherco Unit 1	765	Coal
2026	Inver Hills	281	Natural Gas
2027	Red Wing	23	Refused Derived Fuel (RDF)
2027	Wilmarth	25	Refused Derived Fuel (RDF)
2027	St. Croix Falls	23.2	Hydro
2029	AS King	511	Coal
2030	Sherco Unit 3	525	Coal
2030	Wheaton	250	Oil/Natural Gas
2030	French Island 1-2	15	Municipal Solid Waste
2030	French Island 3-4	160	Oil
2030	Monticello****	646	Nuclear
2031	Black Dog 2,5	298	Natural Gas
2033	Prairie Island 1	566	Nuclear

Notes:
* Years indicated represent the financial end-of-life as identified in the above referenced Remaining Lives docket. Financial end-of-life dates may be adjusted to coincide with the MISO Planning Year, ending May 31st.
** While Sherco 2 will reach its financial end of life at the end of 2022, the plant will be available to provide capacity in 2023.
*** Size represents nameplate or contracted value of the resource.
**** Per the Order in the Resource Plan, the Company is pursuing a 10-year life extension.

The following list outlines current Power Purchase Agreements (PPA) and their scheduled termination dates.

Projected PPA Retirements			
Year	**Unit/Site**	**Size (MW)*** **	**Fuel Type**
2023	Renewable PPAs	86	Renewable
2024	St. Paul CoGen	24	Biomass
2024	Renewable PPAs	61	Renewable
2025	Renewable PPAs	25	Renewable
2025	Manitoba Hydro	500	Hydro
2025	Manitoba Hydro – Diversity Agreement	350	Hydro
2025	Invenergy	358	Natural Gas
2026	Mankato 1	375	Natural Gas
2026	Renewable PPAs	23	Renewable
2027	LS Power	245	Natural Gas
2028	Renewable PPAs	147	Renewable
2029	Renewable PPAs	53	Renewable
2030	Renewable PPAs	28	Renewable
2031	Renewable PPAs	108	Renewable
2032	Renewable PPAs	472	Renewable
2033	Renewable PPAs	150	Renewable

Xcel Energy proposes to fulfill future electric generating resource needs through our resource planning process and subsequent resource acquisition processes. The specific generation technology, location of future generation facilities, and mix of utility-owned, PPAs, and other resources are subject to approval by the Commission.

Xcel Energy -- Minnesota

Transmission Assets

MANITOBA

ONTARIO

Lake Superior

NORTH DAKOTA

SOUTH DAKOTA

IOWA

Kittson County
Roseau County
Lake of the Woods County
Marshall County
Koochiching County
Pennington County
Red Lake County
Beltrami County
Polk County
Clearwater County
Itasca County
St. Louis County
Cook County
Lake County
Norman County
Mahnomen County
Hubbard County
Cass County
Clay County
Becker County
Wadena County
Aitkin County
Carlton County
Wilkin County
Otter Tail County
Crow Wing County
Todd County
Pine County
Grant County
Douglas County
Morrison County
Mille Lacs County
Kanabec County
Traverse County
Stevens County
Pope County
Stearns Co. County
Benton Co. County
Granite City
Isanti County
Big Stone County
Swift County
Sherburne Co. County
Sherburne County
Monticello (MN)
Chisago County
Anoka County
Kandiyohi County
Meeker County
Wright Co. County
Hennepin Co. County
Washington Co. County
Lac Qui Parle County
Chippewa County
Allen S King Plant
Riverside Repowering Project (MN)
United Health Care
Hennepin Island
United Hospital
Alliant Techsystems
Lower Dam
High Bridge
Minnesota Valley
McLeod County
Carver County
Black Dog
Blue Lake (MN)
Inver Hills
Yellow Medicine County
Renville County
Dakota Co. County
Scott County
Prairie Island
Red Wing
Sibley County
Lincoln County
Lyon County
Redwood County
Le Sueur County
Rice County
Goodhue County
Nicollet County
Faribault
West Faribault
Wabasha County
Brown County
Key City
Wilmarth
Holland Wind
Pipestone County
Murray County
Cottonwood County
St James
Blue Earth County
Waseca County
Steele County
Dodge County
Olmsted County
Winona County
Watonwan County
Rock County
Nobles County
Jackson County
Martin County
Faribault County
Freeborn County
Mower County
Fillmore County
Houston County

LEGEND

Existing Transmission

- 230 kV
- 345 kV
- 500 kV

Substation, Generation, and Service Territory

- Substation
- Generation Plant
- Xcel Energy Service Area

N

0 10 20 40 Miles

DISCLAIMER: This information is believed to be correct but is subject to change and is not warranted.

Map Produced By:
Siting and Land Rights
Minneapolis -- tmg
Map Updated: June -- 2023

Xcel Energy®

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Docket No. E999/M-23-11
June 30, 2023
7610.0600 E

Northern States Power Company-Minnesota
Electric Utility Annual Report

Northern States Power Company, a Minnesota corporation

7610.0600E

Minnesota Retail Electric Fuel Cost Charges Table (Mills/kWh)

June 2021-June 2022	FUEL COST CHARGE					
	Residential	C&I Non-Demand	C&I Demand			Outdoor Lighting
			Non-TOD	TOD		
				On-Peak	Off-Peak	
June 2021	36.17	36.63	35.48	44.38	29.02	28.34
July	30.86	31.25	30.27	37.86	24.76	24.18
August	30.12	30.49	29.54	36.96	24.16	23.59
September	30.67	31.06	30.10	37.63	24.62	24.05
October	31.30	31.69	30.70	38.38	25.11	24.53
November	28.69	29.05	28.14	35.19	23.02	22.47
December	26.72	27.06	26.21	32.79	21.45	20.95
January 2022	25.97	26.30	25.48	31.84	20.86	20.38
February	30.66	31.04	30.08	37.61	24.60	24.03
March	32.68	33.09	32.06	40.09	26.23	25.62
April	32.56	32.97	31.94	39.92	26.14	25.54
May	34.53	34.96	33.87	42.34	27.72	27.08
June	39.79	40.29	39.03	48.80	31.94	31.19

Northern States Power Company-Minnesota
Electric Utility Annual Report

Docket No. E999/M-23-11
June 30, 2023
7610.0600E

Electric Rate Schedules
June 1, 2022

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

RATE SCHEDULES Section No. 5
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Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

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Date Filed: 03-08-21 By: Christopher B. Clark Effective Date: 06-01-22
President, Northern States Power Company, a Minnesota corporation
Docket No. E002/M-20-745 Order Date: 04-27-22

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

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Minneapolis, Minnesota 55401
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Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL SERVICE Section No. 5
RATE CODE A00, A01, A03 31st Revised Sheet No. 1

AVAILABILITY
Available to any residential customer for domestic purposes only in a single private residence and qualifying farm customers.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

	Standard	Electric Space Heating	
Customer Charge per Month – Water Heating (A00)	$0.00	N/A	
– Overhead (A01)	$8.00	$10.00	
– Underground (A03)	$10.00	$12.00	
Energy Charge per kWh			
June - September	$0.10301	$0.10301	R
Other Months	$0.08803	$0.05988	R

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

MONTHLY MINIMUM CHARGE
Customer Charge.

(Continued on Sheet No. 5-1.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL SERVICE Section No. 5
RATE CODE A00, A01, A03 32nd Revised Sheet No. 1

AVAILABILITY
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RATE

	Standard	Electric Space Heating
Customer Charge per Month – Water Heating (A00)	$0.00	N/A
– Overhead (A01)	$8.00	$10.00
– Underground (A03)	$10.00	$12.00
Energy Charge per kWh		
June - September	$0.10301	$0.10301
Other Months	$0.08803	$0.05988

INTERIM RATE ADJUSTMENT N
An 8.92% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

MONTHLY MINIMUM CHARGE
Customer Charge.

(Continued on Sheet No. 5-1.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL SERVICE (Continued) Section No. 5
RATE CODE A00, A01, A03 10th Revised Sheet No. 1.1

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

The following are terms and conditions for service under this tariff. D
D

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

LOW INCOME ENERGY DISCOUNT
Energy discount is available to qualified low income customers under this schedule subject to the provisions contained in the Low Income Energy Discount Rider.

OTHER PROVISIONS
This schedule is also subject to provisions contained in Rules for Application of Residential Rates.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL TIME OF DAY SERVICE Section No. 5
RATE CODE A02, A04 31st Revised Sheet No. 2

AVAILABILITY
Available to any residential customer for domestic purposes only in a single private residence and qualifying farm customers.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

	Standard	Electric Space Heating	
Customer Charge per Month			
Overhead (A02)	$10.00	$12.00	
Underground (A04)	$12.00	$14.00	
On Peak Period Energy Charge per kWh			
June - September	$0.20497	$0.20497	R
Other Months	$0.16508	$0.09284	R
Off Peak Period Energy Charge per kWh			
June - September	$0.04170	$0.04170	R
Other Months	$0.04170	$0.04170	R

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

(Continued on Sheet No. 5-3)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL TIME OF DAY SERVICE Section No. 5
RATE CODE A02, A04 32nd Revised Sheet No. 2

AVAILABILITY
Available to any residential customer for domestic purposes only in a single private residence and qualifying farm customers.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

	Standard	Electric Space Heating
Customer Charge per Month		
Overhead (A02)	$10.00	$12.00
Underground (A04)	$12.00	$14.00
On Peak Period Energy Charge per kWh		
June - September	$0.20497	$0.20497
Other Months	$0.16508	$0.09284
Off Peak Period Energy Charge per kWh		
June - September	$0.04170	$0.04170
Other Months	$0.04170	$0.04170

INTERIM RATE ADJUSTMENT
An 8.92% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

(Continued on Sheet No. 5-3)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL TIME OF DAY SERVICE (Continued) Section No. 5
RATE CODE A02, A04 13th Revised Sheet No. 3

MONTHLY MINIMUM CHARGE
Customer Charge.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

The following are terms and conditions for service under this tariff. D
D

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

LOW INCOME ENERGY DISCOUNT
Energy discount is available to qualified low income customers under this schedule subject to the provisions contained in the Low Income Energy Discount Rider.

DEFINITION OF PEAK PERIODS
The on peak period is defined as those hours between 9:00 a.m. and 9:00 p.m. Monday through Friday, except the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When a designated holiday occurs on Sunday, the following Monday will be designated a holiday. The off peak period is defined as all other hours. Definition of on peak and off peak period is subject to change with change in Company's system operating characteristics.

OPTIONAL TRIAL SERVICE
Customers may elect time of day service for a trial period of three months. If a customer chooses to return to non-time of day service after the trial period, the customer will pay a charge of $20.00 for removal of time of day metering equipment.

(Continued on Sheet No. 5-4)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL TIME OF DAY SERVICE (Continued) Section No. 5
RATE CODE A02, A04 6th Revised Sheet No. 4

TERMS AND CONDITIONS OF SERVICE

1. Customer selecting the above time of day rate schedule will remain on this rate for a period of not less than 12 months, except as provided under Optional Trial Service. While served under this schedule, the Residential Service rate is not available.

2. This schedule is also subject to provisions contained in Rules for Application of Residential Rates.

3. Time of Day Metering Charge per Month Option (Closed): For any customer who prior to November 1, 1988, elected to pay a non-refundable payment of $310.00 in lieu of the time of day metering charge, the monthly customer charge is reduced by $2.00.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL TIME OF USE PILOT PROGRAM Section No. 5
SERVICE 1st Revised Sheet No. 4.1
RATE CODE A72, A74

PILOT PROGRAM DESIGN
This is an experimental rate design for the residential Time of Use Pilot Program to be applied for two years from the effective date of this rate schedule. Participating customers will have received Residential Service without electric space heating prior to the Pilot, and may elect a return to the Residential Service rate schedule following the Pilot.

AVAILABILITY
A maximum of 10,000 customers will be selected to receive service with this rate schedule. The Company will determine pilot participants that receive service through the Hiawatha West, Midtown, or Westgate substations. Pilot participants will not include customers that are on net metering service or have other interconnected distributed generation on their premise, or customers that also receive Energy Controlled (Non-Demand Metered) Service, Residential Electric Vehicle Service, Limited Off-Peak Service, or customers that are medical equipment-dependent. Pilot participants may elect to opt out of participation in this Pilot for a specific premise.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Bill Protection may also apply. Details regarding the specific charges applicable to this service and Bill Protection are listed below.

RATE

Customer Charge per Month		
Overhead (A72)	$8.00	
Underground (A74)	$10.00	
Energy Charge per kWh		
June – September		
On-Peak Period	$0.22576	R
Mid-Peak Period	$0.09013	R
Off-Peak Period	$0.02784	R
Other Months		
On-Peak Period	$0.19266	R
Mid-Peak Period	$0.07515	R
Off-Peak Period	$0.02784	R

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

(Continued on Sheet No. 5-4.2)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL TIME OF USE PILOT PROGRAM Section No. 5
SERVICE 2nd Revised Sheet No. 4.1
RATE CODE A72, A74

PILOT PROGRAM DESIGN
This is an experimental rate design for the residential Time of Use Pilot Program to be applied for two years from the effective date of this rate schedule. Participating customers will have received Residential Service without electric space heating prior to the Pilot, and may elect a return to the Residential Service rate schedule following the Pilot.

AVAILABILITY
A maximum of 10,000 customers will be selected to receive service with this rate schedule. The Company will determine pilot participants that receive service through the Hiawatha West, Midtown, or Westgate substations. Pilot participants will not include customers that are on net metering service or have other interconnected distributed generation on their premise, or customers that also receive Energy Controlled (Non-Demand Metered) Service, Residential Electric Vehicle Service, Limited Off-Peak Service, or customers that are medical equipment-dependent. Pilot participants may elect to opt out of participation in this Pilot for a specific premise.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Bill Protection may also apply. Details regarding the specific charges applicable to this service and Bill Protection are listed below.

RATE

Customer Charge per Month	
Overhead (A72)	$8.00
Underground (A74)	$10.00
Energy Charge per kWh	
June – September	
On-Peak Period	$0.22576
Mid-Peak Period	$0.09013
Off-Peak Period	$0.02784
Other Months	
On-Peak Period	$0.19266
Mid-Peak Period	$0.07515
Off-Peak Period	$0.02784

INTERIM RATE ADJUSTMENT N
An 8.92% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

(Continued on Sheet No. 5-4.2)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL TIME OF USE PILOT PROGRAM Section No. 5
SERVICE (Continued) 1st Revised Sheet No. 4.2
RATE CODE A72, A74

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

MONTHLY MINIMUM CHARGE
Customer Charge.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

The following are terms and conditions for service under this tariff. D D

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

LOW INCOME ENERGY DISCOUNT
Energy discount is available to qualified low income customers under this schedule subject to the provisions contained in the Low Income Energy Discount Rider.

BILL PROTECTION
Billing charges considered for bill protection will include customer and energy charges, fuel cost charges and if applicable, the Residential Controlled Air Conditioning and Water Heating Rider discounts. Bill protection will be considered only for customers that have been pilot participants at the same residential location for 12 months from the effective date of this rate schedule, based on the first 12 months of participation in the pilot program. Any Pilot program billing charge in excess of 10 percent of the corresponding billing charge that would have been applied had the customer not been a pilot participant will be credited to the customer's account, including any applicable taxes. The bill protection in this paragraph will terminate after the first 12 months of participation in the pilot program.

Customers that have received LIHEAP assistance within the 12 months prior to participation in the pilot program will have bill protection determined monthly for the first 12 months of pilot participation for any billing charges in excess of the corresponding billing charge that would have been applied had the customer not been a pilot participant. This will be determined on a monthly basis for the first 12 months of pilot participation. For the second 12 months of pilot participation, the bill protection will continue to be provided for these LIHEAP assistance customers for billing charges in excess of 10 percent of the corresponding billing charge on an annual basis for the second 12 months of pilot participation. Customers that start to receive LIHEAP assistance after their participation in the pilot has begun will receive monthly bill protection up to the first 12 month anniversary of the pilot, and shall receive annual bill protection for the second 12 month period of the pilot. Customers who opt out or leave the pilot area will forego the annual protection otherwise offered for this second 12 month period.

(Continued on Sheet No. 5-4.3)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL TIME OF USE PILOT PROGRAM Section No. 5
SERVICE (Continued) Original Sheet No. 4.3
RATE CODE A72, A74

DEFINITION OF PEAK PERIODS
The On-Peak period is defined as those hours between 3:00 p.m. and 8:00 p.m. Monday through Friday, except the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When a designated holiday occurs on Sunday, the following Monday will be designated a holiday. The Mid-Peak period is defined as all hours not defined as On-Peak or Off-Peak periods. The Off-Peak period is defined as those hours between midnight (12:00 a.m.) and 6:00 a.m. every day.

RESIDENTIAL CONTROLLED AIR CONDITIONING AND WATER HEATING RIDER
Customers that received service with the Residential Controlled Air Conditioning and Water Heating Rider in combination with Residential Service prior to participation in the pilot will have a revised discount for Company controlled central air conditioning or electric water heating that is specific to the pilot program. The controlled air conditioning discount is a monthly $10 credit applied during the billing months of June through September. The controlled electric water heating discount is a monthly $2 credit during each billing month. Pilot customers will receive these revised credits in place of percent discounts and are subject to all other terms of the Residential Controlled Air Conditioning and Water Heating Rider.

TERMS AND CONDITIONS OF SERVICE

1. This schedule is also subject to provisions contained in Rules for Application of Residential Rates.

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Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL ELECTRIC VEHICLE SERVICE Section No. 5
RATE CODE A08 19th Revised Sheet No. 5

AVAILABILITY
Available to residential customers for service only to electric vehicle loads including battery charging and accessory usage. The customer must complete Company-approved documentation verifying possession, through ownership or lease, of an electric vehicle as defined in Section 169.011, subdivision 26a of Minnesota law.

CHARACTER OF SERVICE
Single-phase 60-Hertz service at approximately 120 or 120/240 volts will be provided hereunder. Three-phase service or other service upgrade requests will be provided in accordance with Company service regulations.

RENEWABLE ENERGY SUPPLY OPTION
Customers have the option to elect all or a portion of the supply of electricity under this schedule from renewable energy resources. The renewable energy supply option is available subject to the provisions contained in the Voluntary Renewable and High-Efficiency Energy Purchase (Windsource Program) Rider, or other available rate schedule for voluntary renewable energy supply that is applicable.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month	$4.95	
On-Peak Period Energy Charge per kWh		
June - September	$0.20497	R
Other Months	$0.16508	R
Off-Peak Period Energy Charge per kWh	$0.04170	R

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

(Continued on Sheet No. 5-6)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL ELECTRIC VEHICLE SERVICE Section No. 5
RATE CODE A08 20th Revised Sheet No. 5

AVAILABILITY
Available to residential customers for service only to electric vehicle loads including battery charging and accessory usage. The customer must complete Company-approved documentation verifying possession, through ownership or lease, of an electric vehicle as defined in Section 169.011, subdivision 26a of Minnesota law.

CHARACTER OF SERVICE
Single-phase 60-Hertz service at approximately 120 or 120/240 volts will be provided hereunder. Three-phase service or other service upgrade requests will be provided in accordance with Company service regulations.

RENEWABLE ENERGY SUPPLY OPTION
Customers have the option to elect all or a portion of the supply of electricity under this schedule from renewable energy resources. The renewable energy supply option is available subject to the provisions contained in the Voluntary Renewable and High-Efficiency Energy Purchase (Windsource Program) Rider, or other available rate schedule for voluntary renewable energy supply that is applicable.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month	$4.95
On-Peak Period Energy Charge per kWh	
June - September	$0.20497
Other Months	$0.16508
Off-Peak Period Energy Charge per kWh	$0.04170

INTERIM RATE ADJUSTMENT N
An 8.92% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

(Continued on Sheet No. 5-6)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL ELECTRIC VEHICLE SERVICE Section No. 5
RATE CODE A08 16th Revised Sheet No. 6

MONTHLY MINIMUM CHARGE
Customer Charge.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

DEFINITION OF PEAK PERIODS
The on-peak period is defined as those hours between 9:00 a.m. and 9:00 p.m. Monday through Friday, except the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When a designated holiday occurs on Sunday, the following Monday will be designated a holiday. The off-peak period is defined as all other hours. Definition of on-peak and off-peak period is subject to change with change in Company's system operating characteristics.

COMMUNICATION COSTS
The Company will maintain separate accounting of the information, education, advertising and promotion costs associated with electric vehicles as provided in Minn. Stat. §216B.1614, subd.2, paragraph (c) 2 by deferring the costs to a tracker account, and will petition the Minnesota Public Utilities Commission to recover the qualifying costs.

TERMS AND CONDITIONS OF SERVICE
1. Residential Electric Vehicle Service shall be separately served and metered and must at no time be connected to facilities serving customer's other loads. Metering may be installed as a sub-meter behind the customer’s main meter, in which case consumption under this rate schedule will be subtracted from the main meter for purposes of billing customer’s non-Electric Vehicle electricity usage.
2. The customer shall supply, at no expense to the Company, a suitable location for meters and associated equipment used for billing. Installations must conform to the Company’s specifications.
3. Company may require customer to provide access for Company-owned equipment for the recording and wireless communication of energy usage.
4. The rate contemplates that this service will utilize existing facilities with no additional major expenditures. Customer shall reimburse Company for any expenditure for facilities necessary to serve this load which would not otherwise be required to serve customer's load.
5. This schedule is also subject to provisions contained in Rules for Application of Residential Rates.
6. Customers that elect the Windsource program in calendar year 2015 for at least three (3) 100 kWh blocks or their entire usage on this schedule may receive a one-time $25 bill credit or gift card of the same value.

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ELECTRIC VEHICLE HOME SERVICE Section No. 5
RATE CODE A80, A81 6th Revised Sheet No. 7

AVAILABILITY
Available to Residential Service customers for service only to electric vehicle loads including battery charging and accessory usage. Bundled service includes Company installed and provided charging equipment. Pre-Pay Option service is available to customers electing to pay Company for the installed cost of charging equipment prior to beginning service with this tariff. Customers electing Pre-Pay Option service are separately invoiced at the time of installation. Installation-Only Service is available for customers who have purchased a compatible EV charger before the launch date of the Electric Vehicle Home Service. The customer must complete Company-approved documentation verifying possession, through ownership or lease, of an electric vehicle as defined in Section 169.011, subdivision 26a of Minnesota law. N

Enrollment in the Residential Electric Vehicle Pilot Service previously available under these rate codes is no longer available.

CONTRACT
Customers must contract for this service through an Electric Vehicle Home Service/Voluntary Electric Vehicle Charger Service Customer Service Agreement with the Company. The contract period will be as long as the customer wishes to use the equipment.

Customers who initially contracted for the Residential Electric Vehicle Pilot Service through an Electric Vehicle Pilot Electric Service Agreement can still take service under that agreement through the end of the 24-month initial term. At the end of that agreement, the customer can continue service by contracting through the service through an Electric Vehicle Home Service/Voluntary Electric Vehicle Charger Service Customer Service Agreement or terminate their service at no cost to them. N

CHARACTER OF SERVICE
Single-phase 60-Hertz service at approximately 120 or 120/240 volts will be provided hereunder. Three-phase service or other service upgrade requests will be provided in accordance with Company service regulations.

RENEWABLE ENERGY SUPPLY OPTION
Customers have the option to elect all or a portion of the supply of electricity under this schedule from renewable energy resources. The renewable energy supply option is available subject to the provisions contained in the Voluntary Renewable*Connect Pilot Program (Windsource Program) Rider, or other available rate schedule for voluntary renewable energy supply that is applicable. ND

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and /or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

(Continued on Sheet No. 5-7.1)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ELECTRIC VEHICLE HOME SERVICE Section No. 5
RATE CODE A80, A81 Original Sheet No. 7.1

RATE

Customer Charge per Month	
Bundled (A80)	$16.48
Pre-Pay Option/Installation Only (A81)	$6.68
Energy Charge per kWh	
June – September	
On-Peak Period	$0.22576
Mid-Peak Period	$0.09013
Off-Peak Period	$0.02784
Other Months	
On-Peak Period	$0.19266
Mid-Peak Period	$0.07515
Off-Peak Period	$0.02784

N

PRE-PAY/INSTALLATION ONLY OPTION
The Pre-Pay/Installation Only Option Customer Charge per Month applies in place of the Bundled Customer Charge per Month to customers that have paid the installed cost of charging equipment to the Company, or who have purchased a compatible EV charger before the launch date of the Electric Vehicle Home Service

Customers choosing the Installation-Only Service are also responsible for a $240 charge covering the cost of installing and setting up the customer-owned charger for integration with the Company's systems and participation in the program.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

MONTHLY MINIMUM CHARGE
Customer Charge.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

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(Continued on Sheet No. 7.2)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ELECTRIC VEHICLE HOME SERVICE Section No. 5
RATE CODE A80, A81 1st Revised Sheet No. 7.1

RATE

Customer Charge per Month	
Bundled (A80)	$16.48
Pre-Pay Option/Installation Only (A81)	$6.68
Energy Charge per kWh	
June – September	
On-Peak Period	$0.22576
Mid-Peak Period	$0.09013
Off-Peak Period	$0.02784
Other Months	
On-Peak Period	$0.19266
Mid-Peak Period	$0.07515
Off-Peak Period	$0.02784

PRE-PAY/INSTALLATION ONLY OPTION
The Pre-Pay/Installation Only Option Customer Charge per Month applies in place of the Bundled Customer Charge per Month to customers that have paid the installed cost of charging equipment to the Company, or who have purchased a compatible EV charger before the launch date of the Electric Vehicle Home Service

Customers choosing the Installation-Only Service are also responsible for a $240 charge covering the cost of installing and setting up the customer-owned charger for integration with the Company's systems and participation in the program.

INTERIM RATE ADJUSTMENT
An 8.92% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

MONTHLY MINIMUM CHARGE
Customer Charge.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

(Continued on Sheet No. 7.2)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401

MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ELECTRIC VEHICLE HOME SERVICE Section No. 5
RATE CODE A80, A81 Original Sheet No. 7.2

DEFINITION OF PEAK PERIODS

The on-peak period is defined as those hours between 3:00 p.m. and 8:00 p.m. Monday through Friday, except the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When a designated holiday occurs on Sunday, the following Monday will be designated a holiday. The mid- peak period is defined as all hours not defined as on-peak or off-peak periods. The off-peak period is defined as those hours between midnight (12:00 a.m.) and 6:00 a.m. every day. Definition of on-peak and off-peak period is subject to change with change in Company's system operating characteristics. N

COMMUNICATION COSTS

The Company will maintain separate accounting of the information, education, advertising and promotion costs associated with electric vehicles as provided in Minn. Stat. §216B.1614, subd.2, paragraph (c) 2 by deferring the costs to a tracker account, and will petition the Minnesota Public Utilities Commission to recover the qualifying costs.

TERMS AND CONDITIONS OF SERVICE

1. Electric Vehicle Home Service shall be served through wiring connected to customer's single meter provided for Residential Service. Consumption under this rate schedule will be subtracted from the main meter for purposes of billing customer's non-Electric Vehicle electricity usage.
2. The customer shall supply, at no expense to the Company, premises wiring and a suitable location for connection of charging and associated equipment.
3. Company may require customer to provide access for Company-owned equipment for the recording and wireless communication of energy usage.
4. The rate contemplates that this service will utilize existing facilities with no additional major expenditures. Customer shall reimburse Company for any expenditure for facilities necessary to serve this load which would not otherwise be required to serve customer's load.
5. This schedule is also subject to provisions contained in Rules for Application of Residential Rates.
6. Customer must execute an Electric Vehicle Home Service/Voluntary Electric Vehicle Charger Service Customer Service Agreement with the Company. N

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

VOLUNTARY ELECTRIC VEHICLE CHARGER SERVICE Section No. 5
RATE CODE A76, A77 5th Revised Sheet No. 8

AVAILABILITY
Available to residential customers taking service under the Residential Time of Day (Rate Codes A02 and A04) to provide electric vehicle charging equipment to serve electric vehicle loads including battery charging and accessory usage. Customers' energy usage will be billed based on their applicable rate codes. Bundled service includes Company installed and provided charging equipment. Pre-Pay Option service is available to customers electing to pay Company for the installed cost of charging equipment prior to beginning service. Customers electing Pre-Pay Option service are separately invoiced at the time of installation. Installation-Only Service is available for customers who have purchased a compatible EV charger before the launch date of the Voluntary Electric Vehicle Charger Service. The customer must complete Company-approved documentation verifying possession, through ownership or lease, of an electric vehicle as defined in Section 169.011, subdivision 26a of Minnesota law.

CONTRACT
Customers must contract for this service through an Electric Vehicle Home Service/Voluntary Electric Vehicle Charger Service Customer Service Agreement with the Company. The contract period will be as long as the customer wishes to use the equipment

CHARACTER OF SERVICE
Single-phase 60-Hertz service at approximately 120 or 120/240 volts will be provided hereunder. Three-phase service or other service upgrade requests will be provided in accordance with Company service regulations.

COST OF SERVICE
Customer Charge per Month

Bundled (A76)	$12.09
Pre-Pay/Installation Only Option (A77)	$2.30

PRE-PAY/INSTALLATION-ONLY OPTION
The Pre-Pay/Installation Only Option Customer Charge per Month applies in place of the Bundled Customer Charge per Month to customers that have paid the installed cost of charging equipment to the Company, or who have purchased a compatible EV charger before the launch date of the Electric Vehicle Home Service. Customers choosing the Installation-Only Service are also responsible for a $240 charge covering the cost of installing and setting up the customer-owned charger for integration with the Company's systems and participation in the program.

COMMUNICATION COSTS
The Company will maintain separate accounting of the information, education, advertising and promotion costs associated with electric vehicles as provided in Minn. Stat. §216B.1614, subd.2, paragraph (c) 2 by deferring the costs to a tracker account, and will petition the Minnesota Public Utilities Commission to recover the qualifying costs.

TERMS AND CONDITIONS OF SERVICE
1. Voluntary Electric Vehicle Charger Service shall be serviced through wiring connected to customer's single meter provided for Residential Service.
2. The customer shall supply, at no expense to the Company, premises wiring and a suitable location for connection of charging and associated equipment.
3. The rate contemplates that this service will utilize existing facilities with no additional major expenditures. Customer shall reimburse Company for any expenditure for facilities necessary to serve this load which would not otherwise be required to serve customer's load.
4. This schedule is also subject to provisions contained in Rules for Application of Residential Rates.
5. Customer must execute an Electric Vehicle Home Service Customer Service Agreement with the Company.

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL ELECTRIC VEHICLE SUBSCRIPTION PILOT SERVICE
RATE CODE A82, A83

Section No. 5
Original Sheet No. 8.1

AVAILABILITY
Available while this Pilot Service is in effect to Residential Service customers for service only to electric vehicle loads including battery charging and accessory usage. Bundled service includes Company installed and provided charging equipment. Pre-Pay Option service is available to customers electing to pay Company for the installed cost of charging equipment prior to beginning service with this tariff. Customers electing Pre-Pay Option service are separately invoiced at the time of installation. The customer must complete Company-approved documentation verifying possession, through ownership or lease, of an electric vehicle as defined in Section 169.011, subdivision 26a of Minnesota law. N

CONTRACT
Customers must contract for this service through an Electric Vehicle Subscription Pilot Electric Service Agreement with the Company. The initial contract period will normally be for 24 months. Contract allows customers to participate with only one electric vehicle.

CHARACTER OF SERVICE
Single-phase 60-Hertz service at approximately 120 or 120/240 volts will be provided hereunder. Three-phase service or other service upgrade requests will be provided in accordance with Company service regulations.

RENEWABLE ENERGY SUPPLY OPTION
Customers have the option to elect all or a portion of the supply of electricity under this schedule from renewable energy resources. The renewable energy supply option is available subject to the provisions contained in the Voluntary Renewable and High-Efficiency Energy Purchase (Windsource Program) Rider, or other available rate schedule for voluntary renewable energy supply that is applicable.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's Expected Average Electric Vehicle kWh Usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and /or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below. N

(Continued on Sheet No. 5-8.2)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL ELECTRIC VEHICLE SUBSCRIPTION PILOT SERVICE (Continued)
RATE CODE A82, A83

Section No. 5
2nd Revised Sheet No. 8.2

RATE
Customer Charge per Month

General System Energy	
Bundled (A82)	$42.50
Pre-Pay Option (A83)	$32.65
Renewable Energy (Windsource)	
Bundled (A82)	$45.02
Pre-Pay Option (A83)	$35.17

Excess On-Peak Period Energy Charge per kWh

June - September	$0.20497
Other Months	$0.16508

PRE-PAY OPTION
The Pre-Pay Option Customer Charge per Month applies in place of the Bundled Customer Charge per Month to customers that have paid the installed cost of charging equipment to the Company.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
The monthly customer charge includes preset fuel charges for established energy usage during off-peak and on-peak periods. Excess on-peak period energy charges are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
The monthly customer charge includes a preset Resource Adjustment charge for established energy usage during off-peak and on-peak periods. Excess on-peak period energy charges are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

MONTHLY MINIMUM CHARGE
Customer Charge.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

(Continued on Sheet No. 5-8.3)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL ELECTRIC VEHICLE SUBSCRIPTION PILOT SERVICE (Continued)
RATE CODE A82, A83

Section No. 5
3rd Revised Sheet No. 8.2

RATE
Customer Charge per Month

General System Energy	
Bundled (A82)	$42.50
Pre-Pay Option (A83)	$32.65
Renewable Energy (Windsource)	
Bundled (A82)	$45.02
Pre-Pay Option (A83)	$35.17

Excess On-Peak Period Energy Charge per kWh

June - September	$0.20497
Other Months	$0.16508

PRE-PAY OPTION
The Pre-Pay Option Customer Charge per Month applies in place of the Bundled Customer Charge per Month to customers that have paid the installed cost of charging equipment to the Company.

INTERIM RATE ADJUSTMENT
An 8.92% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
The monthly customer charge includes preset fuel charges for established energy usage during off-peak and on-peak periods. Excess on-peak period energy charges are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
The monthly customer charge includes a preset Resource Adjustment charge for established energy usage during off-peak and on-peak periods. Excess on-peak period energy charges are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

MONTHLY MINIMUM CHARGE
Customer Charge.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

(Continued on Sheet No. 5-8.3)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL ELECTRIC VEHICLE SUBSCRIPTION PILOT SERVICE (Continued)
RATE CODE A82, A83

Section No. 5
Original Sheet No. 8.3

DEFINITION OF PEAK PERIODS
The on-peak period is defined as those hours between 9:00 a.m. and 9:00 p.m. Monday through Friday, except the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When a designated holiday occurs on Sunday, the following Monday will be designated a holiday. The off-peak period is defined as all other hours. Definition of on-peak and off-peak period is subject to change with change in Company's system operating characteristics.

DEFINITION OF EXPECTED AVERAGE ELECTRIC VEHICLE KWH USAGE
The expected average electric vehicle kWh usage is defined as the Company's estimated average monthly EV energy consumption across all pilot participants.

COMMUNICATION COSTS
The Company will maintain separate accounting of the information, education, advertising and promotion costs associated with electric vehicles as provided in Minn. Stat. §216B.1614, subd.2, paragraph (c) 2 by deferring the costs to a tracker account, and will petition the Minnesota Public Utilities Commission to recover the qualifying costs.

TERMS AND CONDITIONS OF SERVICE
1. Residential Electric Vehicle Subscription Pilot Service shall be served through wiring connected to customer's single meter provided for Residential Service. Consumption under this rate schedule will be subtracted from the main meter for purposes of billing customer's non-Electric Vehicle electricity usage.
2. The customer shall supply, at no expense to the Company, premises wiring and a suitable location for connection of charging and associated equipment.
3. Company may require customer to provide access for Company-owned equipment for the recording and wireless communication of energy usage.
4. The rate contemplates that this service will utilize existing facilities with no additional major expenditures. Customer shall reimburse Company for any expenditure for facilities necessary to serve this load which would not otherwise be required to serve customer's load.
5. This schedule is also subject to provisions contained in Rules for Application of Residential Rates.
6. Customer must execute an Electric Vehicle Subscription Pilot Service Agreement with the Company.

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Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ENERGY CONTROLLED SERVICE Section No. 5
(NON-DEMAND METERED) 30th Revised Sheet No. 9
RATE CODE A05

AVAILABILITY
Available to residential and commercial customers with permanently connected interruptible loads of up to 50 kW that would be under Company control. The types of loads served would include dual fuel space heating, water heating, and other loads subject to Company approval.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

	Residential	Commercial & Industrial	
Customer Charge	$4.95	$4.95	
Energy Charge per kWh	$0.04487	$0.04487	R
Optional			
June - September	$0.10301	$0.09256	R
Other Months	$0.04487	$0.04487	R

OPTIONAL ENERGY CHARGE
This option is available to customers with heat pump installations for non-interruptible service during June through September billing months.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

(Continued on Sheet No. 5-10)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ENERGY CONTROLLED SERVICE
(NON-DEMAND METERED)
RATE CODE A05

Section No. 5
31st Revised Sheet No. 9

AVAILABILITY
Available to residential and commercial customers with permanently connected interruptible loads of up to 50 kW that would be under Company control. The types of loads served would include dual fuel space heating, water heating, and other loads subject to Company approval.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

	Residential	Commercial & Industrial
Customer Charge	$4.95	$4.95
Energy Charge per kWh	$0.04487	$0.04487
Optional		
June - September	$0.10301	$0.09256
Other Months	$0.04487	$0.04487

OPTIONAL ENERGY CHARGE
This option is available to customers with heat pump installations for non-interruptible service during June through September billing months.

INTERIM RATE ADJUSTMENT N
An 8.92% Interim Rate Surcharge will be applied to Residential rate components and a 13.52% Interim Rate Surcharge will be applied to Commercial rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

(Continued on Sheet No. 5-10)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ENERGY CONTROLLED SERVICE (NON-DEMAND METERED)
(Continued)
RATE CODE A05

Section No. 5
9th Revised Sheet No. 10

MONTHLY MINIMUM CHARGE
Customer Charge.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

The following are terms and conditions for service under this tariff. D D

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

TERMS AND CONDITIONS OF SERVICE

1. The controllable load shall be permanently wired, separately served and metered, and at no time connected to facilities serving customer's firm load.

2. The duration and frequency of interruptions shall be at the discretion of Company. Interruption will normally occur at such times:
   a. When Company is required to use generation equipment or to purchase power that results in production costs in excess of $70 per MWh,
   b. When Company expects to establish an annual system peak demand, or
   c. At such times when, in Company's opinion, the reliability of the system is endangered.

3. Customer selecting Energy Controlled Service (Non-Demand Metered) must have a Company approved electric space heating system and must remain on this service for a minimum term of one year.

4. Customer selecting Energy Controlled Service (Non-Demand Metered) must be prepared for interruptions that will last longer than 12 hours per occurrence. Company shall not be liable for any loss or damage caused by or resulting from any interruption of service.

5. Electricity must be the primary source of energy for dual fuel space heating installations. Customer must have available alternative energy sources capable of supplying up to 30% of the annual heating needs during any heating season.

6. Customer's water heating system served under this rate must be designed and sized to be capable of providing customer's hot water needs for the full duration of the potential interruption periods.

(Continued on Sheet No. 5-10.1)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ENERGY CONTROLLED SERVICE (NON-DEMAND METERED) Section No. 5
(Continued) 5th Revised Sheet No. 10.1
RATE CODE A05

7. Customer must furnish and install an NSP approved electric meter socket to accept Energy Controlled Service (Non-Demand Metered). Company reserves the right to inspect and approve the installation.

8. The rate contemplates that this service will utilize existing facilities with no additional major expenditures. Customer shall reimburse Company for any expenditures for facilities necessary to serve this load which would not otherwise be required to serve customer's load.

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

LIMITED OFF PEAK SERVICE Section No. 5
RATE CODE A06 33rd Revised Sheet No. 11

AVAILABILITY
Available to any customers for controlled loads that will be energized only for the time period between 10:00 p.m. to 6:30 a.m. daily.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

	Residential	Commercial & Industrial	
Customer Charge per Month			
Secondary Voltage			
Single Phase	$4.95	$10.00	
Three Phase	--	$13.60	
Primary Voltage	--	$60.00	
Transmission Transformed	--	$60.00	
Transmission	--	$60.00	
Energy Charge per kWh			
Secondary Voltage	$0.03665	$0.03665	R
Primary Voltage	--	$0.03560	R
Transmission Transformed	--	$0.03398	R
Transmission	--	$0.03388	R

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

(Continued on Sheet No. 5-11.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

LIMITED OFF PEAK SERVICE
RATE CODE A06

Section No. 5
34th Revised Sheet No. 11

AVAILABILITY
Available to any customers for controlled loads that will be energized only for the time period between 10:00 p.m. to 6:30 a.m. daily.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

	Residential	Commercial & Industrial
Customer Charge per Month		
Secondary Voltage		
Single Phase	$4.95	$10.00
Three Phase	--	$13.60
Primary Voltage	--	$60.00
Transmission Transformed	--	$60.00
Transmission	--	$60.00
Energy Charge per kWh		
Secondary Voltage	$0.03665	$0.03665
Primary Voltage	--	$0.03560
Transmission Transformed	--	$0.03398
Transmission	--	$0.03388

INTERIM RATE ADJUSTMENT
An 8.92% Interim Rate Surcharge will be applied to residential rate components and a 13.52% Interim Rate Surcharge will be applied to Commercial Rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022.

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In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

(Continued on Sheet No. 5-11.1)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

LIMITED OFF PEAK SERVICE (Continued) Section No. 5
RATE CODE A06 9th Revised Sheet No. 11.1

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

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(Continued on Sheet No. 5-12)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

LIMITED OFF PEAK SERVICE (Continued) Section No. 5
RATE CODE A06 8th Revised Sheet No. 12

MONTHLY MINIMUM CHARGE
For all customers, the minimum charge shall be the applicable customer charge.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

TERMS AND CONDITIONS OF SERVICE

1. Limited Off Peak Service shall be separately served and metered and must at no time be connected to facilities serving customer's other loads.

2. Company will not be liable for any loss or damage caused by or resulting from any interruption of service.

3. Customer selecting Limited Off Peak Service must remain on this service for a minimum term of one year, unless customer transfers to another interruptible service rate.

4. Customer has the option of directly controlling own load or allowing Company load control. If customer chooses Company load control, customer must:
   a. Provide a load-break switch or circuit breaker equipped with electronic trip and close circuits allowing for remote operation of customer's switch or circuit breaker by Company,
   b. Wire the trip and close circuits into a connection point designated by Company to allow installation of remote control equipment by Company, and
   c. Provide a continuous 120 volt AC power source at the connection point for operation of Company's remote control equipment.

5. A charge of $0.360 per kWh shall be applied to non-authorized energy used outside of the energized time period specified in this tariff. If this energy use occurs during three or more billing months, the Company reserves the right to remove customer from Limited Off Peak Service. R

6. The rate contemplates that this service will utilize existing facilities with no additional major expenditures. Customer shall reimburse Company for any expenditures for facilities necessary to serve this load which would not otherwise be required to serve customer's load.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RULES FOR APPLICATION OF RESIDENTIAL RATES

Section No. 5
9th Revised Sheet No. 13

1. The Residential Service, Residential Time of Day Service and Residential Time of Use Pilot Program are the only rates available to residential customers for domestic purposes in a single private residence. Energy Controlled Service (Non-Demand Metered), Limited Off Peak Service, Voluntary Electric Vehicle Charger Service, Electric Vehicle Home Service, Residential Electric Vehicle Pilot Service, Residential Electric Vehicle Subscription Pilot Service and Automatic Protective Lighting Service rate schedules are also available to qualifying residential customers. C C

2. Normal service under the Residential Service, Residential Time of Day Service and Residential Time of Use Pilot Program rate schedules is single phase service rendered through one meter. Three phase service or service through more than one meter will be provided upon a one-time payment of an amount to reimburse Company for the additional investment. If customer is served through more than one meter, each meter will be separately billed.

3. Electric space heating charges are applicable only when customer's electric space heating equipment is used as customer's primary heating source.

4. Underground service charges will apply where the underground facilities are owned by Company, and Company has not been fully reimbursed for the added cost of such underground facilities.

5. Standby and Supplementary Service is available for any residential customer subject to the provisions in the General Rules and Regulations, Section 2.4. The Company's meter will be ratcheted to measure the flow of power and energy from Company to customer only.

6. A customer using electric service for domestic and non-domestic purposes jointly may combine such use through one meter on such rates as are available to general service customers.

7. The Residential Service and Residential Time of Day Service rate schedules are available to farm installations which were served on the separate Farm Service rate schedule prior to its cancellation on November 1, 1988. Residential Service and Residential Time of Day Service to these qualifying farm customers is limited to 120/240 volts single phase service rendered through one meter. Motors and other equipment which interfere with service to neighboring customers and all transformer type welding machines larger than 25 kilovolt-amperes are not permitted as part of this service.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

AUTOMATIC PROTECTIVE LIGHTING SERVICE Section No. 5
RATE CODE A07 24th Revised Sheet No. 14

AVAILABILITY
Available to all types of customers except for municipal street lighting purposes.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Designation of Lamp (Lumens)	Monthly Rate Per Unit	
Area Units		
100W High Pressure Sodium	$7.41	
175W Mercury (1)	$7.41	
250W High Pressure Sodium	$11.83	
400W Mercury (1)	$11.83	
30-45W Light Emitting Diode (4,000)	$7.28	N
110-165W Light Emitting Diode (14,000)	$11.33	N
Directional Units		
250W High Pressure Sodium	$14.08	
400W High Pressure Sodium	$17.62	
1,000W Mercury (1)	$27.33	

N

(1) Available to existing installations only.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

SERVICE INCLUDED IN RATE
Company shall own, operate, and maintain the lighting unit including the fixture, lamp, ballast, photoelectric control, mounting brackets, and all necessary wiring. Company shall furnish all electric energy required for operation of the unit.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

(Continued on Sheet No. 5-15)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

AUTOMATIC PROTECTIVE LIGHTING SERVICE Section No. 5
RATE CODE A07 25th Revised Sheet No. 14

AVAILABILITY
Available to all types of customers except for municipal street lighting purposes.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Designation of Lamp (Lumens)	Monthly Rate Per Unit
Area Units	
100W High Pressure Sodium	$7.41
175W Mercury (1)	$7.41
250W High Pressure Sodium	$11.83
400W Mercury (1)	$11.83
30-45W Light Emitting Diode (4,000)	$7.28
110-165W Light Emitting Diode (14,000)	$11.33
Directional Units	
250W High Pressure Sodium	$14.08
400W High Pressure Sodium	$17.62
1,000W Mercury (1)	$27.33

(1) Available to existing installations only.

INTERIM RATE ADJUSTMENT
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

SERVICE INCLUDED IN RATE
Company shall own, operate, and maintain the lighting unit including the fixture, lamp, ballast, photoelectric control, mounting brackets, and all necessary wiring. Company shall furnish all electric energy required for operation of the unit.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

(Continued on Sheet No. 5-15)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

AUTOMATIC PROTECTIVE LIGHTING SERVICE (Continued) Section No. 5
RATE CODE A07 11th Revised Sheet No. 15

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

The following are terms and conditions for service under this tariff.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

TERM OF AGREEMENT
Agreement shall be for a term of three years. If not then terminated by at least 30 days' written notice by either party, the agreement shall continue until so terminated.

TERMS AND CONDITIONS OF SERVICE
1. Service available subject to the provisions for Automatic Protective Lighting Service of the General Rules and Regulations, Section 5.4.

2. The lamp shall be lighted and extinguished by a photoelectric control furnished by the Company. The hours of burning shall be from approximately one-half hour after sunset until one-half hour before sunrise, every night.

3. If illumination of a lamp is interrupted and said illumination is not resumed within 72 hours from the time Company receives notice thereof from customer, one-thirtieth of the monthly compensation for such unit shall be deducted for each night of non-illumination after such notice is received.

4. Company reserves the right to discontinue service if equipment is abused.

5. Company will convert mercury vapor lighting units to high pressure sodium upon failure of the mercury vapor ballast.

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL OPTIMIZE CHARGE
Section No. 5
Original Sheet No. 16

AVAILABILITY
This Pilot is applicable for three years from the original effective date of this rate schedule. N

Available to residential customers under the Residential (A01,A03), Residential Time of Day (A02, A04), Residential Time of Use Pilot Program (A72, A74), Residential Electric Vehicle Service (A08), Electric Vehicle Home Service (A80, A81), Voluntary Electric Vehicle Charger Service (A76, A77), Residential Electric Vehicle Subscription (A82 and A84) for customers who own or lease light duty electric vehicles (EVs) and charge them at a home address that receives electricity from Northern States Power Company.

Participating customers agree to utilize the charging schedule they select during the enrollment process to shift EV charging into hours that are better for the power grid, while still meeting driving requirements, and agree to share essential enrollment and charging data with Xcel Energy.

BILL CREDIT
The Pilot is available to residential electric customers who own or lease a light-duty electric vehicle (EV). Participating customers will receive a yearly $50 Bill Credit.

TERMS AND CONDITIONS OF SERVICE

1. Eligibility

1.1 Residential customers meeting the following criteria are eligible to participate in the Pilot:
- Own or lease an EV;
- Have an active Xcel Energy account that receives electric service in Minnesota under an eligible rate;
- Be a residential customer and charge an electric vehicle at the customer's home address in Minnesota;
- Use eligible charging equipment or drive an eligible vehicle;
- Complete a Pilot application and be selected by Xcel Energy to participate in the Pilot (Participation in the Pilot will be determined by Xcel Energy, in its sole discretion);

For a participating customer, failure to meet any of the above eligibility requirements at any time will void any obligation Xcel Energy has to provide the Bill Credit, and Xcel Energy may immediately terminate the customer's participation in the Pilot. N

(Continued on Sheet 16.1)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL OPTIMIZE CHARGE (continued)
Section No. 5
Original Sheet No. 16.1

1. Customer Communications

2.1 Customer consents to receive communications from Xcel Energy relating to the Pilot in electronic or text-based form and sent to Customer's email address or phone provided during enrollment.

3. Compliance with Terms and Conditions

3.1 Xcel Energy reserves the right to refuse payment if the customer violates Pilot terms and conditions.

4. Pilot Requirements

4.1 Provide accurate and complete information as part of participation in the Pilot; Xcel Energy is not responsible for any harm caused by the customer or customer misstatements, misrepresentations, or failure to provide accurate and complete information.
4.2 If required by the Pilot Vendor (selected by Xcel Energy), the customer will: download any Vendor software application required for Pilot participation; install any Vendor hardware required for Pilot participation; comply with any Vendor terms and conditions; and meet any other requirements of the Vendor related to Pilot participation.
4.3 For customers relying on the use of a networked charging station for participation, the charging station must be connected to the Vendor's network via the customer's home Wi-Fi network and be able to maintain on-going and stable connection throughout the Pilot.
4.3.1 Customers driving eligible vehicles may supply their charging data through one of the Company's Pilot Vendors listed at www.xcelenergy.com. If customer is relying on the built-in telematics of their EV for participation in the Pilot, their EV must be connected to the Pilot Vendor; and
4.4 Customers agree to these Pilot Terms and to participate in the Pilot as set forth in these Pilot Requirements.

5. Sharing of Xcel Energy Customer Information

5.1 Xcel Energy will provide Vendors with data ("Customer Information"), including, but not limited to, one or more of the following: name, address, vehicle identification number (VIN), charging station serial number, and e-mail address, for the purposes of allowing the Vendor to carry-out services in relation to this Pilot. Upon enrolling, Vendors will share information about the customer's charging ("Charging Data") with Xcel Energy that includes but is not limited to when the customer plug-ins and charges the EV, how much energy is used in charging the EV, the state of charge of the vehicle before and after plugging in, and the use of a charging schedule.
5.2 Vendors will be required to follow all applicable rules and requirements for data sharing as defined by Minnesota Public Utilities Commission rulings.
5.3 Xcel Energy may share this data directly with service providers performing services on behalf of Xcel Energy, and will use this data to validate the customer's eligibility to participate in the Pilot, to study and evaluate the benefits that the Pilot provides to the power grid, in connection with proceedings before the Minnesota Public Utilities Commission, to design future EV and demand management programs, to support power grid planning and management, to share aggregated and anonymized findings, and to inform Program operations.

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(Continued on Sheet 16.2)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL OPTIMIZE CHARGE (Continued)
Section No. 5
Original Sheet No. 16.2

5.4 Customers will be able to opt-out of sharing non-essential data.
5.5 If the Customer withdraws from the Pilot or if the Pilot is discontinued by Xcel Energy, Xcel Energy and Manufacturers will cease the sharing of Xcel Energy Customer Information and Charging Data without reasonable delay.

N

6. Schedule Determination and Use

6.1 During enrollment, a customer will select a charging schedule from a set of options presented to the customer by Xcel Energy that will be used for the EV home charging under the Pilot. The charging schedule is based on the customer's charging needs and the customer's answers to questions during the enrollment process. Customers who believe the charging schedule options presented will not meet the customer's charging needs can email Xcel Energy at electricvehicles@xcelenergy.com to discuss potential adjustment to the charging schedule.
6.2 Xcel Energy recommends automatically limiting EV charging to the hours allowed by entering the charging schedule into the EV charging station or into the EV smart application; however, a customer may implement the charging schedule in any manner that is suitable to the customer.
6.3 The customer may override the recommended charging schedule, without penalty, whenever it is necessary to meet the customer's driving requirements. The customer must, however, maintain the minimum threshold set forth in paragraph 7.1.

7. Participation Details

7.1 In order to remain enrolled in the Pilot, 25% of the participating EV charging sessions must be conducted during the customer-selected charging schedule. Xcel Energy will review participation on a quarterly basis and assess compliance for each full year of participation measured from the Enrollment Date. Xcel Energy will remove a customer from the Pilot if it has determined, at its sole discretion, that the customer did not meet this participation level.

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(Continued on Sheet 16.3)

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RESIDENTIAL OPTIMIZE CHARGE (Continued)
Section No. 5
Original Sheet No. 16.3

8. Pilot Term and Withdrawal

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8.1 Customer may withdraw from the Pilot at any time without penalty.
8.2 Xcel Energy may discontinue the Pilot at any time for any reason. Xcel Energy will make best efforts to provide Pilot participants a discontinuation notice at least thirty (30) days prior to such termination date.
8.3 Customer will notify Xcel Energy by emailing electricvehicles@xcelenergy.com in the event the customer wishes to unenroll from the Pilot, if the ownership of the EV enrolled in the Pilot changes, or if the customer moves out of Xcel Energy's Minnesota service territory.
8.4 If Xcel Energy becomes aware that the enrolled EV has changed ownership or that the customer has moved outside of Xcel Energy's Minnesota service territory, without first being informed by the customer, it will be deemed by Xcel Energy as a Customer-initiated termination of this Agreement.
8.5 If the customer terminates this Agreement prior to October 1 of any year that the Pilot continues, or if Xcel Energy terminates this Agreement because of the customer's failure to honor the terms of this Agreement at any time, or upon discovery of any tampering with vehicle equipment, then Xcel Energy shall have the right to terminate this Agreement immediately and discontinue payment of the Bill Credit.

9. Limitations

9.1 Pilot terms are subject to change any time. Please visit www.xcelenergy.com to determine whether any Pilot changes have occurred. Any material changes will be communicated the customer by e-mail using the e-mail address provided.
9.2 If customer enrolls more than one eligible vehicle or charging station, they will receive a Bill Credit for each vehicle and charging station enrolled. A single EV and charging station can only be enrolled to participate once—the same vehicle and charging station cannot be registered by multiple accounts.
9.3 Xcel Energy reserves the right to modify all Pilot incentives based on future performance, Pilot modifications, technology upgrades, and changes to Xcel Energy's electrical distribution system. Any such changes will be communicated to Customer by e-mail using the e-mail address provided by the Customer at least thirty (30) days prior to deployment of such changes.
9.4 Customer agrees not to tamper with vehicle, vehicle data, charging station, charging station data, or any hardware related to the Pilot and to reasonably attempt to restrict access by others attempting to tamper with the vehicle, vehicle data, charging station, charging station data, or Pilot-related hardware (as applicable). If Xcel Energy or its Vendors identify any evidence of tampering, the customer will be removed from the Pilot. The customer agrees to protect and hold harmless Xcel Energy from any and all claims, damages and liability caused by the customer's fault or negligence, or customer's failure to comply. If Xcel Energy is made a party (without fault on its part) to any lawsuit or arbitration started by or against the customer, they agree to protect and hold Xcel Energy harmless, and to pay all costs, expenses and reasonable attorneys' fees incurred or paid by Xcel Energy in connection with that lawsuit or arbitration. Customer agrees to pay all costs, expenses and reasonable attorneys' fees that Xcel Energy may incur or pay in enforcing this agreement.

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(Continued on Sheet 16.4)

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RESIDENTIAL OPTIMIZE CHARGE (Continued)
Section No. 5
Original Sheet No. 16.4

9.5 Participation in the Pilot is entirely voluntary. Xcel Energy and vendor do not assume any responsibility for customer's EV, the inability to use or unavailability of the EV, or any damages to or incurred by the customer EV or charging station which may result from participation in the Pilot. In no event, whether based on contract, indemnity, warranty, tort (including negligence), strict liability or otherwise, shall Xcel Energy or vendor be liable to the customer for special, indirect, exemplary, punitive, incidental, or consequential damages whatsoever including, without limitation, loss of profits or revenue, and in no event shall Xcel Energy's or Vendor's liability on any claim of any kind, or from any loss or damage arising out of or in connection with or resulting from the pilot, these pilot terms, or from performance or breach thereof, exceed the total amount of the participation reward. N

10. Requirements

10.1 Customer agrees to maintain services needed to participate in the Pilot at no expense to Xcel Energy. These services may include but are not limited to subscription services with the Manufacturer of the enrolled vehicle to allow communication between the Manufacturer and the EV. Depending on the EV and the Manufacturer, this may require the Customer to activate and/or pay for a subscription. For further information, please communicate with the EV Manufacturer. This is applicable for customers that provide their Charging Data through one of the Vehicle Vendors listed at xcelenergy.com.

10.2 Customer agrees to maintain a functioning high-speed internet connection that allows the charging station to gather Charging Data at no expense to Xcel Energy. This is applicable for customers that provide their Charging Data to Xcel Energy through one of the Charging Station Vendors listed at xcelenergy.com.

10.3 Customer is responsible for maintaining in working order home EV charging or electrical equipment and the participating EV.

10.4 Customer is responsible for downloading any Vendor software application required for Pilot participation.

10.5 Customer responsible for installing any hardware from the Vendor that is required for Pilot participation.

11. Governing Law; Disputes.

11.1 The Customer and Xcel Energy agree that all disputes arising out of these Pilot Terms or the Pilot shall be subject to this section. The internal laws of the State of Minnesota, without regard to conflicts of law's provisions, govern the Pilot and these Pilot Terms and any action brought with respect to the Pilot Terms or the Pilot shall be brought in the courts located in Minneapolis, Minnesota.

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Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

SMALL GENERAL SERVICE Section No. 5
RATE CODE A09, A10, A11, A13 31st Revised Sheet No. 21

AVAILABILITY
Standard service (i.e., alternating current) is available to any non-residential customer for single or three phase electric service. Direct Current service is only available in Minneapolis and St. Paul to the extent now used.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month – Unmetered (A09)	$8.00	
– Metered (A10)	$10.00	
– Water Heating (A11)	$0.00	
– Direct Current (A13)	$10.00	
Energy Charge per kWh		
June - September	$0.09256	R
Other Months	$0.07757	R
Demand Charge (Direct Current Only) per Month per kW of Connected Load	$3.61	R

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

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Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

SMALL GENERAL SERVICE Section No. 5
RATE CODE A09, A10, A11, A13 32nd Revised Sheet No. 21

AVAILABILITY
Standard service (i.e., alternating current) is available to any non-residential customer for single or three phase electric service. Direct Current service is only available in Minneapolis and St. Paul to the extent now used.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month – Unmetered (A09)	$8.00
– Metered (A10)	$10.00
– Water Heating (A11)	$0.00
– Direct Current (A13)	$10.00
Energy Charge per kWh	
June - September	$0.09256
Other Months	$0.07757
Demand Charge (Direct Current Only) per Month per kW of Connected Load	$3.61

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

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Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

SMALL GENERAL SERVICE (Continued) Section No. 5
RATE CODE A9, A10, A11, A13 9th Revised Sheet No. 22

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

MONTHLY MINIMUM CHARGE
Customer Charge, or Customer Charge plus Demand Charge if served at Direct Current.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

The following are terms and conditions for service under this tariff. D
D

LATE PAYMENT CHARGE D
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

TERMS AND CONDITIONS OF SERVICE FOR ALTERNATING CURRENT CUSTOMERS
Company shall install a demand meter for a customer when:

1. Customer's connected load is estimated to be 20 kW or greater,
2. Customer is served single phase and has a service entrance capacity greater than 200 amperes,
3. Customer is served three phase at 120/208 or 120/240 volts and has a service entrance capacity greater than 200 amperes,
4. Customer is served three phase at 240/480 or 277/480 volts and has a service entrance capacity greater than 100 amperes, or
5. Customer's average monthly kWh use for four consecutive months exceeds 3,500 kWh.

If a demand meter is installed in accordance with the above, the customer may remain on the Small General Service schedule as long as customer's maximum demand is less than 25 kW. When the customer achieves an actual maximum demand of 25 kW or greater, the customer will be placed on the General Service schedule in the next billing month. A customer with a billing demand of less than 25 kW for 12 consecutive months will be given the option of returning to the Small General Service schedule.

DETERMINATION OF CONNECTED LOAD FOR DIRECT CURRENT SERVICE
The nameplate rating shall be the basis of determining the connected load and shall be assumed to be one kW for each hp of nameplate rating. In any case, where there is reasonable doubt as to correctness of manufacturer's rating or where insufficient or no rating exists, the Company may fix the rating by test. For billing purposes, the demand shall be rounded to the nearest 0.1 kW.

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

SMALL GENERAL TIME OF DAY SERVICE Section No. 5
RATE CODE A12, A16, A18, A22 31st Revised Sheet No. 23

AVAILABILITY
Available to any non-residential customer for single or three phase electric service supplied through one meter.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month – Time Of Day Metered (A12)	$12.00	
– kWh Metered (A16)	$10.00	
– Unmetered (A18)	$8.00	
– Low Wattage (A22)	(Please see page 5-24.1)	

Energy Charge per kWh	Oct-May	Jun-Sep	
On Peak Period (A12)	$0.11723	$0.14880	R
Off Peak Period (A12)	$0.04170	$0.04170	R
Constant Hourly (A16, A18, A22) (= 35% On, 65% Off)	$0.06814	$0.07919	R

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

MONTHLY MINIMUM CHARGE
Customer Charge.

(Continued on Sheet No. 5-24)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

SMALL GENERAL TIME OF DAY SERVICE Section No. 5
RATE CODE A12, A16, A18, A22 32nd Revised Sheet No. 23

AVAILABILITY
Available to any non-residential customer for single or three phase electric service supplied through one meter.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month – Time Of Day Metered (A12)	$12.00
– kWh Metered (A16)	$10.00
– Unmetered (A18)	$8.00
– Low Wattage (A22)	(Please see page 5-24.1)

Energy Charge per kWh	Oct-May	Jun-Sep
On Peak Period (A12)	$0.11723	$0.14880
Off Peak Period (A12)	$0.04170	$0.04170
Constant Hourly (A16, A18, A22) (= 35% On, 65% Off)	$0.06814	$0.07919

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

MONTHLY MINIMUM CHARGE
Customer Charge.

(Continued on Sheet No. 5-24)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

SMALL GENERAL TIME OF DAY SERVICE (Continued) Section No. 5
RATE CODE A12, A16, A18, A22 14th Revised Sheet No. 24

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

REVENUE DECOUPLING MECHANISM RIDER
Bills are subject to the adjustments provided for in the Revenue Decoupling Mechanism Rider.

The following are terms and conditions for service under this tariff.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

DEFINITION OF PEAK PERIODS
The on peak period is defined as those hours between 9:00 a.m. and 9:00 p.m. Monday through Friday, except the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When a designated holiday occurs on Sunday, the following Monday will be designated a holiday. The off peak period is defined as all other hours. Definition of on peak and off peak period is subject to change with change in Company's system operating characteristics.

OPTIONAL TRIAL SERVICE
Customers may elect time of day service for a trial period of three months. If a customer chooses to return to non-time of day service after the trial period, the customer will pay a charge of $25.00 for removal of time of day metering equipment.

TERMS AND CONDITIONS OF SERVICE
1. Customer selecting the above time of day rate schedule will remain on this rate for a period of not less than 12 months. While served under this schedule, the Small General Service rate is unavailable.

2. Company shall install a demand meter for a customer when:
   a. Customer's connected load is estimated to be 20 kW or greater,
   b. Customer is served single phase and has a service entrance capacity greater than 200 amperes,
   c. Customer is served three phase at 120/208 or 120/240 volts and has a service entrance capacity greater than 200 amperes,
   d. Customer is served three phase at 240/480 or 277/480 volts and has a service entrance capacity greater than 100 amperes, or
   e. Customer's average monthly kWh use for four consecutive months exceeds 3,500 kWh.

   If a demand meter is installed in accordance with the above, the customer may remain on the Small General Time of Day Service schedule as long as customer's maximum demand is less than 25 kW. When the customer achieves an actual maximum demand of 25 kW or greater, the customer will be placed on the General Time of Day Service schedule in the next billing month. A customer with a billing

(Continued on Sheet No. 24.1)

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SMALL GENERAL TIME OF DAY SERVICE (Continued) Section No. 5
RATE CODE A12, A16, A18, A22 12th Revised Sheet No. 24.1

TERMS AND CONDITIONS OF SERVICE (Continued)

demand of less than 25 kW for 12 consecutive months will be given the option of returning to the Small General Time of Day Service schedule.

3. Optional Metering Service: Optional metering is available subject to the provisions in the General Rules and Regulations, Section 1.5, for the following applications:

   a. Kilowatt-hour Metered Service: For applications where a non-time of day meter is used, the time of day metering charge will be waived and the applicable lower monthly Customer Charge shall apply.

   b. Unmetered Service: For applications where no metering is installed, the applicable lower monthly Customer Charge shall apply. If requested by Company, the customer agrees to receive one or more combined bills for all their unmetered service locations. For purposes of applying the appropriate customer service charge, one customer service charge shall be applied for every point of delivery. A point of delivery shall be any location where a meter would otherwise be required under this schedule.

   c. Low Wattage Unmetered Service: For applications where customer owns and operates multiple electronic devices in at least 500 locations within Company's Minnesota electric service area. Such electronic devices are: 1) individually located at each point of delivery, 2) rated at less than 400 Watts, and 3) operated with a continuous and constant load level year round. Each individual electronic device must not in any way interfere with Company operations and service to adjacent customers. This optional metering service is not applicable to electric service for traffic signals, civil defense, or lighting. Company reserves the right to evaluate customer requests for this optional metering service to determine eligibility.

      The monthly fixed charge under this optional metering service shall be $0.30 per device for devices with a rating of 100 Watts or less. For devices with a rating over 100 Watts but less than 400 Watts, the monthly fixed charge shall be $1.20 per device. R

      In place of metered usage for each device, customer will be billed for the predetermined energy usage in kWh per device. The energy charge shall equal the sum of the predetermined energy usage for customer's low wattage devices in service for the billing month multiplied by the Constant Hourly Energy Charge applicable for the billing month.

      Customer shall contract for this optional metering service through an electric service agreement with Company.

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

DIRECT CURRENT SERVICE (CLOSED) Section No. 5
RATE CODE A13 13th Revised Sheet No. 25

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

DIRECT CURRENT SERVICE (CLOSED) (Continued) Section No. 5
RATE CODE A13 2nd Revised Sheet No. 25.1

CANCELED

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

GENERAL SERVICE Section No. 5
RATE CODE A14 31st Revised Sheet No. 26

AVAILABILITY
Available to any non-residential customer for general service where customer is not required to be on a time-of-day rate schedule. Once the customer's 15-minute measured demands are equal to or greater than 1,000 kW for at least 4 of the past 12 consecutive months, the customer will be transferred to the General Time of Day service.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month	$25.64		
Service at Secondary Voltage	Oct-May	Jun-Sep	
Demand Charge per Month per kW	$10.49	$14.79	R
Energy Charge per kWh	$0.03407		R
Energy Charge Credit per Month per kWh			
All kWh in Excess of 400 Hours Times the Billing Demand	$0.01518		R

	January - December		
Voltage Discounts per Month	Per kW	Per kWh	
Primary Voltage	$0.80	$0.00105	R
Transmission Transformed Voltage	$1.55	$0.00267	R
Transmission Voltage	$2.35	$0.00277	R

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

(Continued on Sheet No. 5-27)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

GENERAL SERVICE Section No. 5
RATE CODE A14 32nd Revised Sheet No. 26

AVAILABILITY
Available to any non-residential customer for general service where customer is not required to be on a time-of-day rate schedule. Once the customer's 15-minute measured demands are equal to or greater than 1,000 kW for at least 4 of the past 12 consecutive months, the customer will be transferred to the General Time of Day service.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month	$25.64	
Service at Secondary Voltage	Oct-May	Jun-Sep
Demand Charge per Month per kW	$10.49	$14.79
Energy Charge per kWh	$0.03407	
Energy Charge Credit per Month per kWh		
All kWh in Excess of 400 Hours	$0.01518	
Times the Billing Demand		

Voltage Discounts per Month	January - December Per kW	Per kWh
Primary Voltage	$0.80	$0.00105
Transmission Transformed Voltage	$1.55	$0.00267
Transmission Voltage	$2.35	$0.00277

INTERIM RATE ADJUSTMENT
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

(Continued on Sheet No. 5-27)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

GENERAL SERVICE (Continued) Section No. 5
RATE CODE A14 8th Revised Sheet No. 27

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

The following are terms and conditions for service under this tariff.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

DETERMINATION OF DEMAND
The adjusted demand in kW for billing purposes shall be determined by dividing the maximum actual demand in kW by the power factor expressed in percent but not more than a 90% power factor and multiplying the quotient so obtained by 90% and rounding to the nearest whole kW. In no month shall the demand to be billed be considered as less than current month's adjusted demand in kW or 50% of the greatest monthly adjusted demand in kW during the preceding 11 months. In no month shall the billing demand be greater than the value in kW determined by dividing the kWh sales for the billing month by 100 hours per month.

The greatest monthly adjusted demand in kW during the preceding 11 months shall not include the additional demand which may result from customer's use of standby capacity contracted for under the Standby Service Rider.

MAXIMUM DEMAND
The maximum actual demand in kW shall be the greatest 15 minute load during the month for which bill is rendered.

POWER FACTOR
For three phase customers with services above 200 amperes or above 480 volts, the power factor for the month shall be determined by permanently installed metering equipment. For all single phase customers and three phase customers with services 200 amperes or less, a power factor of 90% will be assumed.

(Continued on Sheet No. 5-28)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

GENERAL SERVICE (Continued) Section No. 5
RATE CODE A14 7th Revised Sheet No. 28

OFF SEASON LOAD SERVICE
The optional Off Season Load Service is available under this schedule subject to the provisions contained in the Off Season Load Rider.

STANDBY SERVICE
Standby Service and Supplemental Generation Service are available under this schedule subject to the provisions contained in the Standby Service Rider or Supplemental Generation Service Rider.

COMPETITIVE SERVICE
Competitive Service is available under this schedule subject to the provisions contained in the Competitive Response Rider.

MINIMUM DEMAND TO BE BILLED
The monthly minimum billing demand shall not be less than provided above.

SPLIT SERVICE
When approved by Company, customer's service may be split between General Service and General Time of Day Service rates. Only Company approved storage space cooling and storage space heating equipment qualifies for the General Time of Day Service portion of a split service installation. The thermal storage equipment shall be permanently wired, separately served and metered, and at no time connected to the general service portion of the split service installation. Each portion of customer's split service installation will be considered separately for all other rate application purposes.

(Continued on Sheet No. 28.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

GENERAL SERVICE (Continued) Section No. 5
RATE CODE A14 5th Revised Sheet No. 28.1

TERMS AND CONDITIONS OF SERVICE

1. Alternating current service is provided at the following nominal voltage:
   a. Secondary Voltage: Single or three phase from 208 volts up to but not including 2,400 volts,
   b. Primary Voltage: Three phase from 2,400 volts up to but not including 69,000 volts,
   c. Transmission Transformed Voltage: Three phase from 2,400 volts up to but not including 69,000 volts, where service is provided at the Company's disconnecting means of a distribution substation transformer, or
   d. Transmission Voltage: Three phase at 69,000 volts or higher.

   Service voltage available in any given case is dependent upon voltage and capacity of Company lines in vicinity of customer's premises.

2. Transmission Transformed Service is available only to customers served by an exclusively dedicated distribution feeder. Customer will be responsible for the cost of all facilities necessary to interconnect at the Company's disconnecting means of a distribution substation transformer.

3. Transmission Service is available at transmission voltage, subject to the terms and conditions contained in the Company's General Rules and Regulations, Section 5.1(B).

4. Customer selecting General Service will remain on this rate for a period of not less than 12 months.

5. If a customer has a billing demand of less than 25 kW for 12 consecutive months, the customer will be given the option of returning to the Small General Service schedule.

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

GENERAL TIME OF DAY SERVICE
RATE CODE A15, A17, A19

Section No. 5
27th Revised Sheet No. 29

AVAILABILITY-MANDATORY
Effective November 1, 2007, this rate schedule is mandatory for any non-residential customer for general service having a 15-minute measured demand equal to or greater than 1,000 kW for at least 4 of the past 12 consecutive months. Customer will remain on this rate schedule on a mandatory basis unless their demand remains below 1,000 kW for 12 consecutive months.

AVAILABILITY-OPTIONAL
This rate schedule is optional for any non-residential customer for general service where customer is not required to be on a time-of-day rate.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month – Time Of Day Metered (A15)	$29.64	
-- kWh Metered (A17)	$25.64	
-- Unmetered (A19)	$21.64	

Service at Secondary Voltage	Oct-May	Jun-Sep	
Demand Charge per Month per kW			
On Peak Period Demand	$10.49	$14.79	R
Off Peak Period Demand in Excess of On Peak Period Demand	$2.35	$2.35	
Energy Charge per kWh			
On Peak Period Energy	$0.04855		R
Off Peak Period Energy	$0.02341		R
Energy Charge Credit per Month per kWh			
All kWh in Excess of 400 Hours Times the On Peak Period Billing Demand, Not to Exceed 50% of Total kWh	$0.01518		R

Voltage Discounts per Month	January - December Per kW	Per kWh	
Primary Voltage	$0.80	$0.00105	R
Transmission Transformed Voltage	$1.55	$0.00267	R
Transmission Voltage	$2.35	$0.00277	R

(Continued on Sheet No. 5-30)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

GENERAL TIME OF DAY SERVICE
RATE CODE A15, A17, A19

Section No. 5
28th Revised Sheet No. 29

AVAILABILITY-MANDATORY
Effective November 1, 2007, this rate schedule is mandatory for any non-residential customer for general service having a 15-minute measured demand equal to or greater than 1,000 kW for at least 4 of the past 12 consecutive months. Customer will remain on this rate schedule on a mandatory basis unless their demand remains below 1,000 kW for 12 consecutive months.

AVAILABILITY-OPTIONAL
This rate schedule is optional for any non-residential customer for general service where customer is not required to be on a time-of-day rate.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month – Time Of Day Metered (A15)	$29.64
-- kWh Metered (A17)	$25.64
-- Unmetered (A19)	$21.64

Service at Secondary Voltage	Oct-May	Jun-Sep
Demand Charge per Month per kW		
On Peak Period Demand	$10.49	$14.79
Off Peak Period Demand in Excess of On Peak Period Demand	$2.35	$2.35

Energy Charge per kWh	
On Peak Period Energy	$0.04855
Off Peak Period Energy	$0.02341
Energy Charge Credit per Month per kWh	
All kWh in Excess of 400 Hours Times the On Peak Period Billing Demand, Not to Exceed 50% of Total kWh	$0.01518

	January - December	
Voltage Discounts per Month	Per kW	Per kWh
Primary Voltage	$0.80	$0.00105
Transmission Transformed Voltage	$1.55	$0.00267
Transmission Voltage	$2.35	$0.00277

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

(Continued on Sheet No. 5-30)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

GENERAL TIME OF DAY SERVICE (Continued) Section No. 5
RATE CODE A15, A17, A19 15th Revised Sheet No. 30

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

The following are terms and conditions for service under this tariff.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

DEFINITION OF PEAK PERIODS
The on peak period is defined as those hours between 9:00 a.m. and 9:00 p.m. Monday through Friday, except the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When a designated holiday occurs on Sunday, the following Monday will be designated a holiday. The off peak period is defined as all other hours. Definition of on peak and off peak period is subject to change with change in Company's system operating characteristics.

(Continued on Sheet No. 5-31)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

GENERAL TIME OF DAY SERVICE (Continued) Section No. 5
RATE CODE A15, A17, A19 8th Revised Sheet No. 31

DETERMINATION OF ON PEAK PERIOD DEMAND
The actual on peak period demand in kW shall be the greatest 15-minute load for the on peak period during the month for which the bill is rendered. The adjusted demand in kW for billing purposes shall be determined by dividing the actual on peak demand by the power factor expressed in percent but not more than 90%, multiplying the quotient so obtained by 90%, and rounding to the nearest whole kW. In no month shall the on peak period demand to be billed be considered as less than the current month's adjusted on peak period demand in kW, or 50% of the greatest monthly adjusted on peak period demand in kW during the preceding 11 months. In no month shall the on peak billing demand be greater than the value in kW determined by dividing the kWh sales for the billing month by 100 hours per month.

The greatest monthly adjusted on peak period demand in kW during the preceding 11 months shall not include the additional demand which may result from customer's use of standby capacity contracted for under the Standby Service Rider.

DETERMINATION OF OFF PEAK PERIOD DEMAND IN EXCESS OF ON PEAK PERIOD DEMAND
The actual off peak period demand in kilowatts shall be the greatest 15-minute load for the off peak period during the month for which the bill is rendered rounded to the nearest whole kW. In no month shall the off peak period demand for billing purposes be considered as less than the current month's actual off peak period demand in kW, or 50% of the greatest monthly actual off peak period demand in kW during the preceding 11 months.

The greatest monthly adjusted off peak period demand in kW during the preceding 11 months shall not include the additional demand which may result from customer's use of standby capacity contracted for under the Standby Service Rider.

The off peak period demand in excess of on peak period demand in kW to be billed shall be determined by subtracting the billing on peak period demand from the actual off peak period demand as defined above only the off peak period demand is greater.

POWER FACTOR
For three phase customers with services above 200 amperes, or above 480 volts, the power factor for the month shall be determined by permanently installed metering equipment. For all single phase customers and three phase customers with services 200 amperes or less, a power factor of 90% will be assumed.

(Continued on Sheet No. 5-32)

Northern States Power Company, a Minnesota corporation
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GENERAL TIME OF DAY SERVICE (Continued) Section No. 5
RATE CODE A15, A17, A19 6th Revised Sheet No. 32

COMPETITIVE SERVICE
Competitive Service is available under this schedule subject to the provisions contained in the Competitive Response Rider.

STANDBY SERVICE
Standby Service is available under this schedule subject to the provisions contained in the Standby Service Rider.

MINIMUM DEMAND TO BE BILLED
The monthly minimum on peak period billing demand shall not be less than provided above.

SPLIT SERVICE
When approved by Company, customer's service may be split between General Service and General Time of Day Service rates. Only Company approved storage space cooling and storage space heating equipment qualifies for the General Time of Day Service portion of a split service installation. The thermal storage equipment shall be permanently wired, separately served and metered, and at no time connected to the general service portion of the split service installation. Each portion of customer's split service installation will be considered separately for all other rate application purposes.

OPTIONAL TRIAL SERVICE
Customers may elect time of day service for a trial period of three months. If a customer chooses to return to non-time of day service after the trial period, the customer will pay a charge of $35.00 for removal of time of day metering equipment.

TERMS AND CONDITIONS OF SERVICE
1. Alternating current service is provided at the following nominal voltages:
   a. Secondary Voltage: Single or three phase from 208 volts up to but not including 2,400 volts,
   b. Primary Voltage: Three phase from 2,400 volts up to but not including 69,000 volts,
   c. Transmission Transformed Voltage: Three phase from 2,400 volts up to but not including 69,000 volts, where service is provided at the Company's disconnecting means of a distribution substation transformer, or
   d. Transmission Voltage: Three phase at 69,000 volts or higher.

   Service voltage available in any given case is dependent upon voltage and capacity of Company lines in vicinity of customer's premises.

(Continued on Sheet No. 5-32.1)

Northern States Power Company, a Minnesota corporation
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GENERAL TIME OF DAY SERVICE (Continued) Section No. 5
RATE CODE A15, A17, A19 5th Revised Sheet No. 32.1

TERMS AND CONDITIONS OF SERVICE (Continued)

2. Transmission Transformed Service is available only to customers served by an exclusively dedicated distribution feeder. Customer will be responsible for the cost of all facilities necessary to interconnect at the Company's disconnecting means of a distribution substation transformer.

3. Transmission Service is available at transmission voltage, subject to the terms and conditions contained in the Company's General Rules and Regulations, Section 5.1(B).

4. Customer selecting the above time of day rate schedule will remain on this rate for a period of not less than 12 months.

5. If a customer has a billing demand of less than 25 kW for 12 consecutive months, the customer will be given the option of returning to the Small General Time of Day Service schedule.

6. Optional Metering Service: Optional metering is available subject to the provisions in the General Rules and Regulations, Section 1.5, for the following applications:
   a. Kilowatt-hour Metered Service: For applications where a non-time of day meter is used, the time of day metering charge will be waived and the applicable lower monthly Customer Charge shall apply.
   b. Unmetered Service: This rate is for applications where no metering is installed and the applicable lower monthly Customer Charge shall apply. If requested by Company, the customer agrees to receive one or more combined bills for all their unmetered service locations. For purposes of applying the appropriate customer service charge, one customer service charge shall be applied for every point of delivery. A point of delivery shall be any location where a meter would otherwise be required under this schedule.

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PEAK CONTROLLED SERVICE (CLOSED) Section No. 5
RATE CODE A20 13th Revised Sheet No. 33

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

PEAK CONTROLLED SERVICE (CLOSED) (Continued) Section No. 5
RATE CODE A20 3rd Revised Sheet No. 34

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

PEAK CONTROLLED SERVICE (CLOSED) (Continued) Section No. 5
RATE CODE A20 2nd Revised Sheet No. 35

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

PEAK CONTROLLED SERVICE (CLOSED) (Continued) Section No. 5
RATE CODE A20 1st Revised Sheet No. 35.1

CANCELED

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

PEAK CONTROLLED TIME OF DAY SERVICE (CLOSED) Section No. 5
RATE CODE A21 8th Revised Sheet No. 36

CANCELED

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

PEAK CONTROLLED TIME OF DAY SERVICE (CLOSED)
(Continued)
RATE CODE A21

Section No. 5
8th Revised Sheet No. 37

CANCELED

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

PEAK CONTROLLED TIME OF DAY SERVICE (CLOSED)
(Continued)
RATE CODE A21

Section No. 5
2nd Revised Sheet No. 38

CANCELED

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

PEAK CONTROLLED TIME OF DAY SERVICE
(CLOSED) (Continued)
RATE CODE A21

Section No. 5
1st Revised Sheet No. 39

CANCELED

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

PEAK CONTROLLED SERVICE Section No. 5
RATE CODE A23 23rd Revised Sheet No. 40

AVAILABILITY

Available to any non-residential customer for general service who agrees to control demand to a predetermined level whenever required by Company and where customer is not required to be on a time-of-day rate schedule. Once the customer's total 15-minute measured demands (Firm plus Controllable) are equal to or greater than 1000 kW for at least 4 of the past 12 consecutive months, the customer will be transferred to the Peak Controlled Time of Day service. Availability is restricted to customers with a minimum Controllable demand of 50 kW. Waivers to certain controllable load requirements, cancellation charges and notice requirements are in effect through December 31, 2020 or the end of the COVID-19 peacetime emergency as declared by the Governor, whichever is later. N N N

DETERMINATION OF CUSTOMER BILLS

Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month	$55.00	
Service at Secondary Voltage		
Energy Charge per kWh	$0.03407	
Energy Charge Credit per Month per kWh		
All kWh in Excess of 400 Hours	$0.01518	
Times the Sum of All Billing Demands		
Demand Charge per Month per kW	Tier 1	Tier 2
Firm Demand		
June - September	$14.79	$14.79
Other Months	$10.49	$10.49
Controllable Demand (Jan-Dec)		
Level A: < 65% PF	Not Available	$8.88
Level B: ≥ 65% and < 85% PF	$7.15	$7.86
Level C: ≥ 85% PF	$6.56	$7.34
Short Notice Rider	$6.09	Not Available

	January – December	
Voltage Discounts per Month	Per kW	Per kWh
Primary Voltage	$0.80	$0.00105
Transmission Transformed Voltage	$1.55	$0.00267
Transmission Voltage	$2.35	$0.00277

(Continued on Sheet No. 5-41)

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Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

PEAK CONTROLLED SERVICE (Continued) Section No. 5
RATE CODE A23 18th Revised Sheet No. 41

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In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

DEFINITION OF PERFORMANCE FACTOR (PF)
Performance factor is defined in percentage terms as the average of the July and August calendar month unadjusted maximum Controllable Demand occurring from 1:00 p.m. to 7:00 p.m. on weekdays, or which has been permanently shifted out of normal control period times, divided by the unadjusted maximum annual Controllable Demand. Customers claiming permanent load shifts must provide verification to Company, based on NSP's established criteria.

DETERMINATION OF DEMAND
Maximum Actual Demand in kW shall be the greatest 15-minute load during the billing month.

Adjusted Demand in kW for billing purposes shall be determined by dividing the Maximum Actual Demand in kW by the power factor expressed in percent but not more than a 90% power factor and multiplying the quotient so obtained by 90% and rounding to the nearest whole kW.

(Continued on Sheet No. 5-42)

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PEAK CONTROLLED SERVICE (Continued) Section No. 5
RATE CODE A23 19th Revised Sheet No. 41

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

DEFINITION OF PERFORMANCE FACTOR (PF)
Performance factor is defined in percentage terms as the average of the July and August calendar month unadjusted maximum Controllable Demand occurring from 1:00 p.m. to 7:00 p.m. on weekdays, or which has been permanently shifted out of normal control period times, divided by the unadjusted maximum annual Controllable Demand. Customers claiming permanent load shifts must provide verification to Company, based on NSP's established criteria.

DETERMINATION OF DEMAND
Maximum Actual Demand in kW shall be the greatest 15-minute load during the billing month.

Adjusted Demand in kW for billing purposes shall be determined by dividing the Maximum Actual Demand in kW by the power factor expressed in percent but not more than a 90% power factor and multiplying the quotient so obtained by 90% and rounding to the nearest whole kW.

(Continued on Sheet No. 5-42)

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PEAK CONTROLLED SERVICE (Continued) Section No. 5
RATE CODE A23 6th Revised Sheet No. 42

DETERMINATION OF DEMAND (Continued)
Predetermined Demand shall be specified and agreed to by the customer and Company. Customer's Adjusted Demand must not exceed the Predetermined Demand Level (PDL) during a control period.

Standard PDL customers must agree to a fixed demand level and limit load to that level during a control period.

Optional PDL customers must agree to reduce demand by a fixed amount during a control period. Customer's Firm Demand will vary from month-to-month while the Controllable Demand remains fixed each month. The Firm Demand will be the Adjusted Demand (based on the Maximum Actual Demand for the month) less the fixed amount of Controllable Demand. Customer's PDL will be the monthly adjusted demand less the fixed load reduction. Customers selecting the Optional PDL must either be equipped with back-up generation to provide the fixed load reduction or have a specific load that can be separately sub-metered and has an annual load factor of 90% or greater.

Firm Demand for the billing month shall be the lesser of Predetermined Demand or Adjusted Demand, except in months when customer fails to control load to Predetermined Demand Level when requested by Company. In these months, Firm Demand shall be the adjusted demand established during the control period. For optional PDL customers, Firm Demand shall be Adjusted Demand less Controllable Demand, except in months when customer fails to control the full amount of their fixed Controllable Demand. In these months the Firm Demand shall be the Adjusted Demand less the amount of Demand that was controlled as shown by meter measurement.

Controllable Demand shall be the difference between Adjusted Demand during the billing month and the greater of Predetermined Demand or Firm Demand, but never less than zero.

Minimum Demand to be billed each month as either Firm Demand, Controllable Demand or a combination of both shall not be less than the current month's adjusted demand in kW.

POWER FACTOR
The power factor for the month shall be determined by permanently installed metering equipment.

ANNUAL MINIMUM DEMAND CHARGE
The Annual Minimum Demand Charge shall be no less than six times the average monthly Firm Demand Charge per kW times the maximum Predetermined Demand, plus six times the Controllable Demand Charge per kW times the maximum Controllable Demand.

(Continued on Sheet No. 5-43)

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PEAK CONTROLLED SERVICE (Continued) Section No. 5
RATE CODE A23 6th Revised Sheet No. 43

TIER 1 PEAK CONTROLLED SHORT NOTICE
Tier 1 Peak Controlled Short Notice is available under this schedule subject to the provisions contained in the Tier 1 Peak Controlled Short Notice Rider.

COMPETITIVE SERVICE
Competitive Service is available under this schedule subject to the provisions contained in the Competitive Response Rider.

OTHER PROVISIONS
Peak Controlled Service is also subject to provisions contained in Rules for Application of Peak Controlled Services.

TERMS AND CONDITIONS OF SERVICE
1. Alternating current service is provided at the following nominal voltages:
   a. Secondary Voltage: Single or three phase from 208 volts up to but not including 2,400 volts,
   b. Primary Voltage: Three phase from 2,400 volts up to but not including 69,000 volts,
   c. Transmission Transformed Voltage: Three phase from 2,400 volts up to but not including 69,000 volts, where service is provided at the Company's disconnecting means of a distribution substation transformer, or
   d. Transmission Voltage: Three phase at 69,000 volts or higher.

   Service voltage available in any given case is dependent upon voltage and capacity of Company lines in vicinity of customer's premises.

2. Transmission Transformed Service is available only to customers served by an exclusively dedicated distribution feeder. Customer will be responsible for the cost of all facilities necessary to interconnect at the Company's disconnecting means of a distribution substation transformer.

3. Transmission Service is available at transmission voltage, subject to the terms and conditions contained in the Company's General Rules and Regulations, Section 5.1(B).

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PEAK CONTROLLED TIME OF DAY SERVICE Section No. 5
RATE CODE A24 18th Revised Sheet No. 44

AVAILABILITY
Available to any non-residential customer for general service who agrees to control demand to a predetermined level whenever required by Company. Availability is restricted to customers with a minimum controllable demand of 50 kW.

AVAILABILITY-MANDATORY
Effective November 1, 2007, this rate schedule is mandatory for any Peak Controlled customer having a 15-minute measured demand equal to or greater than 1000 kW for at least 4 of the past 12 consecutive months. Customer will remain on this rate schedule on a mandatory basis unless their demand remains below 1000 kW for 12 consecutive months. Waivers to certain controllable load requirements, cancellation charges and notice requirements are in effect through December 31, 2020 or the end of the COVID-19 peacetime emergency as declared by the Governor, whichever is later. N N N

AVAILABILITY-OPTIONAL
This rate schedule is optional for any non-residential customer for general service where customer is not required to be on a time-of-day rate.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month	$55.00
Service at Secondary Voltage	
Energy Charge per kWh	
On Peak Period Energy	$0.04855
Off Peak Period Energy	$0.02341
Energy Charge Credit per Month per kWh	
All kWh in Excess of 400 Hours Times the Sum of All On Peak Period Billing Demands, Not to Exceed 50% of Total kWh	$0.01518

(Continued on Sheet No. 5-45)

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PEAK CONTROLLED TIME OF DAY SERVICE
(Continued)
RATE CODE A24

Section No. 5
25th Revised Sheet No. 45

RATE (Continued)

Demand Charge per Month per kW	Tier 1	Tier 2	
On Peak Period Demand			
Firm Demand			
June - September	$14.79	$14.79	R
Other Months	$10.49	$10.49	R
Controllable Demand (Jan-Dec)			
Level A: < 65% PF	Not Available	$8.88	R
Level B: ≥ 65% and < 85% PF	$7.15	$7.86	R
Level C: ≥ 85% PF	$6.56	$7.34	R
Short Notice Rider	$6.09	Not Available	R
Off Peak Period Demand in Excess of On Peak Period Demand (Jan-Dec)	$2.35	$2.35	

	January - December		
Voltage Discounts per Month	Per kW	Per kWh	
Primary Voltage	$0.80	$0.00105	R
Transmission Transformed Voltage	$1.55	$0.00267	R
Transmission Voltage	$2.35	$0.00277	R

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

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PEAK CONTROLLED TIME OF DAY SERVICE Section No. 5
(Continued) 26th Revised Sheet No. 45
RATE CODE A24

RATE (Continued)

Demand Charge per Month per kW	Tier 1	Tier 2
On Peak Period Demand		
Firm Demand		
June - September	$14.79	$14.79
Other Months	$10.49	$10.49
Controllable Demand (Jan-Dec)		
Level A: < 65% PF	Not Available	$8.88
Level B: ≥ 65% and < 85% PF	$7.15	$7.86
Level C: ≥ 85% PF	$6.56	$7.34
Short Notice Rider	$6.09	Not Available
Off Peak Period Demand in Excess of On Peak Period Demand (Jan-Dec)	$2.35	$2.35

	January - December	
Voltage Discounts per Month	Per kW	Per kWh
Primary Voltage	$0.80	$0.00105
Transmission Transformed Voltage	$1.55	$0.00267
Transmission Voltage	$2.35	$0.00277

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

(Continued on Sheet No. 5-46)

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PEAK CONTROLLED TIME OF DAY SERVICE Section No. 5
(Continued) 12th Revised Sheet No. 46
RATE CODE A24

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

The following are terms and conditions for service under this tariff.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

DEFINITION OF PEAK PERIODS
The on peak period is defined as those hours between 9:00 a.m. and 9:00 p.m. Monday through Friday, except the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When a designated holiday occurs on Sunday, the following Monday will be designated a holiday. The off peak period is defined as all other hours. Definition of on peak and off peak period is subject to change with change in Company's system operating characteristics.

DEFINITION OF PERFORMANCE FACTOR (PF)
Performance factor is defined in percentage terms as the average of the July and August calendar month unadjusted maximum Controllable Demand occurring from 1 p.m. to 7 p.m. on weekdays, or which has been permanently shifted out of normal control period times, divided by the unadjusted maximum annual Controllable Demand. Customers claiming permanent load shifts must provide verification to Company, based on NSP established criteria.

DETERMINATION OF DEMAND
Maximum Actual On Peak Period Demand in kW shall be the greatest 15-minute load for the on peak period during the billing month.

Adjusted On Peak Period Demand in kW for billing purposes shall be determined by dividing the Maximum Actual on peak demand by the power factor expressed in percent but not more than 90%, multiplying the quotient so obtained by 90%, and rounding to the nearest whole kW.

Maximum Actual Off Peak Period Demand in kW shall be the greatest 15-minute load for the off peak period during the billing month rounded to the nearest whole kW. In no month shall the off peak period demand for billing purposes be considered as less than the current month's actual off peak period demand in kW.

Off Peak Period Demand in Excess of On Peak Period Demand in kW to be billed shall be determined by subtracting the billing on peak period demand from the actual off peak period demand only if the off peak period demand is greater.

(Continued on Sheet No. 5-47)

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PEAK CONTROLLED TIME OF DAY SERVICE Section No. 5
(Continued) 7th Revised Sheet No. 47
RATE CODE A24

Predetermined Demand shall be specified and agreed to by the customer and Company. Customer's adjusted on peak demand must not exceed the predetermined demand level (PDL) during a control period.

Standard PDL customers must agree to a fixed demand level and limit load to that level during a control period.

Optional PDL customers must agree to reduce demand by a fixed amount during a control period. Customer's Firm Demand will vary from month-to-month while the Controllable Demand remains fixed each month. The Firm Demand will be the Adjusted Demand (based on the Maximum Actual Demand for the month) less the fixed amount of Controllable Demand. Customer's PDL will be the monthly adjusted on peak demand less the fixed load reduction. Customers selecting the Optional PDL must either be equipped with back-up generation to provide the fixed load reduction or have a specific load than can be separately sub-metered and has an annual load factor of 90% or greater.

Firm Demand for the billing month shall be the lesser of Predetermined Demand or Adjusted on Peak Period Demand, except in months when customer fails to control load to Predetermined Demand Level when requested by Company. In these months, Firm Demand shall be the adjusted on peak period demand established during the control period. For Optional PDL customers, Firm Demand shall be Adjusted On Peak Demand less Controllable Demand, except in months when customer fails to control the full amount of their fixed Controllable Demand, In the months the Firm Demand shall be the Adjusted On Peak Period Demand less the amount of Demand that was controlled as shown by meter measurement.

Controllable Demand shall be the difference between Adjusted on Peak Period Demand during the billing month and the greater of Predetermined Demand or firm demand, but never less than zero.

Minimum On Peak Demand to be billed each month as either Firm Demand Controllable Demand or combination of both shall not be less than the current month's Adjusted on Peak Period Demand in kW.

POWER FACTOR
The power factor for the month shall be determined by permanently installed metering equipment.

ANNUAL MINIMUM DEMAND CHARGE
The Annual Minimum Demand Charge shall be no less than six times the average monthly Firm Demand Charge per kW times the predetermined demand, plus six times the Controllable Demand Charge per kW times the maximum Controllable Demand.

(Continued on Sheet No. 47.1)

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PEAK CONTROLLED TIME OF DAY SERVICE (Continued) Section No. 5
RATE CODE A24 6th Revised Sheet No. 47.1

TIER 1 ENERGY CONTROLLED SERVICE
Tier 1 Energy Controlled Service is available under this schedule subject to the provisions contained in the Tier 1 Energy Controlled Service Rider.

TIER 1 PEAK CONTROLLED SHORT NOTICE
Tier 1 Peak Controlled Short Notice option is available under this schedule subject to the provisions contained in the Tier 1 Peak Controlled Short Notice Rider.

COMPETITIVE SERVICE
Competitive Service is available under this schedule subject to the provisions contained in the Competitive Response Rider.

OTHER PROVISIONS
Peak Controlled Time of Day Service is also subject to provisions contained in Rules for Application of Peak Controlled Services.

TERMS AND CONDITIONS OF SERVICE
1. Alternating current service is provided at the following nominal voltages:
   a. Secondary Voltage: Single or three phase from 208 volts up to but not including 2,400 volts,
   b. Primary Voltage: Three phase from 2,400 volts up to but not including 69,000 volts,
   c. Transmission Transformed Voltage: Three phase from 2,400 volts up to but not including 69,000 volts, where service is provided at the Company's disconnecting means of a distribution substation transformer, or
   d. Transmission Voltage: Three phase at 69,000 volts or higher.

   Service voltage available in any given case is dependent upon voltage and capacity of Company lines in vicinity of customer's premises.

2. Transmission Transformed Service is available only to customers served by an exclusively dedicated distribution feeder. Customer will be responsible for the cost of all facilities necessary to interconnect at the Company's disconnecting means of a distribution substation transformer.

3. Transmission Service is available at transmission voltage, subject to the terms and conditions contained in the Company's General Rules and Regulations, Section 5.1(B).

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RULES FOR APPLICATION OF PEAK CONTROLLED SERVICES

Section No. 5
7th Revised Sheet No. 48

1. Customer has the responsibility of controlling own load to Predetermined Demand Level.

2. Customer must allow Company to inspect and approve the load control installation and equipment provided by customer.

3. If controlled demand is 10,000 kW or larger, Company may require customer to:
   a. Provide auxiliary contacts for remote indication of position of switch or circuit breaker used to control demand and wire auxiliary contacts into a connection point designated by Company,
   b. Install the remote breaker indication equipment provided by Company, and
   c. Provide a continuous 120 volt AC power source at the connection point for operation of the Company remote breaker indication equipment.

4. Company will endeavor to give customer one hour notice of commencement of control period, and as much additional notice as is practical. However, control period may be commenced without notice should Company determine such action is necessary.

5. Failure to Control Charge: An additional charge of $8.00 ($10.00 for Tier 1) per kW will apply during each Company specified control period to the amount by which customer's Maximum Adjusted Demand or Maximum Adjusted On Peak Period Demand exceeds their predetermined demand level. After three such customer failures to control load to their Predetermined Demand Level, Company reserves the right to increase the Predetermined Demand Level, or transfer customer to General Service or General Time of Day Service and apply the cancellation charge specified in customer's Electric Service Agreement.

6. The duration and frequency of control periods shall be at the discretion of Company. Control periods will normally occur when:
   a. Company expects a reasonable possibility of system load levels surpassing the level for which NSP has sufficient accredited capacity under the Midwest Reliability Organization (MRO) or any successor organization, including reserve requirements, or
   b. In Company's opinion, the reliability of the system is endangered.

(Continued on Sheet No. 5-49)

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RULES FOR APPLICATION OF PEAK CONTROLLED SERVICES (Continued)

Section No. 5
6th Revised Sheet No. 49

7. Customer must execute an Electric Service Agreement with Company which will include:

   Peak Controlled Service - Tier 1
   a. A minimum initial 10 year term of service which includes a one year trial period and a three year cancellation notice effective after the initial term of service,
   b. The Predetermined Demand Level, or the fixed Controllable Demand if Optional PDL is selected which may be revised subject to approval by Company,
   c. Maximum 150 hours of interruption,
   d. Cancellation charge terms, and
   e. Control period notice.

   Peak Controlled Service - Tier 2
   a. A minimum initial five year term of service which includes a one year trial period and a six month cancellation notice effective after the initial term of service,
   b. The Predetermined Demand Level, or the fixed Controllable Demand if Optional PDL is selected which may be revised subject to approval by Company,
   c. Maximum 80 hours of interruption,
   d. Cancellation charge terms, and
   e. Control period notice.

8. Peak Controlled Service customers choosing the Tier 1 rate option will be subject to an additional monthly charge for a Company approved and installed two-way communications system. The system equipment allows NSP to determine remotely customer load levels and to notify customers of control periods.

9. Minimum Controllable Demand during the Company's peak season shall be 50 kW.

10. Company shall not be liable for any loss or damage caused by or resulting from any interruption of service.

11. Company will determine, at a service location designated by Company, the number of services supplied. Customers requesting special facilities will be charged the additional costs incurred for such facilities.

(Continued on Sheet No. 5-50)

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RULES FOR APPLICATION OF PEAK CONTROLLED SERVICES (Continued)

Section No. 5
6th Revised Sheet No. 50

12. Customers choosing the Predetermined Demand Level option requiring a fixed demand reduction will be subject to an additional charge for metering and billing when additional metering equipment is necessary. The additional charge is $17.00 per month for an application using a single meter in close proximity to customer's service point. The additional charge for more complex applications will be based on the actual costs of the specific application.

13. Company will maintain Firm Demand Charge rates at the General Service and General Time of Day Service levels, whichever is applicable.

14. Any customer with generating equipment which is operated in parallel with Company must comply with all requirements associated with parallel operations as specified in the General Rules and Regulations of the Company.

15. Any load served by customer generation during Company requested control periods must be served by Company at all other times.

16. Customers selecting Peak Controlled Services will normally remain at a specific Performance Factor level for a minimum of one year, subject to the Company's discretion. The Company may transfer customers between Performance Factor levels following verification of a customer's performance, as defined in the applicable rate schedule and as specified in the customer's Electric Service Agreement. This rate contemplates that increases in summer Controllable Demand, which thereby affect a customer's Performance Factor level, will be at sufficient consumption levels to yield a July and August calendar month load factor of 34% or greater. The Company reserves the right to limit the customer's eligibility to be on a higher Performance Factor level due to the above restriction.

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COMMERCIAL OPTIMIZE YOUR CHARGE

Section No. 5
Original Sheet No. 50.6

AVAILABILITY
This Pilot is applicable for three years from the original effective date of this rate schedule. N

Available to Commercial Customers under the Small General (A10), Small General Time of Day (A12, A16), General Service (A14), General Time of Day (A15, A17), and Electric Vehicle Fleet Pilot Service (A87, A88, A89), for customers who own or lease light duty electric vehicles (EVs) and charge them at a commercial address that receives electricity from Northern States Power Company.

Participating customers agree to utilize the charging schedule they select during the enrollment process to shift EV charging into hours that are better for the power grid, while still meeting driving requirements, and agree to share essential enrollment and charging data with Xcel Energy.

BILL CREDIT
The Pilot is available to commercial electric customers who own or lease a light-duty electric vehicle (EV). Participating customers will receive a yearly $50 Bill Credit.

TERMS AND CONDITIONS

1. Eligibility

1.2 Commercial customers meeting the following criteria Customers meeting the following criteria are eligible to participate in Pilot:

- Be a commercial customer and charge an electric vehicle at the customer's business address in Minnesota;
- Use eligible charging equipment or drive an eligible vehicle;
- Complete a Pilot application and be selected by Xcel Energy to participate in the Pilot (Participation in the Pilot will be determined by Xcel Energy, in its sole discretion);

For a participating customer, failure to meet any of the above eligibility requirements at any time will void any obligation Xcel Energy has to provide the Bill Credit, and Xcel Energy may immediately terminate the customer's participation in the Pilot.

2. Customer Communications

2.1 Customer consent to receive communications from Xcel Energy relating to the Pilot in electronic or text-based form and sent to your email address or phone provided during enrollment.

3. Compliance with Terms and Conditions

3.1 Xcel Energy reserves the right to refuse payment if the customer violates Pilot Terms and Conditions. N

(continued on Sheet No. 5-50-7)

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COMMERCIAL OPTIMIZE YOUR CHARGE (Continued)

Section No. 5
Original Sheet No. 50.7

4. Pilot Requirements

4.1 Provide accurate and complete information as part of participation in the Pilot; Xcel Energy is not responsible for any harm caused by the customer or customer misstatements, misrepresentations, or failure to provide accurate and complete information.
4.2 If required by the Pilot Vendor (selected by Xcel Energy), the customer will: download any Vendor software application required for Pilot participation; install any Vendor hardware required for Pilot participation; comply with any Vendor terms and conditions; and meet any other requirements of the Vendor related to Pilot participation.
4.3 For customers relying on the use of a networked charging station for participation, the charging station must be connected to the Vendor's network via the customer's Wi-Fi network and be able to maintain on-going and stable connection throughout the Pilot.
4.3.1 Customers driving eligible vehicles may supply their charging data through one of the Company's Pilot Vendors identified at www.xcelenergy.com. If customer is relying on the built-in telematics of their EV for participation in the Pilot, their EV must be connected to the Pilot Vendor; and
4.4 Customers agree to these Pilot Terms and to participate in the Pilot as set forth in these Pilot Terms.

5. Sharing of Xcel Energy Customer Information

5.1 Xcel Energy will provide Vendors with data ("Customer Information"), including, but not limited to, one or more of the following: name, address, vehicle identification number (VIN), charging station serial number, and e-mail address, for the purposes of allowing the Vendor to carry-out services in relation to this Pilot. Upon enrolling, Vendors will share information about the customer's business charging ("Charging Data") with Xcel Energy that includes but is not limited to when the customer plug-ins and charges the EV, how much energy is used in charging the EV, the state of charge of the vehicle before and after plugging in, and the use of a charging schedule.
5.2 Vendors will be required to follow all applicable rules and requirements for data sharing as defined by Minnesota Public Utilities Commission rulings.
5.3 Xcel Energy may share this data directly with service providers performing services on behalf of Xcel Energy, and will use this data to validate the customer's eligibility to participate in the Pilot, to study and evaluate the benefits that the Pilot provides to the power grid, in connection with proceedings before the Minnesota Public Utilities Commission, to design future EV and demand management programs, to support power grid planning and management, to share aggregated and anonymized findings, and to inform Program operations.
5.4 Customers will be able to opt-out of sharing non-essential data.
5.5 If the Customer withdraws from the Pilot or if the Pilot is discontinued by Xcel Energy, Xcel Energy and Manufacturers will cease the sharing of Xcel Energy Customer Information and Charging Data without reasonable delay.

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(continued on Sheet No. 5-50-8)

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COMMERCIAL OPTIMIZE YOUR CHARGE (Continued)

Section No. 5
Original Sheet No. 50.8

6. Schedule Determination and Use

6.1 During enrollment, a customer will select a charging schedule from a set of options presented to the customer by Xcel Energy that will be used for the EV business charging under the Pilot. The charging schedule is based on the customer's charging needs and the customer's answers to questions during the enrollment process. Customers who believe the charging schedule options presented will not meet the customer's charging needs can email Xcel Energy at electricvehicles@xcelenergy.com to discuss potential adjustment to the charging schedule.

6.2 Xcel Energy recommends automatically limiting EV charging to the hours allowed by entering the charging schedule into the EV charging station or into the EV smart application; however, a customer may implement the charging schedule in any manner that is suitable to the customer.

6.3 The customer may override the recommended charging schedule, without penalty, whenever it is necessary to meet the customer's driving requirements. The customer must, however, maintain the minimum threshold set forth in paragraph 7.1.

7. Participation Details

7.1 In order to remain enrolled in the Pilot, 25% of the participating EV charging sessions must be conducted during the customer-selected charging schedule. Xcel Energy will review participation on a quarterly basis and assess compliance for each full year of participation measured from the Enrollment Date. Xcel Energy will remove a customer from the Pilot if it has determined, at its sole discretion, that the customer did not meet this participation level.

8. Pilot Term and Withdrawal

8.1 Customer may withdraw from the Pilot at any time without penalty.

8.2 Xcel Energy may discontinue the Pilot at any time for any reason.
Xcel Energy will make best efforts to provide Pilot participants a discontinuation notice at least thirty (30) days prior to such termination date.

8.3 Customer will notify Xcel Energy by emailing electricvehicles@xcelenergy.com in the event the customer wishes to unenroll from the Pilot, if the ownership of the EV enrolled in the Pilot changes, or if the customer moves out of Xcel Energy's Minnesota service territory.

8.4 If Xcel Energy becomes aware that the enrolled EV has changed ownership or that the customer has moved outside of Xcel Energy's Minnesota service territory, without first being informed by the customer, it will be deemed by Xcel Energy as a Customer-initiated termination of this Agreement.

8.5 If the customer terminates this Agreement prior to October 1 of any year that the Pilot continues, or if Xcel Energy terminates this Agreement because of the customer's failure to honor the terms of this Agreement at any time, or upon discovery of any tampering with vehicle equipment, then Xcel Energy shall have the right to terminate this Agreement immediately and discontinue payment of the Bill Credit.

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(continued on Sheet No. 5-50-9)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

COMMERCIAL OPTIMIZE YOUR CHARGE (Continued)

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9. Limitations

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9.1 Pilot terms are subject to change any time. Please visit www.xcelenergy.com to determine whether any Pilot changes have occurred. Any material changes will be communicated the customer by e-mail using the e-mail address provided.

9.2 If customer enrolls more than one eligible vehicle or charging station, they will receive a Bill Credit for each vehicle and charging station enrolled. A single EV and charging station can only be enrolled to participate once—the same vehicle and charging station cannot be registered by multiple accounts.

9.3 Xcel Energy reserves the right to modify all Pilot incentives based on future performance, Pilot modifications, technology upgrades, and changes to Xcel Energy's electrical distribution system. Any such changes will be communicated to Customer by e-mail using the e-mail address provided by the Customer at least thirty (30) days prior to deployment of such changes.

9.4 Customer agrees not to tamper with vehicle, vehicle data, charging station, charging station data, or any hardware related to the Pilot and to reasonably attempt to restrict access by others attempting to tamper with the vehicle, vehicle data, charging station, charging station data, or Pilot-related hardware (as applicable). If Xcel Energy or its Vendors identify any evidence of tampering, the customer will be removed from the Pilot.
The customer agrees to protect and hold harmless Xcel Energy from any and all claims, damages and liability caused by customer fault or negligence, or customer's failure to comply. If Xcel Energy is made a party (without fault on its part) to any lawsuit or arbitration started by or against the customer, they agree to protect and hold Xcel Energy harmless, and to pay all costs, expenses and reasonable attorneys' fees incurred or paid by Xcel Energy in connection with that lawsuit or arbitration. Customer also agree to pay all costs, expenses and reasonable attorneys' fees that Xcel Energy may incur or pay in enforcing this agreement.

9.5 Participation in the Pilot is entirely voluntary. Xcel Energy and vendor do not assume any responsibility for customer's EV, the inability to use or unavailability of the EV, or any damages to or incurred by the customer EV or charging station which may result from participation in the Pilot. In no event, whether based on contract, indemnity, warranty, tort (including negligence), strict liability or otherwise, shall Xcel Energy or vendor be liable to the customer for special, indirect, exemplary, punitive, incidental, or consequential damages whatsoever including, without limitation, loss of profits or revenue, and in no event shall Xcel Energy's or Vendor's liability on any claim of any kind, or from any loss or damage arising out of or in connection with or resulting from the pilot, these pilot terms, or from performance or breach thereof, exceed the total amount of the participation reward.

10. Requirements

10.1 Customer agrees to maintain services needed to participate in the Pilot at no expense to Xcel Energy. These services may include but are not limited to subscription services with the Manufacturer of the enrolled vehicle to allow communication between the Manufacturer and the EV. Depending on the EV and the Manufacturer, this may require the Customer to activate and/or pay for a subscription. For further information, please communicate with the EV Manufacturer. This is applicable for customers that provide their Charging Data through one of the Vehicle Vendors listed at xcelenergy.com.

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(continued on Sheet No. 5-50.10)

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Minneapolis, Minnesota 55401
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COMMERCIAL OPTIMIZE YOUR CHARGE (Continued)

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Original Sheet No. 50.10

10.2 Customer agrees to maintain a functioning high-speed internet connection that allows the charging station to gather Charging Data at no expense to Xcel Energy. This is applicable for customers that provide their Charging Data to Xcel Energy through one of the Charging Station Vendors listed at xcelenergy.com. N

10.3 Customer is responsible for maintaining in working order EV charging or electrical equipment and the participating EV.

10.4 Customer is responsible for downloading any Vendor software application required for Pilot participation.

10.5 Customer responsible for installing any hardware from the Vendor that is required for Pilot participation.

11. Governing Law; Disputes.

11.1 The Customer and Xcel Energy agree that all disputes arising out of these Pilot Terms or the Pilot shall be subject to this section. The internal laws of the State of Minnesota, without regard to conflicts of law's provisions, govern the Pilot and these Pilot Terms and any action brought with respect to the Pilot Terms or the Pilot shall be brought in the courts located in Minneapolis, Minnesota. N

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ELECTRIC VEHICLE FLEET PILOT SERVICE Section No. 5
RATE CODE A87. A88, A89 9th Revised Sheet No. 51

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AVAILABILITY
Available while this Pilot Service is in effect to non-residential customers for service only to electric vehicle loads including battery charging and accessory usage. The customer must complete Company-approved documentation verifying ownership or lease of a minimum of five electric vehicles as defined in Section 169.011, subdivision 26a of Minnesota law.

CONTRACT
Customers must contract for this service through an Electric Vehicle Fleet Pilot Service Agreement with the Company. The contract period will be for 120 months.

RENEWABLE ENERGY SUPPLY OPTION
Customers have the option to elect all or a portion of the supply of electricity under this schedule from renewable energy resources. The renewable energy supply option is available subject to the provisions contained in the Voluntary Renewable and High-Efficiency Energy Purchase (Windsource Program) Rider, or other available rate schedule for voluntary renewable energy supply that is applicable.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and /or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month	$29.64	
Service at Secondary Voltage	Oct-May	Jun-Sep
Demand Charge per Month per kW		
On-Peak Period Demand	$10.49	$14.79
Off-Peak Period Demand in Excess of On-Peak Period Demand	$2.35	$2.35
Energy Charge per kWh		
On-Peak Period Energy	$0.04855	
Off-Peak Period Energy	$0.02341	
Energy Charge Credit per Month per kWh		
All kWh in Excess of 400 Hours Times the On-Peak Period Billing Demand, Not to Exceed 50% of Total kWh	$0.01518	

	January - December	
Voltage Discounts per Month	Per kW	Per kWh
Primary Voltage	$0.80	$0.00105

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(Continued on Sheet No. 5-51.1)

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ELECTRIC VEHICLE FLEET PILOT SERVICE Section No. 5
RATE CODE A87. A88, A89 10th Revised Sheet No. 51

AVAILABILITY
Available while this Pilot Service is in effect to non-residential customers for service only to electric vehicle loads including battery charging and accessory usage. The customer must complete Company-approved documentation verifying ownership or lease of a minimum of five electric vehicles as defined in Section 169.011, subdivision 26a of Minnesota law.

CONTRACT
Customers must contract for this service through an Electric Vehicle Fleet Pilot Service Agreement with the Company. The contract period will be for 120 months.

RENEWABLE ENERGY SUPPLY OPTION
Customers have the option to elect all or a portion of the supply of electricity under this schedule from renewable energy resources. The renewable energy supply option is available subject to the provisions contained in the Voluntary Renewable and High-Efficiency Energy Purchase (Windsource Program) Rider, or other available rate schedule for voluntary renewable energy supply that is applicable.

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Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and /or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month	$29.64	
Service at Secondary Voltage	Oct-May	Jun-Sep
Demand Charge per Month per kW		
On-Peak Period Demand	$10.49	$14.79
Off-Peak Period Demand in Excess of On-Peak Period Demand	$2.35	$2.35
Energy Charge per kWh		
On-Peak Period Energy	$0.04855	
Off-Peak Period Energy	$0.02341	
Energy Charge Credit per Month per kWh		
All kWh in Excess of 400 Hours Times the On-Peak Period Billing Demand, Not to Exceed 50% of Total kWh	$0.01518	

	January - December	
Voltage Discounts per Month	Per kW	Per kWh
Primary Voltage	$0.80	$0.00105

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

(Continued on Sheet No. 5-51.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ELECTRIC VEHICLE FLEET PILOT SERVICE Section No. 5
RATE CODE A87, A88, A89 Original Sheet No. 51.1

OPTIONAL CHARGER SERVICE N
Charging equipment may be supplied and installed either by customer or by the Company through an optional charger service. Optional charger service by Company is available as a Bundled Option that includes a monthly charge for the installed cost of charging equipment or as a Pre-Pay Option to customers electing to pay Company for the installed cost of charging equipment prior to beginning service with this tariff. Customers electing the Pre-Pay Option are separately invoiced at the time of installation and are subject to the Pre-Pay Option service charge in place of the Bundled Option service charge.

Service Charge per Month per Port	Group A	Group B	Group C
Bundled Option – Single Port (A88)	$37.88	$52.92	$67.96
Bundled Option – Dual Port (A88)	$32.85	$45.80	$54.94
Pre-Pay Option – Single Port (A89)	$11.73	$25.31	$33.37
Pre-Pay Option – Dual Port (A89)	$10.86	$20.80	$29.85

Pricing for charging infrastructure for transit buses is determined on a per project basis.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

MONTHLY MINIMUM CHARGE
For the first two years after the original effective date establishing this tariff, the minimum charge shall be equal to the Customer Charge. Effective two years after the original effective date establishing this tariff, the minimum charge shall be the total of the Customer Charge and a Facilities Charge based on the number of installed charging ports.

Facilities Charge	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5
Number of Charging Ports	1-9	10-19	20-29	30-39	40+
Monthly Minimum Charge	$75	$150	$300	$450	$600

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5. N

(Continued on Sheet No. 5-51.2)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ELECTRIC VEHICLE FLEET PILOT SERVICE Section No. 5
RATE CODE A87, A88, A89 Original Sheet No. 51.2

DEFINITION OF PEAK PERIODS N
The on-peak period is defined as those hours between 9:00 a.m. and 9:00 p.m. Monday through Friday, except the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When a designated holiday occurs on Sunday, the following Monday will be designated a holiday. The off-peak period is defined as all other hours. Definition of on-peak and off-peak period is subject to change with change in Company's system operating characteristics.

DETERMINATION OF ON-PEAK PERIOD DEMAND
The actual on-peak period demand in kW shall be the greatest 15-minute load for the on-peak period during the month for which the bill is rendered. The adjusted demand in kW for billing purposes shall be determined by dividing the actual on-peak demand by the power factor expressed in percent but not more than 90%, multiplying the quotient so obtained by 90%, and rounding to the nearest whole kW. In no month shall the on-peak period demand to be billed be considered as less than the current month's adjusted on-peak period demand in kW, or 50% of the greatest monthly adjusted on peak period demand in kW during the preceding 11 months. In no month shall the on-peak billing demand be greater than the value in kW determined by dividing the kWh sales for the billing month by 100 hours per month.

The greatest monthly adjusted on-peak period demand in kW during the preceding 11 months shall not include the additional demand which may result from customer's use of standby capacity contracted for under the Standby Service Rider.

DETERMINATION OF OFF-PEAK PERIOD DEMAND IN EXCESS OF ON-PEAK PERIOD DEMAND
The actual off-peak period demand in kilowatts shall be the greatest 15-minute load for the off-peak period during the month for which the bill is rendered rounded to the nearest whole kW. In no month shall the off-peak period demand for billing purposes be considered as less than the current month's actual off-peak period demand in kW, or 50% of the greatest monthly actual off-peak period demand in kW during the preceding 11 months.

The greatest monthly adjusted off-peak period demand in kW during the preceding 11 months shall not include the additional demand which may result from customer's use of standby capacity contracted for under the Standby Service Rider.

The off-peak period demand in excess of on-peak period demand in kW to be billed shall be determined by subtracting the billing on-peak period demand from the actual off-peak period demand as defined above, but only if the off-peak period demand is greater than the on-peak period demand.

POWER FACTOR
For three phase customers with services above 200 amperes, or above 480 volts, the power factor for the month shall be determined by permanently installed metering equipment. For all single phase customers and three phase customers with services 200 amperes or less, a power factor of 90% will be assumed. N

(Continued on Sheet No. 5-51.3)

Northern States Power Company, a Minnesota corporation
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ELECTRIC VEHICLE FLEET PILOT SERVICE Section No. 5
RATE CODE A87, A88, A89 Original Sheet No. 51.3

MINIMUM DEMAND TO BE BILLED N

The monthly minimum on-peak period billing demand shall not be less than provided above.

TERMS AND CONDITIONS OF SERVICE

1. Electric Vehicle Fleet Pilot Service shall be served through wiring connected to customer's dedicated meter.

2. Company may require customer to provide access for Company-owned equipment for the recording and wireless communication of energy usage.

3. The rate contemplates that this service will require the installation of new facilities to provide electric service to the electric vehicle charger.

4. Customer must execute an Electric Vehicle Fleet Pilot Service Agreement with the Company.

5. Customer must retain a minimum four ports per site, or, in cases with less than four ports, a minimum of 50 kW of charging capacity.

6. Company waives CIAC requirements for non-residential customers under the Standard Installation and Extension Rules under Section 5.1(A)(1)(b), Section 5.1 (A)(2) and (3) and Section 5.2 of the General Rules and Regulations on Tariff Sheets No. 6-23 through 6-27.

7. Alternating current service is provided at the following nominal voltages:
   a. Secondary Voltage: Single or three phase from 208 volts up to but not including 2,400 volts.
   b. Primary Voltage: Three phase from 2,400 volts up to but not including 69,000 volts.

Service voltage available in any given case is dependent upon voltage and capacity of Company lines in vicinity of customer's premises.

RIGHT TO REFUSE SERVICE

The Company reserves the right to refuse applicants for service under this Pilot service if it determines that excessive additional capital expenditures will be required to provide service to that applicant. N

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and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
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ELECTRIC VEHICLE PUBLIC CHARGING PILOT SERVICE
RATE CODE A90

Section No. 5
9th Revised Sheet No. 52

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AVAILABILITY
Available while this Pilot Service is in effect to non-residential customers for service only to electric vehicle loads including battery charging and accessory usage for the express purpose of providing public charging service to electric vehicles.

CONTRACT
Customers must contract for this service through an Electric Vehicle Public Charging Pilot Service Agreement with the Company. The contract period will be for 120 months.

RENEWABLE ENERGY SUPPLY OPTION
Customers have the option to elect all or a portion of the supply of electricity under this schedule from renewable energy resources. The renewable energy supply option is available subject to the provisions contained in the Voluntary Renewable and High-Efficiency Energy Purchase (Windsource Program) Rider, or other available rate schedule for voluntary renewable energy supply that is applicable.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and /or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Month	$29.64	
Service at Secondary Voltage	Oct-May	Jun-Sep
Demand Charge per Month per kW		
On-Peak Period Demand	$10.49	$14.79
Off-Peak Period Demand in Excess of On-Peak Period Demand	$2.35	$2.35
Energy Charge per kWh		
On-Peak Period Energy	$0.04855	
Off-Peak Period Energy	$0.02341	
Energy Charge Credit per Month per kWh		
All kWh in Excess of 400 Hours Times the On-Peak Period Billing Demand, Not to Exceed 50% of Total kWh	$0.01518	

	January - December	
Voltage Discounts per Month	Per kW	Per kWh
Primary Voltage	$0.80	$0.00105

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(Continued on Sheet No. 5-52.1)

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Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ELECTRIC VEHICLE PUBLIC CHARGING PILOT SERVICE
RATE CODE A90

Section No. 5
10th Revised Sheet No. 52

AVAILABILITY
Available while this Pilot Service is in effect to non-residential customers for service only to electric vehicle loads including battery charging and accessory usage for the express purpose of providing public charging service to electric vehicles.

CONTRACT
Customers must contract for this service through an Electric Vehicle Public Charging Pilot Service Agreement with the Company. The contract period will be for 120 months.

RENEWABLE ENERGY SUPPLY OPTION
Customers have the option to elect all or a portion of the supply of electricity under this schedule from renewable energy resources. The renewable energy supply option is available subject to the provisions contained in the Voluntary Renewable and High-Efficiency Energy Purchase (Windsource Program) Rider, or other available rate schedule for voluntary renewable energy supply that is applicable.

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RATE

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Energy Charge per kWh		
On-Peak Period Energy	$0.04855	
Off-Peak Period Energy	$0.02341	
Energy Charge Credit per Month per kWh		
All kWh in Excess of 400 Hours Times the On-Peak Period Billing Demand, Not to Exceed 50% of Total kWh	$0.01518	

	January - December	
Voltage Discounts per Month	Per kW	Per kWh
Primary Voltage	$0.80	$0.00105

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

(Continued on Sheet No. 5-52.1)

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ELECTRIC VEHICLE PUBLIC CHARGING PILOT SERVICE
RATE CODE A90

Section No. 5
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In addition, customer bills under this rate are subject to the following adjustments and/or charges. N

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

MONTHLY MINIMUM CHARGE
For the first two years after the original effective date establishing this tariff, the minimum charge shall be equal to the Customer Charge. Effective two years after the original effective date establishing this tariff, the minimum charge shall be the total of the Customer Charge and a Facilities Charge based on the number of installed charging ports.

Facilities Charge	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5
Number of Charging Ports	1-9	10-19	20-29	30-39	40+
Monthly Minimum Charge	$75	$150	$300	$450	$600

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5. N

(Continued on Sheet No. 5-52.2)

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ELECTRIC VEHICLE PUBLIC CHARGING PILOT SERVICE
RATE CODE A90

Section No. 5
Original Sheet No. 52.2

DEFINITION OF PEAK PERIODS
The on-peak period is defined as those hours between 9:00 a.m. and 9:00 p.m. Monday through Friday, except the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When a designated holiday occurs on Sunday, the following Monday will be designated a holiday. The off-peak period is defined as all other hours. Definition of on-peak and off-peak period is subject to change with change in Company's system operating characteristics.

DETERMINATION OF ON-PEAK PERIOD DEMAND
The actual on-peak period demand in kW shall be the greatest 15-minute load for the on-peak period during the month for which the bill is rendered. The adjusted demand in kW for billing purposes shall be determined by dividing the actual on-peak demand by the power factor expressed in percent but not more than 90%, multiplying the quotient so obtained by 90%, and rounding to the nearest whole kW. In no month shall the on-peak period demand to be billed be considered as less than the current month's adjusted on-peak period demand in kW, or 50% of the greatest monthly adjusted on-peak period demand in kW during the preceding 11 months. In no month shall the on-peak billing demand be greater than the value in kW determined by dividing the kWh sales for the billing month by 100 hours per month.

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POWER FACTOR
For three phase customers with services above 200 amperes, or above 480 volts, the power factor for the month shall be determined by permanently installed metering equipment. For all single phase customers and three phase customers with services 200 amperes or less, a power factor of 90% will be assumed.

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ELECTRIC VEHICLE PUBLIC CHARGING PILOT SERVICE
RATE CODE A90

Section No. 5
Original Sheet No. 52.3

MINIMUM DEMAND TO BE BILLED N

The monthly minimum on-peak period billing demand shall not be less than provided above.

TERMS AND CONDITIONS OF SERVICE

1. Electric Vehicle Fleet Pilot Service shall be served through wiring connected to customer's dedicated-meter.

2. Company may require customer to provide access for Company-owned equipment for the recording and wireless communication of energy usage.

3. The rate contemplates that this service will require the installation of new facilities to provide electric service to the electric vehicle charger.

4. Customer must execute an Electric Vehicle Public Charging Pilot Service Agreement with the Company.

5. Customer must retain a minimum four ports per site, or, in cases with less than four ports, a minimum of 50 kW of charging capacity.

6. Company waives CIAC requirements for non-residential customers under the Standard Installation and Extension Rules under Section 5.1(A)(1)(b), Section 5.1 (A)(2) and (3) and Section 5.2 of the General Rules and Regulations on Tariff Sheets No. 6-23 through 6-27.

7. Alternating current service is provided at the following nominal voltages:
   a. Secondary Voltage: Single or three phase from 208 volts up to but not including 2,400 volts.
   b. Primary Voltage: Three phase from 2,400 volts up to but not including 69,000 volts.

Service voltage available in any given case is dependent upon voltage and capacity of Company lines in vicinity of customer's premises.

RIGHT TO REFUSE SERVICE

The Company reserves the right to refuse applicants for service under this Pilot service if it determines that excessive additional capital expenditures will be required to provide service to that applicant. N

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MULTI-DWELLING UNIT ELECTRIC VEHICLE SERVICE PILOT
RATE CODE A91, A92, A93

Section No. 5
Original Sheet No. 52.4

AVAILABILITY
Available while the Pilot is in effect to Multi-Dwelling Unit site hosts for service only to resident electric vehicle loads including battery charging and accessory usage for the express purpose of providing charging service to the residents of the site.

CONTRACT
Participants must contract for the service through a Multi-Dwelling Unit Electric Vehicle Service Pilot Customer Service Agreement with the Company. For site hosts participating under both the Shared Parking and Assigned Parking options, the contract will be for 120 months. For EV driver participating under the Assigned Parking option, the contract will be month-to-month.

RENEWABLE ENERGY SUPPLY OPTION
Customers have the option to elect all or a portion of the supply of electricity under this schedule from renewable energy resources. The renewable energy supply option is available subject to the provisions contained in the Voluntary Renewable and High-Efficiency Energy Purchase (Windsource Program) Rider, or other available rate schedule for voluntary renewable energy supply that is applicable.

DETERMINATION OF CUSTOMER BILLS
Site host bills shall reflect the standard customer charge, energy charges (if applicable) based on metered kWh usage, plus an optional charger service charge (if applicable). Assigned parking participant bills shall reflect energy charges (if applicable) based on kWh usage measured by their charging equipment, plus the charger service charge. Bills may be subject to a minimum charge based on the monthly customer charge plus optional charger service charge (if applicable). Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Standard Customer Charge Per Month		$4.95	
Optional Charger Service Charge Per Month Per Port			
Assigned Parking (A91)		$16.99	
	Group A	Group B	Group C
Shared Parking – Full Service (A93)	$30.59	$45.55	$60.51

Energy Charge per kWh

June-September

On-Peak Period	$0.22576
Mid-Peak Period	$0.09013
Off-Peak Period	$0.02784

(Continued on Sheet No. 5-52.5)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401

MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

MULTI-DWELLING UNIT ELECTRIC VEHICLE SERVICE PILOT (Continued)
RATE CODE A91, A92, A93

Section No. 5
Original Sheet No. 52.5

RATE (Continued) N
Energy Charge per kWh

Other Months

On-Peak Period	$0.19266
Mid-Peak Period	$0.07515
Off-Peak Period	$0.02784

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for int eh Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

MONTHLY MINIMUM CHARGE
Customer Charge plus Optional Charger Service (if applicable).

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

DEFINITION OF PEAK PERIODS
The On-Peak period is defined as those hours between 3:00 p.m. and 8:00 p.m. Monday through Friday, except the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When a designated holiday occurs on Sunday, the following Monday will be designated a holiday. The Mid-Peak period is defined as all hours not defined as On-Peak or Off-Peak periods. The Off-Peak period is defined as those hours between midnight (12:00 a.m.) and 6:00 a.m. every day.

TERMS AND CONDITIONS OF SERVICE
1. Multi-dwelling unit electric vehicle service shall be separately served and metered and must at no time be connected to facilities serving site host's other loads. Metering may be installed as a sub-meter behind the site host's main meter, in which case consumption under this rate schedule will be subtracted from the main meter for purposes of billing site host's non-electric vehicle electricity usage N
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(Continued on Sheet No. 5-52.6)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

MULTI-DWELLING UNIT ELECTRIC VEHICLE SERVICE PILOT (Continued)
RATE CODE A91, A92, A93

Section No. 5
1st Revised Sheet No. 52.5

RATE (Continued)
Energy Charge per kWh

Other Months

On-Peak Period	$0.19266
Mid-Peak Period	$0.07515
Off-Peak Period	$0.02784

INTERIM RATE ADJUSTMENT N
An 8.92% Interim Rate Surcharge will be applied to rate components specified in the “Interim Rate Surcharge Rider” to service provided beginning January 1, 2022. N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for int eh Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

MONTHLY MINIMUM CHARGE
Customer Charge plus Optional Charger Service (if applicable).

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

DEFINITION OF PEAK PERIODS
The On-Peak period is defined as those hours between 3:00 p.m. and 8:00 p.m. Monday through Friday, except the following holidays: New Year’s Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When a designated holiday occurs on Sunday, the following Monday will be designated a holiday. The Mid-Peak period is defined as all hours not defined as On-Peak or Off-Peak periods. The Off-Peak period is defined as those hours between midnight (12:00 a.m.) and 6:00 a.m. every day.

TERMS AND CONDITIONS OF SERVICE
1. Multi-dwelling unit electric vehicle service shall be separately served and metered and must at no time be connected to facilities serving site host’s other loads. Metering may be installed as a sub-meter behind the site host’s main meter, in which case consumption under this rate schedule will be subtracted from the main meter for purposes of billing site host’s non-electric vehicle electricity usage**.**

(Continued on Sheet No. 5-52.6)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

MULTI-DWELLING UNIT ELECTRIC VEHICLE SERVICE PILOT (Continued)
RATE CODE A91, A92, A93

Section No. 5
Original Sheet No. 52.6

T ERMS AND CONDITIONS OF SERVICE (Continued)

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2. Consumption under the Assigned Parking option will be measured by charging equipment for each assigned parking spot and will be subtracted from the dedicated meter for charging equipment. Site hosts will be responsible for meter usage not accounted for from assigned parking spot usage.

3. The rate contemplates that the service will require the installation of new facilities to provide electric service to the electric vehicle chargers.

4. Site Host must retain a minimum of four ports per site (minimum of two ports per site for Affordable MDUs), or in cases with less than four ports, a minimum of 50kW of charging capacity.

5. For participating affordable housing site hosts and market-rate site hosts in the first tranche of participants, the Company waives CIAC requirements for non-residential customers under the Standard Installation and Extension Rules under Section 5.1(A)(1))(b), Section 5.1 (A)(2) and (3) and Section 5.2 of the General Rules and Regulations on Tariff Sheets No. 6-23 through 6.27. The Company waives a portion of the CIAC requirements for market-rate site hosts in the second tranche of participants.

6. Company will cover 100 percent of EV Service Connection Costs for affordable housing site hosts and market-rate site hosts in first tranche. Market-rate site hosts in second and third tranche of participants will receive a revenue-based allowance for EV Service Connection costs.

7. The site host shall supply, at no expense to the Company, a suitable location for meters and associated equipment used for billing. Installations must conform to the Company's specifications.

8. Company may require site host to provide access for Company-owned equipment for the recording and wireless communication of energy usage.

9. This schedule is also subject to provisions contained in Rules for Application of Residential Rates.

10. Participants must execute a Multi-Dwelling Unit Electric Vehicle Service Customer Service Agreement with the Company

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Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

ELECTRIC SERVICE PUBLIC CHARGING STATION PILOT
RATE CODE A94

Section No. 5
Original Sheet No. 52.7

AVAILABILITY
Available while this Pilot Service is in effect to customers purchasing electricity used to recharge a battery that powers an electric vehicle from a Company-owned and operated public charging stations. N

CHARACTER OF SERVICE
The Company is proposing to install, own, and operate Direct Current Fast Charging (DCFC) stations in our service territory.

DETERMINATION OF CUSTOMER'S CHARGES
Customers who elect to use Company-owned and operated public charging stations will be charged for electricity provided by the charging stations. Customer's charges shall reflect energy charges (if applicable) based on customer's kWh usage. Energy charges also include applicable riders, adjustments, surcharges, voltage discounts, energy credits, and other applicable charges. Details regarding the specific charges applicable to this service are listed below.

RATE
Energy Charge per kWh

June-September	
On-Peak Period	$0.52576
Mid-Peak Period	$0.39013
Off-Peak Period	$0.32784
Other Months	
On-Peak Period	$0.49266
Mid-Peak Period	$0.37515
Off-Peak Period	$0.32784

FUEL CLAUSE
Customer charges are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Customer charges are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Customer charges are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, customer charges are subject to surcharges provided for in a Surcharge Rider.

DEFINITION OF PEAK PERIODS
The On-Peak period is defined as those hours between 3:00 p.m. and 8:00 p.m. Monday through Friday, except the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When a designated holiday occurs on Sunday, the following Monday will be designated a holiday. The Mid-Peak period is defined as all hours not defined as On-Peak or Off-Peak periods. The Off-Peak period is defined as those hours between midnight (12:00 a.m.) and 6:00 a.m. every day. N

(Continued on Sheet No. 5-52.8)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

ELECTRIC SERVICE PUBLIC CHARGING STATION PILOT (Continued)
RATE CODE A94

Section No. 5
Original Sheet No. 52.8

TERMS AND CONDITIONS OF SERVICE

1. This schedule is also subject to provisions contained in the General Rules and Regulations.

2. Customers must adhere to all Company instructions regarding the safe and efficient use of the public charging stations displayed on or near the station and must follow all recommendations, guidelines, and requirements published by the manufacturer of customer's electric vehicle regarding the charging of the electric vehicle, including the compatibility of the public charging station with the customer's electric vehicle.

3. Customer's use of the public charging station will be unsupervised, and customer's use of the public charging station is at Customer's own risk.

4. The Company has the right to control the use of the public charging station and may suspend or refuse access to public charging station at any time, for any reason.

5. The Company will use reasonable efforts to maintain the operability of the public charging stations and keep the public charging stations in working order, but the Company does not guarantee, and is under no obligation to ensure the availability, compatibility with customer's electric vehicle or performance of any public charging station.

6. Customer data may be collected by the Company in connection with Customer's use of a public charging station, and the Company will maintain any such information in accordance with and subject to the Company's then current Privacy Policy.

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Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ENERGY CONTROLLED SERVICE (CLOSED)
(Continued)
RATE CODE A26

Section No. 5
1st Revised Sheet No. 53

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ENERGY CONTROLLED SERVICE (CLOSED)
(Continued)
RATE CODE A26

Section No. 5
1st Revised Sheet No. 54

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ENERGY CONTROLLED SERVICE (CLOSED)
(Continued)
RATE CODE A26

Section No. 5
1st Revised Sheet No. 55

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ENERGY CONTROLLED SERVICE (CLOSED) (Continued) Section No. 5
RATE CODE A26 1st Revised Sheet No. 56

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ENERGY CONTROLLED SERVICE (CLOSED)
(Continued)
RATE CODE A26

Section No. 5
1st Revised Sheet No. 57

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

EXPERIMENTAL REAL TIME PRICING SERVICE (CLOSED)
RATE CODE A60 (FIRM) AND
RATE CODE A61 (CONTROLLABLE)

Section No. 5
7th Revised Sheet No. 58

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

EXPERIMENTAL REAL TIME PRICING SERVICE (CLOSED)
(Continued)
RATE CODE A60 (FIRM) AND
RATE CODE A61 (CONTROLLABLE)

Section No. 5
9th Revised Sheet No. 59

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

EXPERIMENTAL REAL TIME PRICING SERVICE (CLOSED)
(Continued)
RATE CODE A60 (FIRM) AND
RATE CODE A61 (CONTROLLABLE)

Section No. 5
2nd Revised Sheet No. 60

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

EXPERIMENTAL REAL TIME PRICING SERVICE (CLOSED)
(Continued)
RATE CODE A60 (FIRM) AND
RATE CODE A61 (CONTROLLABLE)

Section No. 5
2nd Revised Sheet No. 61

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

EXPERIMENTAL REAL TIME PRICING SERVICE (CLOSED)
(Continued)
RATE CODE A60 (FIRM) AND
RATE CODE A61 (CONTROLLABLE)

Section No. 5
2nd Revised Sheet No. 62

CANCELED

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

EXPERIMENTAL REAL TIME PRICING SERVICE (CLOSED)
(Continued)
RATE CODE A60 (FIRM) AND
RATE CODE A61 (CONTROLLABLE)

Section No. 5
2nd Revised Sheet No. 63

CANCELED

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

REAL TIME PRICING SERVICE Section No. 5
RATE CODE: A62 (FIRM), A63 (CONTROLLABLE) 11th Revised Sheet No. 64

AVAILABILITY

Available to customers with a minimum peak demand of 1,000 kW. Availability may be restricted to limit total customer peak demand to a maximum of 150,000 kW. The controllable service option requires a minimum controllable load of 500 kW.

RATE

Customer Charge per Month $300.00

Demand Charge per Month per kW
Contract Demand $9.94 R

Distribution Demand by Voltage

Secondary	Primary	Transmission Transformed	Transmission
$1.97	$0.97	$0.36	$0.00

R

Energy Charge per kWh

	Day-Type 1	2	3	4	5	6	7	8	
12 a.m.-6 a.m.	$0.03432	$0.02800	$0.02552	$0.02391	$0.02324	$0.02189	$0.02113	$0.01978	R
6 a.m.- 9 a.m.	$0.06181	$0.04925	$0.03932	$0.04111	$0.03977	$0.03446	$0.02775	$0.02243	R
9 a.m.-12 p.m.	$0.16995	$0.09623	$0.06050	$0.04817	$0.03701	$0.02991	$0.02471	$0.02331	
12 p.m.- 6 p.m.	$0.28050	$0.18790	$0.09735	$0.05743	$0.03701	$0.02991	$0.02471	$0.02331	R
6 p.m.- 9 p.m.	$0.20679	$0.13310	$0.07845	$0.04959	$0.03701	$0.02991	$0.02471	$0.02331	
9 p.m.-12 a.m.	$0.06181	$0.04925	$0.04302	$0.03724	$0.03051	$0.02784	$0.02425	$0.02243	R

Day-type energy charges are subject to the Stability Factor Adjustment provision. R

Annual Day-Type Distribution

Normal	5	5	10	35	60	110	60	80	R
Maximum	8	8	16	50	n/a	n/a	n/a	n/a	

Limited Energy Surcharge per kWh $0.2000
All kWh during peak period hours in excess of Contract Demand

Energy Charge Credit per Month $0.01143
All kWh in excess of 400 times Contract Demand, not to exceed 50% of total kWh R

Energy Charge Voltage Discount per kWh

Primary	Transmission Transformed	Transmission
$0.00105	$0.00267	$0.00277

R

R

(Continued on Sheet No. 5-65)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

REAL TIME PRICING SERVICE (Continued) Section No. 5
RATE CODE: A62 (FIRM), A63 (CONTROLLABLE) 22nd Revised Sheet No. 65

DAY-TYPE
Separate energy charges are defined for each of eight day-types. Company will normally designate the applicable day-type for each day by 4:00 p.m. of the preceding day. If Company has not designated the applicable day by 4:00 p.m., the day-type will be the same as the last designated day-type, unless Company later designates a lower cost day-type.

CONTRACT
Customers must contract for this service through an Electric Service Agreement with Company. Contract period will normally be for one year.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

PEAK PERIOD HOURS DEFINITION
Peak period hours are the nine hours between 9:00 a.m. and 6:00 p.m. for day-types 1, 2, 3, 4, 5, and 6. No peak period hours are applicable for day-types 7 and 8.

(Continued on Sheet No. 5-65.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

REAL TIME PRICING SERVICE (Continued) Section No. 5
RATE CODE: A62 (FIRM), A63 (CONTROLLABLE) 23rd Revised Sheet No. 65

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

DAY-TYPE
Separate energy charges are defined for each of eight day-types. Company will normally designate the applicable day-type for each day by 4:00 p.m. of the preceding day. If Company has not designated the applicable day by 4:00 p.m., the day-type will be the same as the last designated day-type, unless Company later designates a lower cost day-type.

CONTRACT
Customers must contract for this service through an Electric Service Agreement with Company. Contract period will normally be for one year.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

PEAK PERIOD HOURS DEFINITION
Peak period hours are the nine hours between 9:00 a.m. and 6:00 p.m. for day-types 1, 2, 3, 4, 5, and 6. No peak period hours are applicable for day-types 7 and 8.

(Continued on Sheet No. 5-65.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

REAL TIME PRICING SERVICE (Continued) Section No. 5
RATE CODE: A62 (FIRM), A63 (CONTROLLABLE) 5th Revised Sheet No. 65.1

STABILITY FACTOR ADJUSTMENT

Day-type energy charges will be adjusted by a stability factor to compensate for departures from the normal distribution of day-types. The average day-type energy charge, weighted with system loads, will be determined for actual and normal day-types. Stability factors of no more than five percent will be implemented following an annualized differential that exceeds two percent, and discontinued after the differential for the preceding 12 months is less than one percent. Customers will be notified of the effective date and amount of any stability factor adjustment before that adjustment is implemented, changed or discontinued. No stability factor adjustment will apply to customers receiving this service for fewer months than used to determine the adjustment.

POWER FACTOR

The power factor for the month shall be determined by permanently installed metering equipment. Company may require customer to install Company-approved equipment to maintain a power factor of not less than 90%.

(Continued on Sheet No. 5-66)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

REAL TIME PRICING SERVICE (Continued) Section No. 5
RATE CODE: A62 (FIRM), A63 (CONTROLLABLE) 9th Revised Sheet No. 66

DETERMINATION OF DEMAND

Contract Demand in kW is designated by customer and is fixed for no less than 12 months. Customers are allowed a maximum of one opportunity to revise to their contract demand level in any continuous 12-month period. In no month shall the demand to be billed be considered as less than the actual or expected average kW load during peak period hours of the billing month. In all months, the Contract Demand designated by customer shall be used to determine the kWh sales applied to the Limited Energy Surcharge and the Energy Charge Credit.

Distribution Demand in kW shall be the greatest 15 minute load that occurred during the past 12 months, including the current billing month, rounded to the nearest whole kW. Additional demand that may result from customer's use of contracted standby or supplemental capacity is not included in the determination of distribution demand.

CONTROLLABLE SERVICE OPTION

The controllable service option is available to customers that agree to control a minimum load of 500 kW to a predetermined level whenever required by Company. The applicable monthly controllable demand credit is applied customer's monthly controllable demand. The applicable limited energy charge per kWh replaces the charge for firm service.

Controllable Demand Credit per Month per kW			Limited Energy Surcharge per kWh	
	Jun-Sep	Other Months		
Level A: < 65% PF	$5.36	$1.04	$0.1353	R
Level B: ≥ 65% and < 85% PF	$6.16	$1.84	$0.0962	R
Level C: ≥ 85% PF	$6.67	$2.34	$0.0772	R

Controllable Demand in kW is the difference between Contract Demand for the billing month and Predetermined Demand Level.

Predetermined Demand Level shall be specified and agreed to by the customer and Company, and may not exceed the Contract Demand. Customer's demand must not exceed the predetermined demand level (PDL) during a control period.

Performance Factor (PF) is defined in percentage terms as the average of the July and August calendar month maximum Controllable Demand occurring from 1:00 p.m. to 7:00 p.m. on weekdays, divided by the maximum annual Controllable Demand. Customer's representative load characteristics will be used to determine customer's performance factor. Company reserves the right to determine customer's eligibility for performance factor levels and may transfer customers between levels following verification of a customer's performance.

(Continued on Sheet No. 5-67)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

REAL TIME PRICING SERVICE (Continued) Section No. 5
RATE CODE: A62 (FIRM), A63 (CONTROLLABLE) 6th Revised Sheet No. 67

Controllable Service Terms and Conditions

1. Company will endeavor to give customer one hour notice of commencement of control period.

2. An additional charge of $8.00 per kW for failure to control will apply during each Company specified control period to the amount that customer's maximum power factor adjusted on peak demand exceeds their predetermined demand level.

3. The duration and frequency of control periods shall be at the discretion of Company. Control periods will normally occur when Company expects a reasonable possibility of system load levels surpassing the level for which NSP has sufficient accredited capacity under the Midwest Reliability Organization (MRO) or any successor organization, including reserve requirements, or when in Company's opinion, the reliability of the system is endangered. Customers will be separated into two groups by Company with control periods applicable to one or both groups. Customer groups are determined by geographical location and equivalent total controllable load. Control periods will apply to both customer groups at times of the highest forecast system load levels. Control periods at other high load times may apply to only one of the customer groups. Customer groups will be defined as subject to control periods on either even or odd numbered days.

4. Maximum duration of all control periods specified by Company will be 80 hours per year.

5. Customer may revise predetermined demand level subject to approval by Company.

6. Company shall not be liable for any loss or damage caused by or resulting from any interruption of service.

7. Any customer with generating equipment that is operated in parallel with Company must comply with all requirements associated with parallel operations as specified in the General Rules and Regulations of the Company.

8. Any load served by customer generation during Company requested control periods must normally be served by Company.

(Continued on Sheet No. 5-68)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

REAL TIME PRICING SERVICE (Continued) Section No. 5
RATE CODE: A62 (FIRM), A63 (CONTROLLABLE) 5th Revised Sheet No. 68

STANDBY SERVICE
Standby service is available under this schedule subject to the provisions contained in the Standby Service Rider.

TERMS AND CONDITIONS OF SERVICE
1. Alternating current service is provided at the following nominal voltages:
   a. Secondary Voltage: Single or three phase from 208 volts up to but not including 2,400 volts,
   b. Primary Voltage: Three phase from 2,400 volts up to but not including 69,000 volts,
   c. Transmission Transformed Voltage: Three phase from 2,400 volts up to but not including 69,000 volts, where service is provided at the Company's disconnecting means of a distribution substation transformer, or
   d. Transmission Voltage: Three phase at 69,000 volts or higher.

   Service voltage available in any given case is dependent upon voltage and capacity of Company lines in vicinity of customer's premises.

2. Transmission Transformed Service is available only to customers served by an exclusively dedicated distribution feeder. Customer will be responsible for the cost of all facilities necessary to interconnect at the Company's disconnecting means of a distribution substation transformer.

3. Transmission Service is available at transmission voltage, subject to the terms and conditions contained in the Company's General Rules and Regulations, Section 5.1(B).

4. Company will provide, install, and maintain equipment necessary to communicate real-time prices to customers. Customer will provide for a dedicated telephone line service approved by Company.

5. Customer will pay a cancellation charge for contract cancellation prior to the end of a contract period. The cancellation charge is $1,000.00, plus the difference between customer’s bills recalculated using customer’s previous rate schedule and this rate schedule if such difference is greater than zero.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

LIGHT RAIL LINE TARIFF
RATE CODE A29

Section No. 5
17th Revised Sheet No. 71

AVAILABILITY
Available to the Metropolitan Council's light rail transit lines for all electric power and energy required by its Traction Station service locations. Traction Stations will be aggregated as lines as they are put into service. Traction Stations common to more than one line will be aggregated with the line with which they were originally put into service.

RATE

Customer Charge per Month per Traction Station		$100.00	
Transmission and Distribution Demand Charge per Month per kW			
All Traction Station On Peak Non-Coincident Billing Demands		$5.28	R
Off Peak Period Non-Coincident Demand in Excess of On Peak Period Non-Coincident Demand		$1.55	
Generation Demand Charge per Month per kW	**OCT-MAY**		**JUN-SEP**
Rail Line On Peak Coincident Billing Demand	$4.41		$8.71 R
Energy Charge per kWh			
On Peak Period Energy		$0.04750	
Off Peak Period Energy		$0.02236	R
Energy Charge Credit per Month per kWh			
All Energy in Excess of 400 Hours Times the On Peak Period Coincident Billing Demand, Not to Exceed 50% of the Energy		$0.01303	R

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE R
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

(Continued on Sheet No. 5-72)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

LIGHT RAIL LINE TARIFF
RATE CODE A29

Section No. 5
18th Revised Sheet No. 71

AVAILABILITY
Available to the Metropolitan Council's light rail transit lines for all electric power and energy required by its Traction Station service locations. Traction Stations will be aggregated as lines as they are put into service. Traction Stations common to more than one line will be aggregated with the line with which they were originally put into service.

RATE

Customer Charge per Month per Traction Station	$100.00	
Transmission and Distribution Demand Charge per Month per kW		
All Traction Station On Peak Non-Coincident Billing Demands	$5.28	
Off Peak Period Non-Coincident Demand in Excess of On Peak Period Non-Coincident Demand	$1.55	

Generation Demand Charge per Month per kW	OCT-MAY	JUN-SEP
Rail Line On Peak Coincident Billing Demand	$4.41	$8.71

Energy Charge per kWh	
On Peak Period Energy	$0.04750
Off Peak Period Energy	$0.02236
Energy Charge Credit per Month per kWh	
All Energy in Excess of 400 Hours Times the On Peak Period Coincident Billing Demand, Not to Exceed 50% of the Energy	$0.01303

INTERIM RATE ADJUSTMENT
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

(Continued on Sheet No. 5-72)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

LIGHT RAIL LINE TARIFF (Continued) Section No. 5
RATE CODE A29 7th Revised Sheet No. 72

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

The following are terms and conditions for service under this tariff.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge of $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

DEFINITION OF PEAK PERIODS
The on peak period is defined as those hours between 9:00 a.m. and 9:00 p.m. The on peak period occurs Monday through Friday, except the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. When a designated holiday occurs on Saturday, the preceding Friday will be designated a holiday. When the designated holiday occurs on a Sunday, the following Monday will be designated a holiday. The off peak period is defined as all other hours. Definition of on peak and off peak period is subject to change with change in Company's system operating characteristics.

DETERMINATION OF TRACTION STATION ON PEAK PERIOD NON-COINCIDENT DEMAND
The individual Traction Station Actual On Peak Period Non-Coincident Demand in kW shall be the greatest 15-minute load during the on peak periods during the month for which the bill is rendered for each and every Traction Station along the Light Rail Line. The individual Traction Station Adjusted On Peak Period Non-Coincident Demand in kW for any one Traction Station for billing purposes shall be determined by dividing the Actual On Peak Period Non-Coincident Demand by the power factor expressed in percent but not more than 90%, multiplying the quotient so obtained by 90%, and rounding to the nearest whole kW. The total Traction Station Adjusted On Peak Period Non-Coincident Demand in kW for billing purposes shall be the sum of the individual Adjusted On Peak Period Non-Coincident Demands from each and every Traction Station.

DETERMINATION OF TRACTION STATION OFF PEAK PERIOD NON-COINCIDENT DEMAND
The individual Traction Station Actual Off Peak Period Non-Coincident Demand in kW shall be the greatest 15-minute load during the off peak periods during the month for which the bill is rendered for each and every Traction Station along the Light Rail Line. The individual Traction Station Adjusted Off Peak Period Non-Coincident Demand in kW for any one Traction Station for billing purposes shall be determined by dividing the Actual Off Peak Period Non-Coincident Demand by the power factor expressed in percent but not more than 90%, multiplying the quotient so obtained by 90%, and rounding to the nearest whole kW. The total Traction Station Adjusted Off Peak Period Non-Coincident Demand in kW for billing purposes shall be the sum of the individual Adjusted Off Peak Period Non-Coincident Demands from each and every Traction Station.

(Continued on Sheet No. 5-73)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

LIGHT RAIL LINE TARIFF (Continued) Section No. 5
RATE CODE A29 6th Revised Sheet No. 73

DETERMINATION OF RAIL LINE ON PEAK PERIOD COINCIDENT DEMAND

The Rail Line Actual On Peak Period Coincident Demand in kW shall be the greatest simultaneous 15-minute load during the on peak periods during the month for which the bill is rendered for all of the Traction Stations along the Light Rail Line. The Rail Line Adjusted On Peak Period Coincident Demand in kW for billing purposes shall be determined by dividing the Actual On Peak Period Coincident Demand by the power factor expressed in percent but not more that 90%, multiplying the quotient so obtained by 90%, and rounding to the nearest whole kW.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STREET LIGHTING SYSTEM SERVICE Section No. 5
RATE CODE A30 26th Revised Sheet No. 74

AVAILABILITY
Available for year-round illumination of public streets, parkways, and highways by High Pressure Sodium (HPS), Metal Halide or Light Emitting Diode (LED) luminaires supported on poles, where the facilities for this service are furnished by Company. Underground Service under this schedule is limited to areas having a Company owned underground electric distribution system. Standard Service includes a monthly payment for the lighting system cost. Pre-Pay Option requires customer payment for the lighting system cost before establishing service.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

	Monthly Rate Per Luminaire			
	Standard Service			Pre-Pay
Designation of Lamp (Lumens)	Overhead	Underground	Decorative	Option
70W High Pressure Sodium	$9.63	$19.54	--	$5.97
100W High Pressure Sodium	$10.17	$20.07	$31.67	$6.66
150W High Pressure Sodium	$10.95	$20.86	$32.84	$7.54
200W High Pressure Sodium*	$12.88	--	--	--
250W High Pressure Sodium	$13.87	$23.38	$34.89	$9.61
400W High Pressure Sodium	$16.85	$26.06	$37.38	$12.42
175W Metal Halide	$14.98	$27.90	$37.38	$13.54
30-40W Light Emitting Diode (*4,000*)	$10.32	$20.22	--	$4.90
50-75W Light Emitting Diode (*6,000*)	$11.01	$20.91	--	$5.49
110-165W Light Emitting Diode (*14,000*)	$14.46	$23.96	--	$7.05
200-250W Light Emitting Diode (*25,000*)	$17.98	$27.19	--	$8.93

R R

*Closed to new customers

(Continued on Sheet No 5-74.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STREET LIGHTING SYSTEM SERVICE Section No. 5
RATE CODE A30 27th Revised Sheet No. 74

AVAILABILITY
Available for year-round illumination of public streets, parkways, and highways by High Pressure Sodium (HPS), Metal Halide or Light Emitting Diode (LED) luminaires supported on poles, where the facilities for this service are furnished by Company. Underground Service under this schedule is limited to areas having a Company owned underground electric distribution system. Standard Service includes a monthly payment for the lighting system cost. Pre-Pay Option requires customer payment for the lighting system cost before establishing service.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

	Monthly Rate Per Luminaire			
	Standard Service			Pre-Pay
Designation of Lamp (Lumens)	Overhead	Underground	Decorative	Option
70W High Pressure Sodium	$9.63	$19.54	--	$5.97
100W High Pressure Sodium	$10.17	$20.07	$31.67	$6.66
150W High Pressure Sodium	$10.95	$20.86	$32.84	$7.54
200W High Pressure Sodium*	$12.88	--	--	--
250W High Pressure Sodium	$13.87	$23.38	$34.89	$9.61
400W High Pressure Sodium	$16.85	$26.06	$37.38	$12.42
175W Metal Halide	$14.98	$27.90	$37.38	$13.54
30-40W Light Emitting Diode (*4,000*)	$10.32	$20.22	--	$4.90
50-75W Light Emitting Diode (*6,000*)	$11.01	$20.91	--	$5.49
110-165W Light Emitting Diode (*14,000*)	$14.46	$23.96	--	$7.05
200-250W Light Emitting Diode (*25,000*)	$17.98	$27.19	--	$8.93

*Closed to new customers

INTERIM RATE ADJUSTMENT
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N N

(Continued on Sheet No 5-74.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STREET LIGHTING SYSTEM SERVICE (Continued) Section No. 5
RATE CODE A30 11th Revised Sheet No. 74.1

PRE-PAY OPTION SURCHARGE
A monthly surcharge per luminaire of 0.2% applies to the amount the purchase price exceeds $1,200.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

OTHER PROVISIONS
This schedule is also subject to provisions contained in Rules for Application of Street Lighting Rates.

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STREET LIGHTING SYSTEM SERVICE (CLOSED) Section No. 5
RATE CODE A31 11th Revised Sheet No. 75

CANCELED

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STREET LIGHTING ENERGY SERVICE (CLOSED) Section No. 5
RATE CODE A32 25th Revised Sheet No. 76

AVAILABILITY

Available for year-round illumination of public streets, parkways, and highways by electric lamps mounted on standards where customer owns a Company approved ornamental street lighting system complete with standards, luminaires with globes, lamps, and other appurtenances, together with all necessary cables extending between standards and to point of connection to Company's facilities as designated by Company. Service is limited to existing lighting systems being served under this schedule.

DETERMINATION OF CUSTOMER BILLS

Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Designation of Lamp (Lumens)	Monthly Rate per Luminaire	
100W Mercury	$2.45	
175W Mercury	$3.64	
250W Mercury	$4.94	
400W Mercury	$7.69	
700W Mercury	$12.78	
1,000W Mercury	$17.77	
50W High Pressure Sodium	$1.37	
70W High Pressure Sodium	$1.73	
100W High Pressure Sodium	$2.29	
150W High Pressure Sodium	$3.14	
200W High Pressure Sodium	$4.18	
250W High Pressure Sodium	$5.28	
400W High Pressure Sodium	$8.03	
750W High Pressure Sodium	$13.78	
F72HO Fluorescent	$3.61	
<30W Light Emitting Diode (2,500)	$1.06	N
30-45W Light Emitting Diode (4,000)	$1.34	N
50-75W Light Emitting Diode (6,000)	$1.85	N
110-165W Light Emitting Diode (14,000)	$3.44	N
200-250W Light Emitting Diode (25,000)	$5.14	N

(Continued on Sheet No. 5-77)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STREET LIGHTING ENERGY SERVICE (CLOSED) Section No. 5
RATE CODE A32 26th Revised Sheet No. 76

AVAILABILITY
Available for year-round illumination of public streets, parkways, and highways by electric lamps mounted on standards where customer owns a Company approved ornamental street lighting system complete with standards, luminaires with globes, lamps, and other appurtenances, together with all necessary cables extending between standards and to point of connection to Company's facilities as designated by Company. Service is limited to existing lighting systems being served under this schedule.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Designation of Lamp (Lumens)	Monthly Rate per Luminaire
100W Mercury	$2.45
175W Mercury	$3.64
250W Mercury	$4.94
400W Mercury	$7.69
700W Mercury	$12.78
1,000W Mercury	$17.77
50W High Pressure Sodium	$1.37
70W High Pressure Sodium	$1.73
100W High Pressure Sodium	$2.29
150W High Pressure Sodium	$3.14
200W High Pressure Sodium	$4.18
250W High Pressure Sodium	$5.28
400W High Pressure Sodium	$8.03
750W High Pressure Sodium	$13.78
F72HO Fluorescent	$3.61
<30W Light Emitting Diode (2,500)	$1.06
30-45W Light Emitting Diode (4,000)	$1.34
50-75W Light Emitting Diode (6,000)	$1.85
110-165W Light Emitting Diode (14,000)	$3.44
200-250W Light Emitting Diode (25,000)	$5.14

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

(Continued on Sheet No. 5-77)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STREET LIGHTING ENERGY SERVICE (CLOSED) Section No. 5
(Continued) 11th Revised Sheet No. 77
RATE CODE A32

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

OTHER PROVISIONS
This schedule is also subject to provisions contained in Rules for Application of Street Lighting Rates.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STREET LIGHTING ENERGY SERVICE - METERED Section No. 5
RATE CODE A34 29th Revised Sheet No. 78

AVAILABILITY
Available for year-round illumination of public streets, parkways, and highways by electric lamps mounted on standards where customer owns and maintains an ornamental street lighting system complete with standards, luminaires with globes, lamps, photocells, and other appurtenances, together with all necessary cables extending between standards and to point of connection to Company's meter as designated by Company.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Meter per Month	$5.00	
Energy Charge per kWh	$0.04534	R

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

(Continued on Sheet No. 78.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STREET LIGHTING ENERGY SERVICE - METERED Section No. 5
RATE CODE A34 30th Revised Sheet No. 78

AVAILABILITY
Available for year-round illumination of public streets, parkways, and highways by electric lamps mounted on standards where customer owns and maintains an ornamental street lighting system complete with standards, luminaires with globes, lamps, photocells, and other appurtenances, together with all necessary cables extending between standards and to point of connection to Company's meter as designated by Company.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Customer Charge per Meter per Month	$5.00
Energy Charge per kWh	$0.04534

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

(Continued on Sheet No. 78.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STREET LIGHTING ENERGY SERVICE – METERED (Continued) Section No. 5
RATE CODE A34 6th Revised Sheet No. 78.1

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

CONDITIONS OF SERVICE
The customer owns and maintains ornamental street lighting system including underground cables, posts, lamps, ballasts, photocells, and glassware. Ballasts shall provide a power factor of at least 90% and photocells shall conform to specified daily operating schedule. Company furnishes energy only at central metered distribution points designated by Company. The daily operating schedule of the lamps shall be from approximately one-half hour after sunset until one-half hour before sunrise.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STREET LIGHTING SERVICE - CITY OF ST. PAUL Section No. 5
(CLOSED) 27th Revised Sheet No. 80
RATE CODE A37

AVAILABILITY
Available to the City of St. Paul for furnishing, maintaining, and operating certain electrical connections, lines, and appurtenances thereto, and supplying electric current for city street lighting.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Designation of Lamp	Monthly Rate per Luminaire
100W High Pressure Sodium	$5.48
150W High Pressure Sodium	$6.14
250W High Pressure Sodium	$8.60

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

The following are terms and conditions for service under this tariff.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

(Continued on Sheet No. 5-81)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STREET LIGHTING SERVICE - CITY OF ST. PAUL Section No. 5
(CLOSED) 28th Revised Sheet No. 80
RATE CODE A37

AVAILABILITY
Available to the City of St. Paul for furnishing, maintaining, and operating certain electrical connections, lines, and appurtenances thereto, and supplying electric current for city street lighting.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

Designation of Lamp	Monthly Rate per Luminaire
100W High Pressure Sodium	$5.48
150W High Pressure Sodium	$6.14
250W High Pressure Sodium	$8.60

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

The following are terms and conditions for service under this tariff.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

(Continued on Sheet No. 5-81)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STREET LIGHTING SERVICE – CITY OF ST. PAUL
(CLOSED)
RATE CODE A37

Section No. 5
15th Revised Sheet No. 81

OTHER PROVISIONS
This schedule is also subject to provisions contained in Rules for Application of Street Lighting Rates.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RULES FOR APPLICATION OF STREET LIGHTING RATES

Section No. 5
7th Revised Sheet No. 82

1. SERVICE INCLUDED IN RATE

a. *Street Lighting System Service*

Overhead, Underground, and Decorative
Company shall own, operate, and maintain the overhead and underground street lighting systems using Company's standard street lighting equipment.

Company Property
All poles, other material and equipment that may be used by Company in carrying out street lighting service shall be and remain the property of Company. Company shall have the right to install poles and other materials for street lighting service on or along public streets and alleys of customer and to remove the same upon expiration of term.

Terms and Conditions:

Standard Service
Except for customers choosing the pre-pay option for street lighting system service, the term of service will be a minimum of five (5) years. After the minimum five year service term, service shall continue thereafter for one (1) year terms, unless either party provides written notice at least ninety (90) days prior to the expiration of a term that customer intends to terminate the service. Existing lights that have been in service for more than five years at the time this Tariff provision is approved by the Commission will continue on 1-year terms until either party terminates the service based on the provisions listed above. Company shall furnish all electric energy necessary to operate the street lighting system, shall make all lamp and glassware renewals, clean the glassware, light and extinguish all lamps, make all ballast and starter renewals, and furnish all the materials and labor necessary for these services. Company shall also repair all damaged equipment.

Pre-Pay Option
Customer shall pay the Company upfront the costs associated with the entire ornamental street lighting system including underground cables, posts, lamps, ballasts, starters, photocells, and glassware. The Company retains ownership of the street lighting system. The street lighting system shall be Company approved and include a lamp type and wattage combination that corresponds to an existing Pre-Pay Option rate. Company shall furnish all electric energy necessary to operate the street lighting system, shall make all lamp and glassware renewals, clean the glassware, light and extinguish all lamps, make all ballast and starter renewals, and furnish all the materials and labor necessary for these services. Company shall also repair all damaged equipment for 25 years from the installation date. After 25 years, Company will repair damaged equipment when the damage is not associated with the age of the street lighting system. These repairs are routine in nature such as lamp, photo control, starter, and fuses.

(Continued on Sheet No. 5-83)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RULES FOR APPLICATION OF STREET LIGHTING RATES (Continued)

Section No. 5
6th Revised Sheet No. 83

1. SERVICE INCLUDED IN RATE (Continued)

Prepay Option (Continued)
If in the Company's opinion, the condition of the street lighting system is such that replacement or significant renovation of the system is necessary (for example, due to underground faults, pole deterioration, ballast outage), the customer shall have two options:

(1) the customer must either transfer to the Street Lighting Energy Service – Metered rate, or
(2) reimburse Company for the installed cost of a replacement system.

Attachments
The Customer may not make any attachments, including but not limited to, banners, flags, signs, or holiday lighting, to the poles without the express written permission of Company. Approval of any such attachments will be at the sole discretion of the Company. In the event that any such attachments are made without written Company authorization, customer shall remove such attachments upon notice from Company. Any damage to Company property or other Company equipment caused by an unauthorized attachment by customer shall, after notice of damage to the customer be repaired by Company at the customer's expense. However, notice to customer prior to repair will not be required in case of an emergency or any other reason that requires immediate repair. In addition, if a street light outage is caused by an unauthorized attachment to Company property, service outage credits will not apply as described in paragraph 3 below.

b. *Street Lighting Energy Service*
The customer owns and maintains entire ornamental street lighting system including underground cables, posts, lamps, ballasts, photocells, and glassware. Ballasts shall provide a power factor of at least 90% and photocells shall conform to specified daily operating schedule. Company furnishes energy only at central distribution points designated by Company.

c. *City of St. Paul*
City owns and maintains lamp units, lamps, photocells, and glassware. Company owns and maintains distribution system, including hangers and furnishes energy at the lamp unit. Ballasts shall provide a power factor of at least 90% and photocells shall conform to specified daily operating schedule.

2. DAILY OPERATING SCHEDULE
The daily operating schedule of lamps shall be from approximately one-half hour after sunset until one-half hour before sunrise.

(Continued on Sheet No. 5-84)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RULES FOR APPLICATION OF STREET LIGHTING RATES (Continued)

Section No. 5
6th Revised Sheet No. 84

3. OUTAGES

If illumination from any non-metered lamp is interrupted and the illumination is not resumed within 2 business days from the time the Company receives notice, 1/30th of the applicable monthly metered energy and fuel cost charges for the affected lamp(s) for each night of service outage shall be credited to the customer.

The Company shall apply such credits to all affected customers one time annually in the month of December of each year, together with an itemized list of the street lamps and/or poles associated with the credits.

Interruption of Company Performance:
In the event of the total or partial interruption of service where the Company is prevented from providing service, a customer shall not be charged under this tariff for the duration of time service cannot be provided. The Company will proceed with all reasonable diligence to put itself and its works in condition to resume and continue the supply of electric energy and the performance of the service. The Company shall not be responsible for any loss or damage resulting from the interruption or disturbance of service for any cause other than gross negligence of the Company. The Company shall not be liable for any loss of profits or other consequential damages resulting from the use of service or any interruption or disturbance of service.

4. SPECIAL SERVICES

a. *Street Lighting System Service*

Temporary Disconnection of Service (Street lighting facilities remain in place.)
When requested by the customer, Company will temporarily disconnect service to individual street lighting units provided the customer pays a monthly facilities charge equal to the regular monthly rate less the product of the average monthly kWh for the lighting unit and the energy charge from the Street Lighting Energy Service - Metered rate schedule. The customer must pay a charge of $25.00 to disconnect or reconnect each lighting unit.

Termination of Street Lighting Facilities
When requested by the customer, except for Pre-Pay Option lighting service, Company will remove all or a portion of a street lighting system and cease billing. The customer must pay termination costs for the removal and undepreciated value of facilities, less any salvage value, if the number of lights requested to be removed in any 12 month period exceeds 5% of the municipality's street lighting system.

(Continued on Sheet No. 5-84.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RULES FOR APPLICATION OF Section No. 5
STREET LIGHTING RATES (Continued) 4th Revised Sheet No. 84.1

4. SPECIAL SERVICES (Continued)

b. *Street Lighting Energy Service*

Daily Operating Schedule Option

Reduced hours of operation from the standard daily operating schedule is available under the applicable commercial and industrial rate, subject to the following provisions:

(1) customer must install a meter socket at the service point, and
(2) customer shall provide all maintenance to lighting units and identify the lighting units with Company approved markings.

Disconnection of Service

During the period between customer disconnection and reconnection of street lighting units, Company will cease billing provided the disconnection is made on the line side of the lighting unit ballast. Customer disconnection not on the line side will require the customer to pay a charge to compensate for the lighting unit ballast core loss. When requested by the customer, Company will disconnect or reconnect street lighting units provided the customer pays a charge of $25.00 for the disconnection or reconnection of each lighting unit. The customer must identify all disconnected street lighting units with Company approved markings.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

SMALL MUNICIPAL PUMPING SERVICE Section No. 5
RATE CODE A40 30th Revised Sheet No. 85

AVAILABILITY
Available to municipal owned water works and municipal sewage systems for operation of pumping and treatment plants. (Rate schedule is applied separately to each delivery point.)

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

	Oct-May	Jun-Sep
Customer Charge per Month	$10.00	$10.00
Energy Charge per kWh	$0.07757	$0.09256

R

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

MONTHLY MINIMUM CHARGE
Customer Charge.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

(Continued on Sheet No. 5-86)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

SMALL MUNICIPAL PUMPING SERVICE Section No. 5
RATE CODE A40 31st Revised Sheet No. 85

AVAILABILITY
Available to municipal owned water works and municipal sewage systems for operation of pumping and treatment plants. (Rate schedule is applied separately to each delivery point.)

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE

	Oct-May	Jun-Sep
Customer Charge per Month	$10.00	$10.00
Energy Charge per kWh	$0.07757	$0.09256

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

MONTHLY MINIMUM CHARGE
Customer Charge.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

(Continued on Sheet No. 5-86)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

SMALL MUNICIPAL PUMPING SERVICE (Continued) Section No. 5
RATE CODE A40 7th Revised Sheet No. 86

The following are terms and conditions for service under this tariff.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

INSTALLATION OF DEMAND METERS
The Company shall install a demand meter for a customer when:
1. Customer's connected load is estimated to be 20 kW or greater, or
2. Customer is served single phase and has a service entrance capacity greater than 200 amperes, or
3. Customer is served three phase at 120/208 or 120/240 volts and has a service entrance capacity greater than 200 amperes, or
4. Customer is served three phase at 240/480 or 277/480 volts and has a service entrance capacity greater than 100 amperes, or

Customer's average monthly kWh use for four consecutive months exceeds 3,500 kWh.

If a demand meter is installed in accordance with the above, the customer may remain on the Small Municipal Pumping Service schedule as long as customer’s maximum demand is less than 25 kW. When the customer achieves an actual maximum demand of 25 kW or greater, the customer will be placed on the Municipal Pumping Service schedule in the next billing month. Customers with a billing demand of less than 25 kW for 12 consecutive months will be given the option of returning to the Small Municipal Pumping Service schedule.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

MUNICIPAL PUMPING SERVICE Section No. 5
RATE CODE A41 31st Revised Sheet No. 87

AVAILABILITY
Available to municipal owned water works and municipal sewage systems for operation of pumping and treatment plants. (Rate schedule is applied separately to each delivery point.)

RATE

Customer Charge per Month	$25.64		
	Oct-May	Jun-Sep	
Service at Secondary Voltage			
Demand Charge per Month per kW	$10.49	$14.79	R
Energy Charge per kWh	$0.03407		R
Energy Charge Credit per Month per kWh			
All kWh in Excess of 400 Hours Times the Billing Demand	$0.01518		R

	January - December		
Voltage Discounts per Month	Per kW	Per kWh	
Primary Voltage	$0.80	$0.00105	R

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

(Continued on Sheet No. 5-88)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

MUNICIPAL PUMPING SERVICE Section No. 5
RATE CODE A41 32nd Revised Sheet No. 87

AVAILABILITY
Available to municipal owned water works and municipal sewage systems for operation of pumping and treatment plants. (Rate schedule is applied separately to each delivery point.)

RATE

Customer Charge per Month	$25.64	
	Oct-May	Jun-Sep
Service at Secondary Voltage		
Demand Charge per Month per kW	$10.49	$14.79
Energy Charge per kWh	$0.03407	
Energy Charge Credit per Month per kWh		
All kWh in Excess of 400 Hours	$0.01518	
Times the Billing Demand		

	January - December	
Voltage Discounts per Month	Per kW	Per kWh
Primary Voltage	$0.80	$0.00105

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the “Interim Rate Surcharge Rider” to service provided beginning January 1, 2022. N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

(Continued on Sheet No. 5-88)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

MUNICIPAL PUMPING SERVICE (Continued) Section No. 5
RATE CODE A41 8th Revised Sheet No. 88

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

The following are terms and conditions for service under this tariff.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

DETERMINATION OF DEMAND
The adjusted demand in kW for billing purposes shall be determined by dividing the maximum actual demand in kW by the power factor expressed in percent but not more than a 90% power factor and multiplying the quotient so obtained by 90% and rounding to the nearest whole kW. In no month shall the demand to be billed be considered as less than the current month's adjusted demand in kW nor greater than the value in kW determined by dividing the kWh sales for the billing month by 75 hours per month.

MAXIMUM DEMAND
The maximum actual demand in kW shall be the greatest 15 minute load during the month for which bill is rendered.

POWER FACTOR
For three phase customers with services above 200 amperes, or above 480 volts, the power factor for the month shall be determined by permanently installed metering equipment. For all single phase customers and three phase customers with services 200 amperes or less, a power factor of 90% will be assumed.

MINIMUM DEMAND TO BE BILLED
The monthly minimum billing demand shall not be less than provided above.

TERMS AND CONDITIONS OF SERVICE
Alternating current service is provided at the following nominal voltages:

1. Secondary Voltage: Single or three phase from 208 volts up to but not including 2,400 volts, or
2. Primary Voltage: Three phase from 2,400 volts up to but not including 69,000 volts.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

FIRE AND CIVIL DEFENSE SIREN SERVICE Section No. 5
RATE CODE A42 14th Revised Sheet No. 89

AVAILABILITY
Available for power service for the operation of municipal fire and civil defense warning sirens having a rated capacity not in excess of 25 horsepower.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE
Per Month per Horsepower of Connected Capacity $0.76 R

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

MONTHLY MINIMUM CHARGE
Net per Month $3.66 R

The following are terms and conditions for service under this tariff.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

CONNECTION
Under the above rate, the Company will make no extension for service other than a normal service span. Where conditions are such that a long service connection or extra transformer capacity, or both, are necessary, the customer shall either pay the entire cost of such extra equipment or pay a monthly facilities charge based on such costs.

The circuit serving the siren must be in conduit from the entrance to the motor with an enclosed entrance switch box, which may be sealed and operated from an external appliance.

OPTIONAL
In case the customer already has a service connection of sufficient capacity to permit operation of the siren without unduly disturbing conditions on the Company's nearby circuits, the siren may be connected at the option of the customer on the load side of the customer's existing meter and the commercial rate applied to the total load.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

FIRE AND CIVIL DEFENSE SIREN SERVICE Section No. 5
RATE CODE A42 15th Revised Sheet No. 89

AVAILABILITY
Available for power service for the operation of municipal fire and civil defense warning sirens having a rated capacity not in excess of 25 horsepower.

DETERMINATION OF CUSTOMER BILLS
Customer bills shall reflect energy charges (if applicable) based on customer's kWh usage, plus a customer charge (if applicable), plus demand charges (if applicable) based on customer's kW billing demand as defined below. Bills may be subject to a minimum charge based on the monthly customer charge and / or certain monthly or annual demand charges. Bills also include applicable riders, adjustments, surcharges, voltage discounts, and energy credits. Details regarding the specific charges applicable to this service are listed below.

RATE
Per Month per Horsepower of Connected Capacity $0.76

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

MONTHLY MINIMUM CHARGE
Net per Month $3.66

The following are terms and conditions for service under this tariff.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

CONNECTION
Under the above rate, the Company will make no extension for service other than a normal service span. Where conditions are such that a long service connection or extra transformer capacity, or both, are necessary, the customer shall either pay the entire cost of such extra equipment or pay a monthly facilities charge based on such costs.

The circuit serving the siren must be in conduit from the entrance to the motor with an enclosed entrance switch box, which may be sealed and operated from an external appliance.

OPTIONAL
In case the customer already has a service connection of sufficient capacity to permit operation of the siren without unduly disturbing conditions on the Company's nearby circuits, the siren may be connected at the option of the customer on the load side of the customer's existing meter and the commercial rate applied to the total load.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

EXCESS ENERGY -
ST. ANTHONY FALLS LOCKS AND DAM
RATE CODE A43

Section No. 5
15th Revised Sheet No. 90

CANCELED

(Continued on Sheet No. 90.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

EXCESS ENERGY -
ST. ANTHONY FALLS LOCKS AND DAM (Continued)
RATE CODE A43

Section No. 5
6th Revised Sheet No. 90.1

CANCELED

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

FUEL CLAUSE RIDER

Section No. 5
30th Revised Sheet No. 91

FUEL CLAUSE CHARGE

There shall be added to or deducted from the monthly bill a Fuel Cost Charge calculated by multiplying the applicable monthly billing kilowatt hours (kWh) by the billed Fuel Adjustment Factor (FAF) per kWh. The billed FAF is calculated by prorating each calendar month FAF by the number of customer billing days in each calendar month, and rounding to the nearest $0.00001 per kWh.

EXEMPTION

For customers participating in Company's Renewable*Connect and Renewable*Connect Government pilot programs, or the Windsource® Program under the Voluntary Renewable and High-Efficiency Energy Purchase Rider, the applicable billing kWh subject to the FAF shall be reduced by the elected Voluntary Renewable Adjustment energy blocks. In the event that a customer's metered energy use is lower than the subscribed energy blocks, the applicable billing kWh for the FAF for that month is zero.

For customer premises recognized by the Company as not being subject to any of the costs of satisfying the solar energy standard under Minn. Stat. § 216B.1691, subd. 2f ("SES Costs"), the SES Costs reflected in the Fuel Clause Charge assessed to the accounts associated with these premises may be credited to these accounts, and the dollar amount of these credits shall be added back into the Current Period Cost of Energy applicable to the time period when the credit is issued.

FUEL ADJUSTMENT FACTOR (FAF)

A separate FAF will be determined for each service category defined by customer class and time-of-day (TOD) period within the Commercial and Industrial – Demand class. The FAF for each service category is the sum of the Current Period Cost of Energy multiplied by the applicable FAF Ratio, and the applicable Energy Cost True-up Factor. The FAF Ratio is the Class Cost Ratio multiplied by the corresponding TOD Ratio:

Service Category	Class Cost Ratio	TOD Ratio	FAF Ratio
Residential	1.0177	1.0000	1.0177
C&I Non-Demand	1.0305	1.0000	1.0305
C&I Demand	0.9930	1.0054	0.9984
C&I Demand TOD On-Peak	0.9930	1.2574	1.2486
C&I Demand TOD Off-Peak	0.9930	0.8224	0.8166
Outdoor Lighting	0.7976	1.0000	0.7976

D

(Continued on Sheet No. 5-91.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

FUEL CLAUSE RIDER (Continued)

Section No. 5
18th Revised Sheet No. 91.1

FUEL COST FACTORS (2021)

N

Month	Residential	Commercial & Industrial				Outdoor Lighting
		Non-Demand	Demand			
			Non-TOD	On-Peak	Off-Peak	
January	$0.02315	$0.02344	$0.02271	$0.02839	$0.01859	$0.01816
February	$0.02613	$0.02646	$0.02564	$0.03206	$0.02097	$0.02048
March	$0.02716	$0.02750	$0.02665	$0.03332	$0.02180	$0.02129
April	$0.02854	$0.02890	$0.02800	$0.03500	$0.02292	$0.02239
May	$0.03236	$0.03277	$0.03175	$0.03970	$0.02597	$0.02537
June	$0.03617	$0.03663	$0.03548	$0.04438	$0.02902	$0.02834
July	$0.03086	$0.03125	$0.03027	$0.03786	$0.02476	$0.02418
August	$0.03012	$0.03049	$0.02954	$0.03696	$0.02416	$0.02359
September	$0.02890	$0.02927	$0.02836	$0.03546	$0.02320	$0.02266
October	$0.02743	$0.02777	$0.02691	$0.03364	$0.02201	$0.02150
November	$0.02474	$0.02505	$0.02427	$0.03035	$0.01985	$0.01938
December	$0.02310	$0.02339	$0.02266	$0.02834	$0.01854	$0.01811

N

CURRENT PERIOD COST OF ENERGY

The Current Period Cost of Energy per kWh is defined as the qualifying costs, forecasted to be incurred during the calendar month, divided by the kWh sales forecasted for the same month. Qualifying kWh sales are all kWh sales excluding intersystem, Renewable*Connect, Renewable*Connect Government and Windsource® Program kWh sales. Qualifying costs are the sum of the following:

1. The cost of fuels consumed in the Company's generating stations as recorded in Federal Energy Regulatory Commission (FERC) Accounts 151 and 518.

2. The cost of energy purchases as recorded in FERC Account 555, exclusive of capacity or demand charges, irrespective of the designation assigned to such transaction, when such energy is purchased on an economic dispatch basis.

3. All Midwest ISO (MISO) costs and revenues authorized by the Commission to flow through this Fuel Clause Rider and excluding MISO costs and revenues that are recoverable in base rates, as prescribed in applicable Commission Orders.

4. All fuel and purchased energy expenses incurred by the Company over the duration of any Commission-approved contract, as provided for by Minnesota Statutes, Section 216B.1645, except any such expenses recovered in base rates or other riders.

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(Continued on Sheet No. 5-91.2)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

FUEL CLAUSE RIDER (Continued)

Section No. 5
19th Revised Sheet No. 91.1

FUEL COST FACTORS (2021)

Month	Residential	Commercial & Industrial				Outdoor Lighting
		Non-Demand	Demand			
			Non-TOD	On-Peak	Off-Peak	
January	$0.02315	$0.02344	$0.02271	$0.02839	$0.01859	$0.01816
February	$0.02613	$0.02646	$0.02564	$0.03206	$0.02097	$0.02048
March	$0.02716	$0.02750	$0.02665	$0.03332	$0.02180	$0.02129
April	$0.02854	$0.02890	$0.02800	$0.03500	$0.02292	$0.02239
May	$0.03236	$0.03277	$0.03175	$0.03970	$0.02597	$0.02537
June	$0.03617	$0.03663	$0.03548	$0.04438	$0.02902	$0.02834
July	$0.03086	$0.03125	$0.03027	$0.03786	$0.02476	$0.02418
August	$0.03012	$0.03049	$0.02954	$0.03696	$0.02416	$0.02359
September	$0.03067	$0.03106	$0.03010	$0.03763	$0.02462	$0.02405
October	$0.02743	$0.02777	$0.02691	$0.03364	$0.02201	$0.02150
November	$0.02474	$0.02505	$0.02427	$0.03035	$0.01985	$0.01938
December	$0.02310	$0.02339	$0.02266	$0.02834	$0.01854	$0.01811

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CURRENT PERIOD COST OF ENERGY

The Current Period Cost of Energy per kWh is defined as the qualifying costs, forecasted to be incurred during the calendar month, divided by the kWh sales forecasted for the same month. Qualifying kWh sales are all kWh sales excluding intersystem, Renewable*Connect, Renewable*Connect Government and Windsource® Program kWh sales. Qualifying costs are the sum of the following:

1. The cost of fuels consumed in the Company's generating stations as recorded in Federal Energy Regulatory Commission (FERC) Accounts 151 and 518.

2. The cost of energy purchases as recorded in FERC Account 555, exclusive of capacity or demand charges, irrespective of the designation assigned to such transaction, when such energy is purchased on an economic dispatch basis.

3. All Midwest ISO (MISO) costs and revenues authorized by the Commission to flow through this Fuel Clause Rider and excluding MISO costs and revenues that are recoverable in base rates, as prescribed in applicable Commission Orders.

4. All fuel and purchased energy expenses incurred by the Company over the duration of any Commission-approved contract, as provided for by Minnesota Statutes, Section 216B.1645, except any such expenses recovered in base rates or other riders.

(Continued on Sheet No. 5-91.2)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

FUEL CLAUSE RIDER (Continued)

Section No. 5
20th Revised Sheet No. 91.1

FUEL COST FACTORS (2021)

Month	Residential	Commercial & Industrial				Outdoor Lighting	
		Non-Demand	Demand				
			Non-TOD	On-Peak	Off-Peak		
January	$0.02315	$0.02344	$0.02271	$0.02839	$0.01859	$0.01816	
February	$0.02613	$0.02646	$0.02564	$0.03206	$0.02097	$0.02048	
March	$0.02716	$0.02750	$0.02665	$0.03332	$0.02180	$0.02129	
April	$0.02854	$0.02890	$0.02800	$0.03500	$0.02292	$0.02239	
May	$0.03236	$0.03277	$0.03175	$0.03970	$0.02597	$0.02537	
June	$0.03617	$0.03663	$0.03548	$0.04438	$0.02902	$0.02834	
July	$0.03086	$0.03125	$0.03027	$0.03786	$0.02476	$0.02418	
August	$0.03012	$0.03049	$0.02954	$0.03696	$0.02416	$0.02359	
September	$0.03067	$0.03106	$0.03010	$0.03763	$0.02462	$0.02405	
October	$0.03130	$0.03169	$0.03070	$0.03838	$0.02511	$0.02453	R
November	$0.02869	$0.02905	$0.02814	$0.03519	$0.02302	$0.02247	R
December	$0.02672	$0.02706	$0.02621	$0.03279	$0.02145	$0.02095	R

CURRENT PERIOD COST OF ENERGY

The Current Period Cost of Energy per kWh is defined as the qualifying costs, forecasted to be incurred during the calendar month, divided by the kWh sales forecasted for the same month. Qualifying kWh sales are all kWh sales excluding intersystem, Renewable*Connect, Renewable*Connect Government and Windsource® Program kWh sales. Qualifying costs are the sum of the following:

1. The cost of fuels consumed in the Company's generating stations as recorded in Federal Energy Regulatory Commission (FERC) Accounts 151 and 518.

2. The cost of energy purchases as recorded in FERC Account 555, exclusive of capacity or demand charges, irrespective of the designation assigned to such transaction, when such energy is purchased on an economic dispatch basis.

3. All Midwest ISO (MISO) costs and revenues authorized by the Commission to flow through this Fuel Clause Rider and excluding MISO costs and revenues that are recoverable in base rates, as prescribed in applicable Commission Orders.

4. All fuel and purchased energy expenses incurred by the Company over the duration of any Commission-approved contract, as provided for by Minnesota Statutes, Section 216B.1645, except any such expenses recovered in base rates or other riders.

(Continued on Sheet No. 5-91.2)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

FUEL CLAUSE RIDER (Continued)

Section No. 5
21st Revised Sheet No. 91.1

FUEL COST FACTORS (2022)

Month	Residential	Commercial & Industrial				Outdoor Lighting	
		Non-Demand	Demand				
			Non-TOD	On-Peak	Off-Peak		
January	$0.02597	$0.02630	$0.02548	$0.03184	$0.02086	$0.02038	R
February	$0.03066	$0.03104	$0.03008	$0.03761	$0.02460	$0.02403	R
March	$0.03268	$0.03309	$0.03206	$0.04009	$0.02623	$0.02562	R
April	$0.03256	$0.03297	$0.03194	$0.03992	$0.02614	$0.02554	R
May	$0.03453	$0.03496	$0.03387	$0.04234	$0.02772	$0.02708	R
June	$0.03979	$0.04029	$0.03903	$0.04880	$0.03194	$0.03119	R
July	$0.03392	$0.03435	$0.03328	$0.04161	$0.02722	$0.02658	R
August	$0.03386	$0.03428	$0.03321	$0.04154	$0.02716	$0.02653	R
September	$0.03328	$0.03369	$0.03265	$0.04081	$0.02671	$0.02609	R
October	$0.03116	$0.03155	$0.03057	$0.03822	$0.02501	$0.02443	R
November	$0.02891	$0.02927	$0.02836	$0.03546	$0.02320	$0.02266	R
December	$0.02662	$0.02696	$0.02612	$0.03265	$0.02138	$0.02088	R

CURRENT PERIOD COST OF ENERGY

The Current Period Cost of Energy per kWh is defined as the qualifying costs, forecasted to be incurred during the calendar month, divided by the kWh sales forecasted for the same month. Qualifying kWh sales are all kWh sales excluding intersystem, Renewable*Connect, Renewable*Connect Government and Windsource® Program kWh sales. Qualifying costs are the sum of the following:

1. The cost of fuels consumed in the Company's generating stations as recorded in Federal Energy Regulatory Commission (FERC) Accounts 151 and 518.

2. The cost of energy purchases as recorded in FERC Account 555, exclusive of capacity or demand charges, irrespective of the designation assigned to such transaction, when such energy is purchased on an economic dispatch basis.

3. All Midwest ISO (MISO) costs and revenues authorized by the Commission to flow through this Fuel Clause Rider and excluding MISO costs and revenues that are recoverable in base rates, as prescribed in applicable Commission Orders.

4. All fuel and purchased energy expenses incurred by the Company over the duration of any Commission-approved contract, as provided for by Minnesota Statutes, Section 216B.1645, except any such expenses recovered in base rates or other riders.

(Continued on Sheet No. 5-91.2)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

FUEL CLAUSE RIDER (Continued)

Section No. 5
12th Revised Sheet No. 91.2

CURRENT PERIOD COST OF ENERGY (Continued)

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5. The energy cost of purchases from a qualifying facility, as that term is defined in 18 C.F.R. Part 292 and Minn. Rule 7835.0100, Subp. 19, as amended, and the net cost of energy (and capacity if purchased on an energy output basis) purchases from any qualifying facility using wind energy conversion systems for the generation of electric energy, whether or not those purchases occur on an economic dispatch basis. Capacity costs associated with such purchased power contracts, which are in excess of 100 kW and commenced after the date of the Commission's final order in Docket No. E002/GR-05-1428, shall be excluded from Fuel Cost Charge recovery.

6. Less the fuel-related costs recovered through intersystem sales.

7. Less purchased power costs for the Renewable*Connect and Renewable*Connect Government pilot programs and for the Windsource® Program as recorded in FERC account 555.

8. Less neutrality charge cost recovery for the Renewable*Connect and Renewable*Connect Government pilot programs.

9. Less asset based margins from intersystem sales of excess generation and ancillary services. Asset based margins are defined as sales revenues less the sum of fuel and energy costs (including costs associated with MISO Day 2 markets that are booked to FERC Account 555) and any additional transmission costs incurred that are required to make such sales.

ENERGY COST TRUE-UP FACTORS

An Energy Cost True-up Factor per kWh is calculated annually for each Class and TOD category by dividing the Energy Cost True-up Amount by the qualifying kWh sales forecasted for the proposed period of up to twelve months the rate will be in effect and then multiplied by the applicable FAF ratio. The application of true-up factors to customers' bills is subject to Commission approval.

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(Continued on Sheet No. 5-91.3)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

FUEL CLAUSE RIDER (Continued)

Section No. 5
18th Revised Sheet No. 91.3

RATE SCHEDULES BY SERVICE CATEGORY

Residential
Residential (A00, A01, A03)
Residential TOD (A02, A04)
Residential TOU Pilot Program (A72, A74)
Energy Controlled (A05)
Limited Off-Peak (A06)
Residential Electric Vehicle (A08)
Electric Vehicle Home Service (A80, A81) C
Residential Electric Vehicle Subscription Pilot (A82, A83)

Commercial and Industrial Non-Demand
Energy Controlled (A05)
Limited Off Peak (A06)
Small General (A09, A10, A11, A13)
Small General TOD (A12, A16, A18, A22)
Small Municipal Pumping (A40)
Fire and Civil Defense Siren (A42)

Commercial and Industrial Demand – Non-TOD
General (A14)
Peak Controlled (A23)
Municipal Pumping (A41)

Commercial and Industrial Demand – TOD
General TOD (A15, A17, A19)
Peak Controlled TOD (A24)
Tier 1 Energy Controlled Rider (A27)
Real Time Pricing (A62, A63)
Light Rail Line (A29)

Outdoor Lighting
Automatic Protective (A07)
Street Lighting System (A30)
Street Lighting Energy (Closed) (A32)
Street Lighting Energy – Metered (A34)
Street Lighting - City of St. Paul (A37)

PROVISION OF FORECAST DATA
To assist commercial and industrial customers in budgeting and managing their energy costs, the Company will annually make available on May 1st a 24-month forecast of the fuel and purchased energy costs applicable to demand billed C&I customers under this Rider. The forecast period begins January 1st of the following year. This forecast will be provided only to customers who have signed a protective agreement with the Company.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

FUEL CLAUSE RIDER (Continued)

Section No. 5
19th Revised Sheet No. 91.3

RATE SCHEDULES BY SERVICE CATEGORY

Residential
Residential (A00, A01, A03)
Residential TOD (A02, A04)
Residential TOU Pilot Program (A72, A74)
Energy Controlled (A05)
Limited Off-Peak (A06)
Residential Electric Vehicle (A08)
Residential Electric Vehicle Pilot (A80, A81)
Residential Electric Vehicle Subscription Pilot (A82, A83)

Commercial and Industrial Non-Demand
Energy Controlled (A05)
Limited Off Peak (A06)
Small General (A09, A10, A11, A13)
Small General TOD (A12, A16, A18, A22)
Small Municipal Pumping (A40)
Fire and Civil Defense Siren (A42)
Multi-Dwelling Unit Electric Vehicle Service Pilot (A91, A92, A93)

Commercial and Industrial Demand – Non-TOD
General (A14)
Peak Controlled (A23)
Municipal Pumping (A41)

Commercial and Industrial Demand – TOD
General TOD (A15, A17, A19)
Peak Controlled TOD (A24)
Tier 1 Energy Controlled Rider (A27)
Real Time Pricing (A62, A63)
Light Rail Line (A29)

Outdoor Lighting T

Automatic Protective (A07)
Street Lighting System (A30)
Street Lighting Energy (Closed) (A32)
Street Lighting Energy – Metered (A34)
Street Lighting - City of St. Paul (A37)

PROVISION OF FORECAST DATA
To assist commercial and industrial customers in budgeting and managing their energy costs, the Company will annually make available on May 1st a 24-month forecast of the fuel and purchased energy costs applicable to demand billed C&I customers under this Rider. The forecast period begins January 1st of the following year. This forecast will be provided only to customers who have signed a protective agreement with the Company.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

CONSERVATION IMPROVEMENT PROGRAM ADJUSTMENT RIDER

Section No. 5
21st Revised Sheet No. 92

APPLICABILITY
Applicable to bills for electric service provided under the Company's retail rate schedules. Exemptions are as follows:

"Large Customer Facility" customers that have been exempted from the Company's Conservation Improvement Program charges pursuant to Minn. Stat. 216B.241 subd. 1a (b) shall receive a monthly exemption from conservation improvement program charges pursuant to Minn. Stat. 216B.16, subd. 6b Energy Conservation Improvement. Such monthly exemption will be effective beginning January 1 of the year following the grant of exemption. Upon exemption from conservation program charges, the "Large Customer Facility" customers can no longer participate in the Company's Energy Conservation Improvement Program.

RIDER
There shall be included on each non-exempt customer's monthly bill a Conservation Improvement Program (CIP) Adjustment, which shall be calculated by multiplying the monthly applicable billing kilowatt hours (kWh) by the CIP Adjustment Factor.

DETERMINATION OF CONSERVATION IMPROVEMENT PROGRAM ADJUSTMENT FACTOR
The CIP Adjustment Factor shall be calculated for each customer class by dividing the Recoverable Conservation Improvement Program Expense by the Projected Retail Sales for a designated recovery period. The factor may be adjusted annually with approval of the Minnesota Public Utilities Commission. The CIP Adjustment Factor for all rate schedules is:

All Classes	$0.001848 per kWh	R

Recoverable Conservation Improvement Program Expense shall be the CIP expense not recovered through base rates as determined from the CIP Tracker account balance for a designated period. All costs appropriately charged to the CIP Tracker Account shall be eligible for recovery through this Rider. All revenues received from the CIP Adjustment Factor shall be credited to the CIP Tracker Account.

Projected Retail Sales shall be the estimated kilowatt-hour sales to all non-exempt customers for the designated recovery period.

(Continued on Sheet No. 5-92.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

CONSERVATION IMPROVEMENT PROGRAM ADJUSTMENT RIDER

Section No. 5
22nd Revised Sheet No. 92

APPLICABILITY
Applicable to bills for electric service provided under the Company's retail rate schedules. Exemptions are as follows:

"Large Customer Facility" customers that have been exempted from the Company's Conservation Improvement Program charges pursuant to Minn. Stat. 216B.241 subd. 1a (b) shall receive a monthly exemption from conservation improvement program charges pursuant to Minn. Stat. 216B.16, subd. 6b Energy Conservation Improvement. Such monthly exemption will be effective beginning January 1 of the year following the grant of exemption. Upon exemption from conservation program charges, the "Large Customer Facility" customers can no longer participate in the Company's Energy Conservation Improvement Program.

RIDER
There shall be included on each non-exempt customer's monthly bill a Conservation Improvement Program (CIP) Adjustment, which shall be calculated by multiplying the monthly applicable billing kilowatt hours (kWh) by the CIP Adjustment Factor.

DETERMINATION OF CONSERVATION IMPROVEMENT PROGRAM ADJUSTMENT FACTOR
The CIP Adjustment Factor shall be calculated for each customer class by dividing the Recoverable Conservation Improvement Program Expense by the Projected Retail Sales for a designated recovery period. The factor may be adjusted annually with approval of the Minnesota Public Utilities Commission. The CIP Adjustment Factor for all rate schedules is:

All Classes	$0.003521 per kWh	R

Recoverable Conservation Improvement Program Expense shall be the CIP expense not recovered through base rates as determined from the CIP Tracker account balance for a designated period. All costs appropriately charged to the CIP Tracker Account shall be eligible for recovery through this Rider. All revenues received from the CIP Adjustment Factor shall be credited to the CIP Tracker Account.

Projected Retail Sales shall be the estimated kilowatt-hour sales to all non-exempt customers for the designated recovery period.

(Continued on Sheet No. 5-92.1)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

CONSERVATION IMPROVEMENT PROGRAM Section No. 5
ADJUSTMENT RIDER (Continued) 7th Revised Sheet No. 92.1

DETERMINATION OF CONSERVATION COST RECOVERY CHARGE (CCRC)
The CCRC is the amount included in base rates dedicated to the recovery of CIP costs as approved by the Minnesota Public Utilities Commission (or successor agency) in the Company's last general rate case. The CCRC is approved and applied on a per kWh basis by dividing the test-year CIP expenses by the test-year sales volumes (net of CIP-exempt volumes). All revenues received from the CCRC shall be credited to the CIP Tracker Account. The CCRC for all rate schedules is:

All Classes	$0.003133 per kWh

DETERMINATION OF CCRC EXEMPTION ADJUSTMENT FACTOR
For "Large Customer Facilities", as defined in Minn. Stat. 216B.241 subd. 1, granted exemption by the Commissioner of the Minnesota Department of Commerce, Division of Energy Resources, pursuant to Minn. Stat. 216B.241, the CIP Adjustment Factor shall not apply and monthly bills will include a CCRC Exemption Adjustment credit determined by multiplying total billing kWh by the applicable CCRC Exemption Adjustment Factor. Customers' accounts granted exemption by a decision of the Commissioner after the beginning of a calendar year shall be credited for any CIP collections billed after January 1st of the year following the Commissioner's decision. The CCRC Exemption Adjustment Factor for all rate classes is:

All Classes	$0.003133 per kWh

PROVISION OF FORECAST DATA
To assist commercial and industrial customers in budgeting and managing their energy costs, the Company will annually make available on April 1st a 24-month forecast of the CIP Adjustment Factor applicable to demand billed C&I customers under this Rider. The forecast period begins January 1st of the following year.

EXEMPTION
For customer premises recognized by the Company as not being subject to any of the costs of satisfying the solar energy standard under Minn. Stat. § 216B.1691, subd. 2f ("SES Costs"), the SES Costs reflected in the CIP Adjustment assessed to the accounts associated with these premises may be credited to these accounts, and the dollar amount of these credits shall be added as part of the Recoverable Conservation Improvement Program Expense applicable to the time period when the credit is issued. N N

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

SURCHARGE RIDER

Section No. 5
8th Revised Sheet No. 93

A surcharge will be included in the monthly customer bills in Minnesota communities in an amount equal to any franchise gross earnings or other fee, permit or usage fee, excise, city sales or other charge or tax now or hereafter imposed upon Company by a community, whether by ordinance, franchise or otherwise, applicable to electric service supplied by Company to a customer.

The Company remits 100% of these fees collected from ratepayers to the local government unit.*

The Company will notify the Minnesota Public Utilities Commission of any new, renewed, expired, or changed fee, authorized by Minn. Stat. § 216B.36 to raise revenue, at least 60 days prior to its implementation. If the Company receives less than 60 days' notice of a repealed or reduced fee from a city, the Company will notify the Minnesota Public Utilities Commission within 10 business days of receiving notice. Notification to the Minnesota Public Utilities Commission will include a copy of the relevant franchise fee ordinance, or other operative document authorizing imposition of, or change in, the fee.

Affected customers will be notified on the first bill on which a new or modified fee is listed via the standard bill message below:

> *[The municipality] imposes a [X% of gross revenues/$X per meter/$X per kWh/$X per therm] fee on Xcel Energy collectable through a fee on Xcel Energy [electric/gas] accounts effective [effective date]. The line item appears on your bill as "City Fees." Xcel Energy remits 100% of this fee to [the municipality].*

*The amount collected for Baker is applied to the community's street lighting bill.

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MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES

Section No. 5
27th Revised Sheet No. 93.1

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local government unit.
— Indicates fee is not applied

Franchise Fees									
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date
Afton	$2.00	$2.00	$5.00	$5.00	$1.00	$1.00	$1.00	01/2005	08/16/2024
Albertville	$2.50	$5.00	$10.00	$50.00	$2.00	—	—	03/2011	09/07/2029
Bayport	$1.50	$3.00	$25.00	$50.00	$3.00	$3.00	$25.00	01/2014	05/04/2028
Big Lake	$4.00	$8.00	$8.00	$8.00	—	—	—	10/2014	07/04/2034
Bloomington	$3.75	$7.50	$40.00	$115.00	—	—	—	04/2016	12/20/2035
Brooklyn Center	$1.65	$4.25	$22.75	$103.00	$13.50	$13.50	$13.50	01/2020	12/08/2023
Brooklyn Park	$7.00	$7.50	$45.00	$160.00	—	—	—	03/2016	12/31/2028
Burnsville	$4.00	$12.00	$40.00	$180.00	—	—	—	09/2020	02/15/2036 R
Centerville	$4.00	$8.00	$8.00	$8.00	—	—	—	05/2016	01/26/2036
Champlin	$3.62	$9.80	$41.21	$144.24	$17.51	$17.51	$17.51	01/2020	11/23/2028
Chanhassen	$5.00	$14.00	$40.00	$290.00	—	—	—	02/2020	10/27/2039
Chisago City	$1.30	$5.00	$15.00	$55.00	$5.00	$5.00	$15.00	06/2009	02/28/2029
Circle Pines	$2.75	$3.00	$35.00	—	$3.00	—	—	10/2009	08/24/2029
Clara City	$2.00	$2.00	$15.00	$68.00	$2.00	$2.00	$15.00	01/2014	10/07/2033
Clements	$1.00	$1.00	$1.00	$1.00	—	—	—	07/2012	06/09/2024
Coon Rapids[1]	4.0%	4.0%	4.0%	4.0%	—	—	—	04/2018	01/13/2032
Cottage Grove	$1.65	$1.65	$8.25	$33.00	$3.30	$0.75	$8.25	03/2016	11/04/2023

[1] Coon Rapids: The franchise fee excludes rate schedules for highway lighting, municipal street lighting, municipal water pumping, municipal fire sirens, and municipal sewage disposal service. For all consumers, the four percent franchise fee is applicable to the first $950,000 of calendar year gross operating revenues. The franchise fee is reduced to one half percent (0.5%) for the remaining amount of annual gross operating revenues exceeding $950,000.

(Continued on Sheet No. 5-93.1a)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES

Section No. 5
28th Revised Sheet No. 93.1

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local government unit.
— Indicates fee is not applied

Franchise Fees										
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date	
Afton	$2.00	$2.00	$5.00	$5.00	$1.00	$1.00	$1.00	01/2005	08/16/2024	
Albertville	$2.50	$5.00	$10.00	$50.00	$2.00	—	—	03/2011	09/07/2029	
Bayport	$1.50	$3.00	$25.00	$50.00	$3.00	$3.00	$25.00	01/2014	05/04/2028	
Big Lake	$4.00	$8.00	$8.00	$8.00	—	—	—	10/2014	07/04/2034	
Bloomington	$4.60	$9.20	$49.00	$141.00	—	—	—	01/2022	12/20/2035	R
Brooklyn Center	$1.65	$4.25	$22.75	$103.00	$13.50	$13.50	$13.50	01/2020	12/08/2023	
Brooklyn Park	$7.00	$7.50	$45.00	$160.00	—	—	—	03/2016	12/31/2028	
Burnsville	$4.00	$12.00	$40.00	$180.00	—	—	—	09/2020	02/15/2036	
Centerville	$4.00	$8.00	$8.00	$8.00	—	—	—	05/2016	01/26/2036	
Champlin	$3.62	$9.80	$41.21	$144.24	$17.51	$17.51	$17.51	01/2020	11/23/2028	
Chanhassen	$5.00	$14.00	$40.00	$290.00	—	—	—	02/2020	10/27/2039	
Chisago City	$1.30	$5.00	$15.00	$55.00	$5.00	$5.00	$15.00	06/2009	02/28/2029	
Circle Pines	$2.75	$3.00	$35.00	—	$3.00	—	—	10/2009	08/24/2029	
Clara City	$2.00	$2.00	$15.00	$68.00	$2.00	$2.00	$15.00	01/2014	10/07/2033	
Clements	$1.00	$1.00	$1.00	$1.00	—	—	—	07/2012	06/09/2024	
Coon Rapids[1]	4.0%	4.0%	4.0%	4.0%	—	—	—	04/2018	01/13/2032	
Cottage Grove	$1.65	$1.65	$8.25	$33.00	$3.30	$0.75	$8.25	03/2016	11/04/2023	

[1] Coon Rapids: The franchise fee excludes rate schedules for highway lighting, municipal street lighting, municipal water pumping, municipal fire sirens, and municipal sewage disposal service. For all consumers, the four percent franchise fee is applicable to the first $950,000 of calendar year gross operating revenues. The franchise fee is reduced to one half percent (0.5%) for the remaining amount of annual gross operating revenues exceeding $950,000.

(Continued on Sheet No. 5-93.1a)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES

Section No. 5
11th Revised Sheet No. 93.1a

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local government unit.
— Indicates fee is not applied

Franchise Fees										
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date	
Dayton	$4.00	$12.00	$45.00	$200.00	$16.00	$16.00	$16.00	01/2020	09/09/2039	
Deephaven	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	04/2002	11/02/2030	
Dilworth	$2.60	$6.00	$21.00	$136.50	—	$6.00	$21.00	05/2018	02/25/2038	
Eagle Lake	$0.50	$0.50	$0.50	$0.50	—	—	—	10/2012	05/06/2032	
Eden Prairie	$4.00	$5.00	$12.50	$55.00	—	—	—	04/2018	06/18/2032	
Edina	$2.90	$4.90	$13.68	$58.32	—	—	—	07/2019	11/03/2035	
Excelsior	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	11/2012	08/02/2032	
Falcon Heights	$2.25	$3.50	$22.00	$200.00	$2.00	—	—	10/2018	06/12/2038	
Faribault[1]	$1.63	$1.94	$38.72	$338.80	—	—	—	01/2020	11/08/2024	
Forest Lake	$4.00	$2.50	$18.50	$75.00	$7.50	$2.50	$18.50	05/2013	01/27/2033	
Glyndon	$1.25	$1.00	$8.00	$35.00	$5.00	$0.50	$1.75	05/2020	01/21/2040	N
Golden Valley	$6.00	$6.00	$30.00	$258.00	—	—	—	04/2018	12/17/2027	

(Continued on Sheet No. 5-93.2)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES

Section No. 5
12th Revised Sheet No. 93.1a

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local government unit.
— Indicates fee is not applied

Franchise Fees										
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date	
Dayton	$4.00	$12.00	$45.00	$200.00	$16.00	$16.00	$16.00	01/2020	09/09/2039	
Deephaven	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	04/2002	11/02/2030	
Dilworth	$2.60	$6.00	$21.00	$136.50	—	$6.00	$21.00	05/2018	02/25/2038	
Eagle Lake	$0.50	$0.50	$0.50	$0.50	—	—	—	10/2012	05/06/2032	
Eden Prairie	$4.00	$5.00	$12.50	$55.00	—	—	—	04/2018	06/18/2032	
Edina	$2.90	$4.90	$13.68	$58.32	—	—	—	07/2019	11/03/2035	
Excelsior	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	11/2012	08/02/2032	
Falcon Heights	$2.25	$3.50	$22.00	$200.00	$2.00	—	—	10/2018	06/12/2038	
Faribault[1]	$6.63	$21.94	$58.72	$438.80	—	—	—	04/2022	11/08/2024	R
Forest Lake	$4.00	$2.50	$18.50	$75.00	$7.50	$2.50	$18.50	05/2013	01/27/2033	
Glyndon	$1.25	$1.00	$8.00	$35.00	$5.00	$0.50	$1.75	05/2020	01/21/2040	
Golden Valley	$6.00	$6.00	$30.00	$258.00	—	—	—	04/2018	12/17/2027	

(Continued on Sheet No. 5-93.2)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
20th Revised Sheet No. 93.2

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local government unit.
— Indicates fee is not applied

Franchise Fees									
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date
Goodview	$2.75	$3.00	$25.00	$110.00	$25.00	$2.50	$10.00	07/2006	04/30/2026
Grant	$2.35	$2.00	$14.00	$75.00	$2.00	$2.00	$2.00	01/2015	12/01/2023
Hayfield	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	01/2015	04/17/2031
Henderson	$3.00	$3.00	$3.00	$3.00	—	—	—	04/2012	08/16/2031
Hopkins	$3.50	$6.15	$24.70	$170.50	—	—	—	01/2019	12/31/2023
Inver Grove Heights	$2.75	$3.00	$25.00	$95.00	—	—	—	01/2018	06/30/2029
Landfall Village	$2.25	$4.75	$14.00	$65.00	$15.50	—	—	04/2014	12/10/2033
Lexington	$4.00	$6.50	$40.00	$170.00	—	—	—	03/2017	10/05/2031
Lindstrom	$2.50	$5.00	$24.00	$70.00	$7.00	$7.00	$7.00	04/2016	12/17/2028
Little Canada	$2.75	$5.25	$40.00	$230.00	$15.50	$2.00	$3.00	07/2010	08/26/2023
Madison Lake	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	05/2013	02/03/2033
Mahtomedi	$1.30	$1.38	$14.40	$110.28	$12.71	$0.63	$14.84	01/2005	10/18/2024
Mankato	$1.00	$1.55	$16.50	$223.00	$1.00	$0.25	$1.00	02/2015	09/21/2034
Mantorville	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	11/2012	08/12/2032
Maplewood	$3.00	$4.75	$30.00	$180.00	$4.00	$4.00	$4.00	11/2018	09/26/2024

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(Continued on Sheet No. 5-93.3)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
20th Revised Sheet No. 93.3

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local government unit.
— Indicates fee is not applied

Franchise Fees									
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date
Minneapolis	5.0%	5.5% <100 kW	5.5% <100 kW	3.5% ≥100 kW at primary or higher voltage 5.5% ≥100 kW at secondary voltage	5.5%	5.5%	5.5%	03/2018	10/16/2024
Minnetonka	$4.50	$4.50	$13.50	$45.00	—	$4.50	$4.50	01/2019	05/14/2038
Monticello	$1.95	$5.50	$31.00	$190.00	$12.00	$12.00	$31.00	06/2007	05/31/2027
Montrose	$4.00	$8.00	$8.00	$8.00	—	—	—	01/2020	09/09/2032
Mound	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	01/2017	08/11/2023 C
Mounds View	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	01/2019	12/31/2021
New Brighton	$0.0047 per kWh	$0.0043 per kWh	$0.0033 per kWh	$0.0017 per kWh	$0.0054 per kWh	$0.0046 per kWh	$0.0033 per kWh	03/2016	11/25/2022
New Hope	$3.00	$6.00	$26.00	$115.00	—	—	—	01/2017	06/26/2031
New Richland	$1.00	$1.00	$1.00	$1.00	—	—	—	02/2013	07/11/2024
Newport	$1.00	$1.50	$14.00	$70.00	$5.00	$1.00	$10.00	01/2011	10/18/2026
North Branch	$3.50	$3.50	$8.75	$17.50	—	—	—	08/2018	04/09/2038

(Continued on Sheet No. 5-93.4)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
21st Revised Sheet No. 93.3

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local government unit.
— Indicates fee is not applied

Franchise Fees									
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date
Minneapolis	5.0%	5.5% <100 kW	5.5% <100 kW	3.5% ≥100 kW at primary or higher voltage 5.5% ≥100 kW at secondary voltage	5.5%	5.5%	5.5%	03/2018	10/16/2024
Minnetonka	$4.50	$4.50	$13.50	$45.00	—	$4.50	$4.50	01/2019	05/14/2038
Monticello	$1.95	$5.50	$31.00	$190.00	$12.00	$12.00	$31.00	06/2007	05/31/2027
Montrose	$4.00	$8.00	$8.00	$8.00	—	—	—	01/2020	09/09/2032
Mound	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	01/2017	08/11/2023
Mounds View	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	01/2022	12/31/2026 C
New Brighton	$0.0047 per kWh	$0.0043 per kWh	$0.0033 per kWh	$0.0017 per kWh	$0.0054 per kWh	$0.0046 per kWh	$0.0033 per kWh	03/2016	11/25/2022
New Hope	$3.00	$6.00	$26.00	$115.00	—	—	—	01/2017	06/26/2031
New Richland	$1.00	$1.00	$1.00	$1.00	—	—	—	02/2013	07/11/2024
Newport	$1.00	$1.50	$14.00	$70.00	$5.00	$1.00	$10.00	01/2011	10/18/2026
North Branch	$3.50	$3.50	$8.75	$17.50	—	—	—	08/2018	04/09/2038

(Continued on Sheet No. 5-93.4)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
26th Revised Sheet No. 93.4

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local government unit.
— Indicates fee is not applied

Franchise Fees									
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date
North Mankato	$1.00	$1.55	$16.50	$223.00	$17.62	$1.46	$12.30	04/2015	10/05/2034
Northfield	$3.25	$4.00	$32.50	$990.00	—	—	—	03/2021	12/03/2032
Oakdale	$1.50	$3.00	$10.00	$8.00	$6.00	$2.00	$8.00	11/2013	10/27/2023
Osseo	$1.28	$2.07	$17.57	$102.65	$6.20	$0.45	$2.55	03/2012	10/26/2023
Owatonna	$0.0016 per kWh Customer peak demand less than 100 kW in calendar year $0.0014 per kWh Customer peak demand greater than 100 kW in calendar year							01/2003	04/01/2022
Plymouth	$2.29	$3.44	$11.48	$45.90	—	—	—	08/2020	07/09/2027
Prior Lake	$1.50	$5.00	$10.00	$50.00	—	—	—	07/2006	03/19/2026
Richmond	$1.00	$1.00	$1.00	$1.00	—	—	—	05/2013	05/03/2031
Richfield	$4.10	$12.50	$30.00	$185.00	—	—	—	04/2014	03/12/2027
Robbinsdale	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	06/2021	07/01/2023
Rogers	$5.00	$7.00	$45.00	$210.00	$17.00	$12.00	$65.00	01/2016	11/22/2024
Sartell	$4.00	$6.75	$15.00	$109.00	—	—	—	01/2017	09/11/2036
Sauk Rapids	4.0% Customers who purchase $50,000 or less in calendar year 1.5% That part which exceeds $50,000 in calendar year							02/2016	06/15/2023
Shakopee[1]	3.0%	3.0%	3.0%	3.0%	—	—	—	01/2017	08/06/2021
Shoreview	$3.75	$5.00	$36.00	$340.00	—	—	—	01/2021	07/17/2031

C

[1] Shakopee: The fee collected shall total three percent (3%) of the Company's gross revenues from its operations within the City collected from each customer of each class. For customers in the Large C&I class, the three percent franchise fee is applicable to the first $950,000 of calendar year gross revenues. The franchise fee is reduced to one-half percent (0.5%) for the remaining amount of annual gross revenues exceeding $950,000.

(Continued on Sheet No. 5-93.5)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
27th Revised Sheet No. 93.4

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local government unit.
— Indicates fee is not applied

Franchise Fees									
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date
North Mankato	$1.00	$1.55	$16.50	$223.00	$17.62	$1.46	$12.30	04/2015	10/05/2034
Northfield	$3.25	$4.00	$32.50	$990.00	—	—	—	03/2021	12/03/2032
Oakdale	$1.50	$3.00	$10.00	$8.00	$6.00	$2.00	$8.00	11/2013	10/27/2023
Osseo	$1.28	$2.07	$17.57	$102.65	$6.20	$0.45	$2.55	03/2012	10/26/2023
Owatonna	$0.0016 per kWh Customer peak demand less than 100 kW in calendar year $0.0014 per kWh Customer peak demand greater than 100 kW in calendar year							01/2003	04/01/2022
Plymouth	$2.29	$3.44	$11.48	$45.90	—	—	—	08/2020	07/09/2027
Prior Lake	$1.50	$5.00	$10.00	$50.00	—	—	—	07/2006	03/19/2026
Richmond	$1.00	$1.00	$1.00	$1.00	—	—	—	05/2013	05/03/2031
Richfield	$4.10	$12.50	$30.00	$185.00	—	—	—	04/2014	03/12/2027
Robbinsdale	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	06/2021	07/01/2023
Rogers	$5.00	$7.00	$45.00	$210.00	$17.00	$12.00	$65.00	01/2016	11/22/2024
Sartell	$4.00	$6.75	$15.00	$109.00	—	—	—	01/2017	09/11/2036
Sauk Rapids	4.0% Customers who purchase $50,000 or less in calendar year 1.5% That part which exceeds $50,000 in calendar year							02/2016	06/15/2023
Shakopee[1]	3.0%	3.0%	3.0%	3.0%	—	—	—	01/2017	12/31/2021
Shoreview	$3.75	$5.00	$36.00	$340.00	—	—	—	01/2021	07/17/2031

C

[1] Shakopee: The fee collected shall total three percent (3%) of the Company's gross revenues from its operations within the City collected from each customer of each class. For customers in the Large C&I class, the three percent franchise fee is applicable to the first $950,000 of calendar year gross revenues. The franchise fee is reduced to one-half percent (0.5%) for the remaining amount of annual gross revenues exceeding $950,000.

(Continued on Sheet No. 5-93.5)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
28th Revised Sheet No. 93.4

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local government unit.
— Indicates fee is not applied

Franchise Fees										
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date	
North Mankato	$1.00	$1.55	$16.50	$223.00	$17.62	$1.46	$12.30	04/2015	10/05/2034	
Northfield	$3.25	$4.00	$32.50	$990.00	—	—	—	03/2021	12/03/2032	
Oakdale	$1.50	$3.00	$10.00	$8.00	$6.00	$2.00	$8.00	11/2013	10/27/2023	
Osseo	$1.28	$2.07	$17.57	$102.65	$6.20	$0.45	$2.55	03/2012	10/26/2023	
Owatonna	$0.0016 per kWh Customer peak demand less than 100 kW in calendar year $0.0014 per kWh Customer peak demand greater than 100 kW in calendar year							01/2003	04/01/2022	
Plymouth	$2.29	$3.44	$11.48	$45.90	—	—	—	08/2020	07/09/2027	
Prior Lake	$5.00	$15.00	$30.00	$150.00	—	—	—	01/2022	03/19/2026	R
Richmond	$1.00	$1.00	$1.00	$1.00	—	—	—	05/2013	05/03/2031	
Richfield	$4.10	$12.50	$30.00	$185.00	—	—	—	04/2014	03/12/2027	
Robbinsdale	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	06/2021	07/01/2023	
Rogers	$5.00	$7.00	$45.00	$210.00	$17.00	$12.00	$65.00	01/2016	11/22/2024	
Sartell	$4.00	$6.75	$15.00	$109.00	—	—	—	01/2017	09/11/2036	
Sauk Rapids	4.0% Customers who purchase $50,000 or less in calendar year 1.5% That part which exceeds $50,000 in calendar year							02/2016	06/15/2023	
Shakopee[1]	3.0%	3.0%	3.0%	3.0%	—	—	—	01/2022	08/03/2041	C
Shoreview	$3.75	$5.00	$36.00	$340.00	—	—	—	01/2021	07/17/2031	

[1] Shakopee: The fee collected shall total three percent (3%) of the Company's gross revenues from its operations within the City collected from each customer of each class. For customers in the Large C&I class, the three percent franchise fee is applicable to the first $950,000 of calendar year gross revenues. The franchise fee is reduced to one-half percent (0.5%) for the remaining amount of annual gross revenues exceeding $950,000.

(Continued on Sheet No. 5-93.5)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
29th Revised Sheet No. 93.4

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local government unit.
— Indicates fee is not applied

Franchise Fees									
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date
North Mankato	$1.00	$1.55	$16.50	$223.00	$17.62	$1.46	$12.30	04/2015	10/05/2034
Northfield	$3.25	$4.00	$32.50	$990.00	—	—	—	03/2021	12/03/2032
Oakdale	$1.50	$3.00	$10.00	$8.00	$6.00	$2.00	$8.00	11/2013	10/27/2023
Osseo	$1.28	$2.07	$17.57	$102.65	$6.20	$0.45	$2.55	03/2012	10/26/2023
Owatonna	$0.0016 per kWh Customer peak demand less than 100 kW in calendar year $0.0014 per kWh Customer peak demand greater than 100 kW in calendar year							01/2003	12/31/2022
Plymouth	$2.40	$3.61	$12.05	$48.20	—	—	—	04/2022	07/09/2027
Prior Lake	$5.00	$15.00	$30.00	$150.00	—	—	—	01/2022	03/19/2026
Richmond	$1.00	$1.00	$1.00	$1.00	—	—	—	05/2013	05/03/2031
Richfield	$4.10	$12.50	$30.00	$185.00	—	—	—	04/2014	03/12/2027
Robbinsdale	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	06/2021	07/01/2023
Rogers	$5.00	$7.00	$45.00	$210.00	$17.00	$12.00	$65.00	01/2016	11/22/2024
Sartell	$4.00	$6.75	$15.00	$109.00	—	—	—	01/2017	09/11/2036
Sauk Rapids	4.0% Customers who purchase $50,000 or less in calendar year 1.5% That part which exceeds $50,000 in calendar year							02/2016	06/15/2023
Shakopee[1]	3.0%	3.0%	3.0%	3.0%	—	—	—	01/2022	08/03/2041
Shoreview	$3.75	$5.00	$36.00	$340.00	—	—	—	01/2021	07/17/2031

C
R

[1] Shakopee: The fee collected shall total three percent (3%) of the Company's gross revenues from its operations within the City collected from each customer of each class. For customers in the Large C&I class, the three percent franchise fee is applicable to the first $950,000 of calendar year gross revenues. The franchise fee is reduced to one-half percent (0.5%) for the remaining amount of annual gross revenues exceeding $950,000.

(Continued on Sheet No. 5-93.5)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)
Section No. 5
19th Revised Sheet No. 93.5

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local government unit.
— Indicates fee is not applied

Franchise Fees									
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date
Shorewood	$4.00	$8.00	$10.00	$25.00	—	—	—	10/2018	06/24/2038
South St. Paul[1]	5.0%	5.0%	5.0%	5.0%	—	—	—	04/2018	04/05/2030
Spicer	$1.00	$1.00	$8.00	$8.00	—	—	—	02/2013	10/01/2032
Spring Lake Park	$0.80	$1.20	$8.50	$50.00	—	—	—	04/2015	01/04/2035
St. Cloud[2]	4.0%	4.0%	4.0%	4.0%	—	—	—	12/2017	12/31/2024
St. Joseph	$1.00	$1.75	$10.00	2% purchase ≤$100,000 in calendar year 1.5% that part >$100,000 in calendar year	$8.00	$1.00	$10.00	02/2004	11/19/2023
St. Louis Park	$6.75	$12.00	$48.50	$148.50	—	$12.00	$48.50	06/2021	09/18/2036
St. Michael	$3.50	$2.50	$2.50	$10.00	$10.00	$2.50	$10.00	05/2011	11/24/2023
St. Paul[3]	See fee schedule in the Notes section on the following sheets.							11/2006	08/31/2026
St. Paul Park	$1.50	$2.00	$25.00	$335.00	$10.00	$1.00	$5.00	08/2005	05/15/2025
Stillwater	$2.00	$2.50	$18.00	$125.00	$4.00	$2.00	$18.00	06/2015	02/16/2035

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[1] South St. Paul: The franchise fee excludes rate schedules for highway lighting, municipal street lighting, municipal water pumping, municipal traffic signals, municipal fire sirens, and municipal sewage disposal service.

[2] St. Cloud: The franchise fee for residential heating customers will be 1.5% during the months of November – April.

[3] St. Paul: The monthly franchise fee will be as stated on the following sheets. The residential service franchise fee will be as stated except during the months of November - April when there will be no fee. The fee shall not exceed $620,000 during any calendar year from any large commercial and industrial customer qualifying for service on the Competitive Market Rider. The schedule on the following sheets show the meter, energy, and demand factor for each year of the St. Paul franchise and for each of the customer classifications.

(Continued on Sheet No. 5-93.6)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
4th Revised Sheet No. 93.6

Notes:
[3] St. Paul (continued)

Customer Class	Meter Factor - Monthly Charge per Account				
Start Date	1-Nov-2006	1-Nov-2008	1-Nov-2010	1-Nov-2012	1-Nov-2014
End Date	31-Oct-2008	31-Oct-2010	31-Oct-2012	31-Oct-2014	31-Oct-2016
Residential (May - October)	$2.63	$2.70	$2.77	$2.84	$2.91
Small Commercial & Industrial					
Non-Demand	$2.96	$3.09	$3.22	$3.35	$3.48
Firm Secondary	$2.96	$3.09	$3.22	$3.35	$3.48
Firm Primary	$2.96	$3.09	$3.22	$3.35	$3.48
Interruptible Secondary	$2.96	$3.09	$3.22	$3.35	$3.48
Interruptible Primary	$2.96	$3.09	$3.22	$3.35	$3.48
Large Commercial & Industrial					
Special	$5.04	$5.11	$5.18	$5.25	$5.32
Firm Secondary	$5.04	$5.11	$5.18	$5.25	$5.32
Firm Primary	$5.04	$5.11	$5.18	$5.25	$5.32
Firm Trans. Transf.	$5.04	$5.11	$5.18	$5.25	$5.32
Interruptible Secondary	$5.04	$5.11	$5.18	$5.25	$5.32
Interruptible Primary	$5.04	$5.11	$5.18	$5.25	$5.32
Interruptible TT	$5.04	$5.11	$5.18	$5.25	$5.32
Standby Service	None	None	None	None	None
Public Street & Highway Lighting	$6.74	$6.81	$6.88	$6.95	$7.02
Small Municipal Pumping					
Non-Demand	$2.96	$3.09	$3.22	$3.35	$3.48
Demand Secondary	$2.96	$3.09	$3.22	$3.35	$3.48
Demand Primary	$2.96	$3.09	$3.22	$3.35	$3.48
Large Municipal Pumping					
Demand Primary (Sec cust)	$2.96	$3.09	$3.22	$3.35	$3.48
Fire and Civil Defense Siren Service	$2.96	$3.09	$3.22	$3.35	$3.48

(Continued on Sheet No. 5-93.7)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
4th Revised Sheet No. 93.7

Notes:
[3] St. Paul (continued)

Customer Class	Meter Factor - Monthly Charge per Account				
Start Date	1-Nov-2016	1-Nov-2018	1-Nov-2020	1-Nov-2022	1-Nov-2024
End Date	31-Oct-2018	31-Oct-2020	31-Oct-2022	31-Oct-2024	31-Aug-2026
Residential (May - October)	$3.03	$3.15	$3.27	$3.40	$3.54
Small Commercial & Industrial					
Non-Demand	$3.62	$3.76	$3.91	$4.07	$4.23
Firm Secondary	$3.62	$3.76	$3.91	$4.07	$4.23
Firm Primary	$3.62	$3.76	$3.91	$4.07	$4.23
Interruptible Secondary	$3.62	$3.76	$3.91	$4.07	$4.23
Interruptible Primary	$3.62	$3.76	$3.91	$4.07	$4.23
Large Commercial & Industrial					
Special	$5.53	$5.75	$5.98	$6.22	$6.47
Firm Secondary	$5.53	$5.75	$5.98	$6.22	$6.47
Firm Primary	$5.53	$5.75	$5.98	$6.22	$6.47
Firm Trans. Transf.	$5.53	$5.75	$5.98	$6.22	$6.47
Interruptible Secondary	$5.53	$5.75	$5.98	$6.22	$6.47
Interruptible Primary	$5.53	$5.75	$5.98	$6.22	$6.47
Interruptible TT	$5.53	$5.75	$5.98	$6.22	$6.47
Standby Service	None	None	None	None	None
Public Street & Highway Lighting	$7.30	$7.59	$7.90	$8.21	$8.54
Small Municipal Pumping					
Non-Demand	$3.62	$3.76	$3.91	$4.07	$4.23
Demand Secondary	$3.62	$3.76	$3.91	$4.07	$4.23
Demand Primary	$3.62	$3.76	$3.91	$4.07	$4.23
Large Municipal Pumping					
Demand Primary (Sec cust)	$3.62	$3.76	$3.91	$4.07	$4.23
Fire and Civil Defense Siren Service	$3.62	$3.76	$3.91	$4.07	$4.23

(Continued on Sheet No. 5-93.8)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
4th Revised Sheet No. 93.8

Notes:
[3] St. Paul (continued)

Customer Class	Energy Factor - Monthly Charge per kWh				
Start Date	1-Nov-2006	1-Nov-2008	1-Nov-2010	1-Nov-2012	1-Nov-2014
End Date	31-Oct-2008	31-Oct-2010	31-Oct-2012	31-Oct-2014	31-Oct-2016
Residential (May - October)	$0.0094	$0.0095	$0.0096	$0.0097	$0.0098
Small Commercial & Industrial					
Non-Demand	$0.0040	$0.0040	$0.0040	$0.0040	$0.0040
Firm Secondary	$0.0018	$0.0018	$0.0018	$0.0018	$0.0018
Firm Primary	$0.0018	$0.0018	$0.0018	$0.0018	$0.0018
Interruptible Secondary	$0.0018	$0.0018	$0.0018	$0.0018	$0.0018
Interruptible Primary	$0.0018	$0.0018	$0.0018	$0.0018	$0.0018
Large Commercial & Industrial					
Special	$0.0028	$0.0028	$0.0028	$0.0028	$0.0028
Firm Secondary	$0.0013	$0.0013	$0.0013	$0.0013	$0.0013
Firm Primary	$0.0013	$0.0013	$0.0013	$0.0013	$0.0013
Firm Trans. Transf.	$0.0013	$0.0013	$0.0013	$0.0013	$0.0013
Interruptible Secondary	$0.0013	$0.0013	$0.0013	$0.0013	$0.0013
Interruptible Primary	$0.0013	$0.0013	$0.0013	$0.0013	$0.0013
Interruptible TT	$0.0013	$0.0013	$0.0013	$0.0013	$0.0013
Standby Service	None	None	None	None	None
Public Street & Highway Lighting	$0.0040	$0.0040	$0.0040	$0.0040	$0.0040
Small Municipal Pumping					
Non-Demand	$0.0040	$0.0040	$0.0040	$0.0040	$0.0040
Demand Secondary	$0.0018	$0.0018	$0.0018	$0.0018	$0.0018
Demand Primary	$0.0018	$0.0018	$0.0018	$0.0018	$0.0018
Large Municipal Pumping					
Demand Primary (Sec cust)	$0.0018	$0.0018	$0.0018	$0.0018	$0.0018
Fire and Civil Defense Siren Service	$0.0018	$0.0018	$0.0018	$0.0018	$0.0018

(Continued on Sheet No. 5-93.9)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
4th Revised Sheet No. 93.9

Notes:
[3] St. Paul (continued)

Customer Class	Energy Factor - Monthly Charge per kWh				
Start Date	1-Nov-2016	1-Nov-2018	1-Nov-2020	1-Nov-2022	1-Nov-2024
End Date	31-Oct-2018	31-Oct-2020	31-Oct-2022	31-Oct-2024	31-Aug-2026
Residential (May - October)	$0.0102	$0.0106	$0.0110	$0.0115	$0.0119
Small Commercial & Industrial					
Non-Demand	$0.0042	$0.0043	$0.0045	$0.0047	$0.0049
Firm Secondary	$0.0019	$0.0019	$0.0020	$0.0021	$0.0022
Firm Primary	$0.0019	$0.0019	$0.0020	$0.0021	$0.0022
Interruptible Secondary	$0.0019	$0.0019	$0.0020	$0.0021	$0.0022
Interruptible Primary	$0.0019	$0.0019	$0.0020	$0.0021	$0.0022
Large Commercial & Industrial					
Special	$0.0029	$0.0030	$0.0031	$0.0033	$0.0034
Firm Secondary	$0.0014	$0.0014	$0.0015	$0.0015	$0.0016
Firm Primary	$0.0014	$0.0014	$0.0015	$0.0015	$0.0016
Firm Trans. Transf.	$0.0014	$0.0014	$0.0015	$0.0015	$0.0016
Interruptible Secondary	$0.0014	$0.0014	$0.0015	$0.0015	$0.0016
Interruptible Primary	$0.0014	$0.0014	$0.0015	$0.0015	$0.0016
Interruptible TT	$0.0014	$0.0014	$0.0015	$0.0015	$0.0016
Standby Service	None	None	None	None	None
Public Street & Highway Lighting	$0.0042	$0.0043	$0.0045	$0.0047	$0.0049
Small Municipal Pumping					
Non-Demand	$0.0042	$0.0043	$0.0045	$0.0047	$0.0049
Demand Secondary	$0.0019	$0.0019	$0.0020	$0.0021	$0.0022
Demand Primary	$0.0019	$0.0019	$0.0020	$0.0021	$0.0022
Large Municipal Pumping					
Demand Primary (Sec cust)	$0.0019	$0.0019	$0.0020	$0.0021	$0.0022
Fire and Civil Defense Siren Service	$0.0019	$0.0019	$0.0020	$0.0021	$0.0022

(Continued on Sheet No. 5-93.10)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
4th Revised Sheet No. 93.10

Notes:
[3] St. Paul (continued)

Customer Class	Demand Factor - Monthly Charge per kW				
Start Date	1-Nov-2006	1-Nov-2008	1-Nov-2010	1-Nov-2012	1-Nov-2014
End Date	31-Oct-2008	31-Oct-2010	31-Oct-2012	31-Oct-2014	31-Oct-2016
Residential (May - October)	None	None	None	None	None
Small Commercial & Industrial					
Non-Demand	None	None	None	None	None
Firm Secondary	$1.10	$1.10	$1.10	$1.10	$1.10
Firm Primary	$1.06	$1.06	$1.06	$1.06	$1.06
Interruptible Secondary	$1.10	$1.10	$1.10	$1.10	$1.10
Interruptible Primary	$1.06	$1.06	$1.06	$1.06	$1.06
Large Commercial & Industrial					
Special	None	None	None	None	None
Firm Secondary	$1.10	$1.10	$1.10	$1.10	$1.10
Firm Primary	$1.06	$1.06	$1.06	$1.06	$1.06
Firm Trans. Transf.	$1.06	$1.06	$1.06	$1.06	$1.06
Interruptible Secondary	$0.81	$0.81	$0.81	$0.81	$0.81
Interruptible Primary	$0.71	$0.71	$0.71	$0.71	$0.71
Interruptible TT	$0.51	$0.54	$0.57	$0.60	$0.63
Standby Service	$0.30	$0.33	$0.36	$0.39	$0.42
Public Street & Highway Lighting	None	None	None	None	None
Small Municipal Pumping					
Non-Demand	None	None	None	None	None
Demand Secondary	$1.10	$1.10	$1.10	$1.10	$1.10
Demand Primary	$1.06	$1.06	$1.06	$1.06	$1.06
Large Municipal Pumping					
Demand Primary (Sec cust)	$1.06	$1.06	$1.06	$1.06	$1.06
Fire and Civil Defense Siren Service	$1.06	$1.06	$1.06	$1.06	$1.06

(Continued on Sheet No. 5-93.11)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
4th Revised Sheet No. 93.11

Notes:
[3] St. Paul (continued)

Customer Class	Demand Factor - Monthly Charge per kW				
Start Date	1-Nov-2016	1-Nov-2018	1-Nov-2020	1-Nov-2022	1-Nov-2024
End Date	31-Oct-2018	31-Oct-2020	31-Oct-2022	31-Oct-2024	31-Aug-2026
Residential (May - October)	None	None	None	None	None
Small Commercial & Industrial					
Non-Demand	None	None	None	None	None
Firm Secondary	$1.14	$1.19	$1.24	$1.29	$1.34
Firm Primary	$1.10	$1.15	$1.19	$1.24	$1.29
Interruptible Secondary	$1.14	$1.19	$1.24	$1.29	$1.34
Interruptible Primary	$1.10	$1.15	$1.19	$1.24	$1.29
Large Commercial & Industrial					
Special	None	None	None	None	None
Firm Secondary	$1.14	$1.19	$1.24	$1.29	$1.34
Firm Primary	$1.10	$1.15	$1.19	$1.24	$1.29
Firm Trans. Transf.	$1.10	$1.15	$1.19	$1.24	$1.29
Interruptible Secondary	$0.84	$0.88	$0.91	$0.95	$0.99
Interruptible Primary	$0.74	$0.77	$0.80	$0.83	$0.86
Interruptible TT	$0.66	$0.68	$0.71	$0.74	$0.77
Standby Service	$0.44	$0.45	$0.47	$0.49	$0.51
Public Street & Highway Lighting	None	None	None	None	None
Small Municipal Pumping					
Non-Demand	None	None	None	None	None
Demand Secondary	$1.14	$1.19	$1.24	$1.29	$1.34
Demand Primary	$1.10	$1.15	$1.19	$1.24	$1.29
Large Municipal Pumping					
Demand Primary (Sec cust)	$1.10	$1.15	$1.19	$1.24	$1.29
Fire and Civil Defense Siren Service	$1.10	$1.15	$1.19	$1.24	$1.29

(Continued on Sheet No. 5-93.12)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
11th Revised Sheet No. 93.12

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local governmental unit.
— Indicates fee is not applied

Franchise Fees										
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date	
Vadnais Heights	$4.00	$6.00	$26.00	$120.00	—	—	—	01/2021	01/01/2038	R
Victoria	$3.00	$10.00	$10.00	$10.00	—	—	—	02/2017	10/09/2036	
Waite Park	$4.00	$6.75	$15.00	$109.00	—	—	—	01/2019	06/10/2032	
Watertown	$3.00	$4.50	$16.00	$51.00	—	$13.50	$21.00	04/2010	04/10/2027	
Wayzata	$2.06	$4.64	$4.64	$15.45	$1.03	$1.03	$1.03	03/2011	11/30/2026	
White Bear Lake	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	05/2018	01/08/2038	
Winona	4.0% Customers who purchase $100,000 or less in calendar year 1.5% That part which exceeds $100,000 in calendar year							06/2003	06/15/2023	
Winsted	$2.00	$2.00	$2.00	$2.00	—	—	—	05/2012	12/19/2031	

(Continued on Sheet No. 5-93.13)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
12th Revised Sheet No. 93.12

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local governmental unit.
— Indicates fee is not applied

Franchise Fees									
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date
Vadnais Heights	$4.00	$6.00	$26.00	$120.00	—	—	—	01/2021	01/01/2038
Victoria	$3.00	$10.00	$10.00	$10.00	—	—	—	02/2017	10/09/2036
Waite Park	$4.00	$6.75	$15.00	$109.00	—	—	—	01/2019	06/10/2032
Watertown	$3.00	$4.50	$16.00	$51.00	—	$13.50	$21.00	04/2010	04/10/2027
Wayzata	$2.06	$4.64	$4.64	$15.45	$1.03	$1.03	$1.03	03/2011	11/30/2026
White Bear Lake	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	05/2018	01/08/2038
Winona	4.0% Customers who purchase $100,000 or less in calendar year 1.5% That part which exceeds $100,000 in calendar year							06/2003	06/15/2023
Winsted	$2.00	$2.00	$2.00	$2.00	—	—	—	05/2012	12/19/2031
Woodbury	$3.25	$3.50	$23.00	$90.00	$0.00	$0.00	$0.00	01/2022	08/10/2041

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(Continued on Sheet No. 5-93.13)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES (Continued)

Section No. 5
13th Revised Sheet No. 93.12

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local governmental unit.
— Indicates fee is not applied

Franchise Fees										
City	Residential	Small C&I Non-demand	Small C&I Demand	Large C&I	Public Street Lighting	Municipal Pumping Non-demand	Municipal Pumping Demand	Effective Date	Expiration Date	
Vadnais Heights	$4.00	$6.00	$26.00	$120.00	—	—	—	01/2021	01/01/2038	
Victoria	$3.00	$10.00	$10.00	$10.00	—	—	—	02/2017	10/09/2036	
Wabasha	$2.00	$4.00	$10.00	$10.00	—	—	—	05/2022	01/03/2042	N
Waite Park	$4.00	$6.75	$15.00	$109.00	—	—	—	01/2019	06/10/2032	
Watertown	$3.00	$4.50	$16.00	$51.00	—	$13.50	$21.00	04/2010	04/10/2027	
Wayzata	$2.06	$4.64	$4.64	$15.45	$1.03	$1.03	$1.03	03/2011	11/30/2026	
White Bear Lake	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	05/2018	01/08/2038	
Winona	4.0% Customers who purchase $100,000 or less in calendar year 1.5% That part which exceeds $100,000 in calendar year							06/2003	06/15/2023	
Winsted	$2.00	$2.00	$2.00	$2.00	—	—	—	05/2012	12/19/2031	
Woodbury	$3.25	$3.50	$23.00	$90.00	$0.00	$0.00	$0.00	01/2022	08/10/2041	
Wyoming	$3.75	$3.75	$25.00	$150.00	—	—	—	05/2022	02/01/2042	N

(Continued on Sheet No. 5-93.13)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

FRANCHISE AND OTHER CITY FEES

Section No. 5
5th Revised Sheet No. 93.13

Franchise and other city fees, as designated below will be included in the customers' monthly bills computed under the indicated rate classes and effective in the following Minnesota communities:

The Company remits 100% of these fees collected from ratepayers to the local government unit.*
(U) Indicates unincorporated community

Other City Fees				
City	**Description**	**Effective Date**	**Expiration Date**	
West St. Paul	Pursuant to city code, the Company collects a 6.0% gross revenue tax derived from the sale of electricity within the City of West St. Paul. The amount collected is remitted to the City of West St. Paul.	07/2019	--	RC C
FEES NOT REMITTED DIRECTLY TO CITY				
Baker (U)	The Company collects a fee of $3.25 per residential and small commercial and industrial customer in the community of Baker for energy usage and maintenance on community street lighting. The amount collected is applied to Baker's street lighting bill.	03/1994	--	

*Except Baker. See above.

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INTERIM RATE SURCHARGE RIDER

Section No. 5
12th Revised Sheet No. 94

CANCELED C

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

INTERIM RATE SURCHARGE RIDER

Section No. 5
13th Revised Sheet No. 94

AVAILABILITY N

The Interim Rate Surcharge applies to:

1. Customer, Energy, Demand and Minimum Charges
2. Energy Charge Credits
3. Limited Energy Surcharges
4. Controllable Demand Credits
5. Voltage Discounts
6. Fixed Charges for Low Wattage Unmetered Devices
7. Lighting Rates per Luminaire and Lighting Rates per Unit
8. Siren Service Rate per Horsepower
9. Residential Controlled Air Conditioning and Water Heating Discounts (Energy and Fuel Cost Charges)
10. Commercial and Industrial Controlled Air Conditioning Credits
11. Off Season Load Rider
12. Standby Service Rider
13. Supplemental Service Rider
14. Tier 1 Energy Controlled Service Rider
15. Area Development Rider
16. Competitive Response Rider
17. Tier 1 Peak Controlled Short Notice Rider
18. Business Incentive and Sustainability Rider
19. Photovoltaic Demand Credit Rider

The Interim Rate Surcharge does not apply to:

1. Fuel Clause Rider
2. Conservation Improvement Program Adjustment Rider
3. Low Income Discounts (Energy and Fuel Cost Charges)
4. Low Income Program Surcharges
5. City Requested Facilities Surcharge Rider
6. Windsource Program Rider
7. WAPA Bill Credit Program Rider
8. Mercury Cost Recovery Rider
9. Environmental Improvement Rider
10. State Energy Policy Rate Rider
11. Renewable Development Fund Rider
12. Transmission Cost Recovery Rider
13. Renewable Energy Standard Rider
14. Net Energy Billing Service
15. Late Payment Charge
16. Voluntary Renewable*Connect Rider

This temporary Interim Rate Surcharge Rider will expire when final rates become effective.

RATE

Each rate schedule that the Interim Rate Surcharge applies to contains the following text:

INTERIM RATE ADJUSTMENT

An 8.92% Interim Rate Surcharge will be applied to Residential rate components and a 13.52% Interim Rate Surcharge will be applied to Commercial rate components specified in the “Interim Rate Surcharge Rider” to service provided beginning January 1, 2022. N

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LOW INCOME ENERGY DISCOUNT RIDER Section No. 5
9th Revised Sheet No. 95

DISCOUNT PROGRAM D
Eligible Senior and / or Disabled customers receive a $15 discount in each monthly billing period. Customers must be certified annually by an authorized agency as receiving assistance from the Low Income Home Energy Assistance Program. N N N

PowerOn PROGRAM
Eligible Seniors and / or Disabled, and Customers Under 62 Years of Age with no Disability.
A customer using more than 3% of their annual household income for electric use may be eligible for the Company's PowerOn affordability program. Customers must be certified annually by an authorized agency as receiving assistance from the Low Income Home Energy Assistance Program. The Company will offer customers with the lowest income, and a history of electric consumption that exceeds the residential average of 750 kWh per month, an affordable monthly bill. For a customer to be eligible for a supplemental reduction in their electric bill, the customer must agree to affordable monthly payments. N N

Medical Affordability PROGRAM N
Available to customers with certified medical circumstances and an income level up to 50 percent of the state median income guidelines. Availability will be extended to medically certified customers with income up to 60 percent of the state median income guidelines if funds are available. Availability is on a first-come/first-served basis until the budget is exhausted.

- Affordability Credit: Participating customers will receive an affordability credit limiting their bill to 3% of household income.
- Arrearage Credit: Participating customers will receive an arrearage credit. Receipt of the arrearage forgiveness credit will require a customer copayment that does not exceed 3% of the customer's annual income. The arrearage credit is designed to eliminate customer arrears over a period of 12 to 24 months.
- Customer Payment Requirements: Participating customers that miss two consecutive monthly payments will be removed from the program and subject to regular collection practices, including service disconnection. N

TERMS AND CONDITIONS OF SERVICE

1. The company will review current billing information, approved LIHEAP benefits and household income to make payment arrangements with the customer. A mutually agreed to payment plan will be offered to the customer and a payment schedule provided.

2. Customer must maintain an active account registered under customer's name with the Company to be eligible for this discount Rider.

3. Customers receiving assistance from LIHEAP with electric service through one meter for domestic and non-domestic purposes jointly may be eligible for this Discount Rider subject to Company's verification and approval. The Company shall determine the kWh use that is for domestic purposes. This Discount Rider only applies to kWh use for domestic purposes.

(Continued on Sheet No. 5-96)

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LOW INCOME ENERGY DISCOUNT RIDER Section No. 5
(Continued) 12th Revised Sheet No. 96

TERMS AND CONDITIONS OF SERVICE (Continued)

4. Qualified customers are only eligible to receive an energy discount under this Rider at one residential location at any one time and the discount only applies to a qualified customer's permanent primary residence. This Rider will not be available when, in the opinion of the Company, the customer's accommodation or occupancy is of temporary nature.

5. The discount shall be prospective and may not be applicable to past due bills or non-electric services.

6. An annual application and eligibility declaration is required for each request for service under this Rider. Without declaration of continuing eligibility, the discount ends in the September calendar month of each year.

7. It is the customer's responsibility to notify the Company if there is a change of address or eligibility status.

8. Discounts will be credited to the eligible customer bills one billing month after Company's receipt of notification of LIHEAP certification. The applicable discount under this Rider will be retroactive to the October billing month during that same LIHEAP fiscal year.

9. Refusal or failure of a customer or agencies to provide documentation of eligibility acceptable to the Company may result in removal from this Rider.

10. Customers may be rebilled for periods of ineligibility under the applicable rate schedule.

11. This Rider shall meet the conditions of Minnesota Statutes, Chapter 216B.16, Subd. 14 on low income discount rates.

PROGRAM SURCHARGE

Rider program costs shall be recovered in the following per month amounts, with the total surcharge as a separate line item on customer billing statements:

Service Category	Base	PowerOn	Medical Affordability	Total	
Residential	$0.58	$0.21	$0.19	$0.98	R
C&I Non-Demand	$0.78	$0.26	$0.23	$1.27	R
C&I Demand	$2.34	$0.66	$0.60	$3.60	R

Xcel Energy customers who receive LIHEAP assistance in the current LIHEAP year (October 1–September 30) and Lighting class service customers are exempt from paying the program surcharge.

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RESIDENTIAL CONTROLLED AIR CONDITIONING AND WATER HEATING RIDER
Section No. 5
8th Revised Sheet No. 97

AVAILABILITY
Available to Residential Service customers with:
1. Company controlled central air conditioning, or
2. Company controlled heat pumps receiving Energy Controlled Service (Non-Demand Metered) with optional non-interruptible service during June through September.

Company controlled electric water heating is also available to residential customers with a controlled central air conditioner or heat pump, except electric water heaters served with the Energy Controlled Service (Non-Demand Metered) rate schedule. Availability is limited to customers located in areas which are within the operating range of radio control transmitters.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

RIDER
Residential Central Air Conditioning. A 15% discount will apply to the energy and fuel cost charges up to a maximum of 4,000 kWh per month during the billing months of June through September.

Residential Electric Water Heating. A 2% discount will apply to the energy and fuel cost charges up to a maximum of 4,000 kWh per month during each billing month provided total energy use is not less than 300 kWh.

TERMS AND CONDITIONS OF SERVICE
1. The duration and frequency of interruptions will be determined by Company. Customer's air conditioning equipment will normally be cycled on a schedule designed to achieve a 50% reduction in the homes air conditioning requirements during load management period. Air conditioning interruptions will normally occur on high demand days during summer months. Water heating interruptions will normally occur on high demand days during summer and winter months. Interruption will normally be based on meeting peak demands and system economic dispatch requirements of Company. However, interruption may also occur at times when, in the Company's opinion, the reliability of the system may be at risk. Air conditioning and water heating interruptions will not normally occur during the observation day of the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. The interruptions as described above, will be made so as to benefit native load and may occur up to a maximum of 300 hours per calendar year.

2. Company shall not be liable for any loss or damage caused by or resulting from any interruption of service.

3. To be eligible for this service, customer must agree to Company load control for a minimum term of one year.

(Continued on Sheet No. 5-98)

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MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

RESIDENTIAL CONTROLLED AIR CONDITIONING AND WATER HEATING RIDER (Continued)

Section No. 5
5th Revised Sheet No. 98

TERMS AND CONDITIONS OF SERVICE (Continued)

4. The storage capacity of the water heater shall be 40 gallons or more in order to be eligible for this service.

5. The residential central air conditioning energy charge discount for Energy Controlled Service (Non-Demand Metered) customers will also apply to their standard service energy charge.

6. Rider availability for heat pump installations is limited to those sized for summer cooling requirements, as determined by Company.

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COMMERCIAL AND INDUSTRIAL Section No. 5
CONTROLLED AIR CONDITIONING RIDER 8th Revised Sheet No. 99

AVAILABILITY
Available to non-residential customers with Company controlled central air conditioning. Availability is restricted to customers with single and/or dual stage air conditioning units.

RIDER
A $5.00 per ton per month credit shall be applied to customer's bill during each of the four summer billing months (June through September).

TERMS AND CONDITIONS OF SERVICE

1. The duration and frequency of interruptions will be determined by the Company. Customer single and dual stage air conditioners will be cycled on a schedule designed to achieve a 50% reduction in the building air conditioning requirements during a load management period. Dual stage air conditioners will be allowed to have the first stage run without interruption while the second stage will be shut off for the entire load management period. Air conditioning interruptions will normally occur on high demand days during summer months. Interruption will normally be based on meeting peak demands and system economic dispatch requirements of Company. However, interruption may also occur at times when, in the Company's opinion, the reliability of the system may be at risk. Air conditioning interruptions will not normally occur during the observation day of the following holidays: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. The interruptions as described above, will be made so as to benefit native load and may occur up to a maximum of 300 hours per calendar year.

2. Company shall not be liable for any loss or damage caused by or resulting from any interruption of service.

3. To be eligible for this service, customer must be on Small General Service, Small General Time of Day Service, General Service, or General Time of Day Service and customer must agree to Company load control for no less than one year.

4. Rider will not be available to customers that have an air conditioning system which significantly exceeds summer cooling requirements, as determined by Company.

5. Company will normally control every air conditioning unit at the customer's building. Subject to Company approval, customers may exclude individual air conditioning units from Company control where those units serve either a sufficiently isolated area within a building or a separate building.

6. Availability is limited to customers located within the operating range of radio control transmitters.

7. Those air conditioning units that the Company is not able to install equipment on will be excluded.

(Continued on Sheet No. 5-99.1)

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

COMMERCIAL AND INDUSTRIAL Section No. 5
CONTROLLED AIR CONDITIONING RIDER (Continued) 5th Revised Sheet No. 99.1

TERMS AND CONDITIONS OF SERVICE (Continued)

8. If the Company determines that its load management equipment on the customer's premises has been rendered ineffective due to tampering by use of mechanical, electrical, or other devices or actions, then the Company may discontinue the customer's participation in the program. The customer would be billed for all expenses involved with the removal of the load management equipment and any charges resulting from the investigation of the device tampering. The Company may rebill all prior load management credits received by the customer to the date the tampering appears to have first occurred or the previous twelve months, which ever is longer. The customer will be removed from the program and is not eligible to participate again for twelve months. The Company will verify installation has been corrected before the customer is permitted to participate in the program.

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

OFF SEASON LOAD RIDER

Section No. 5
5th Revised Sheet No. 100

AVAILABILITY
Available to any General Service customer whose maximum monthly demand occurs during the usage months of April, May, October, or November. Typical applications would be agricultural grain drying and handling loads.

RATE
The General Service rate provisions apply except the adjusted demands established during the usage months of April, May, October, and November are not included in determining the 50% demand ratchet contained in the General Service determination of demand provision.

TERMS AND CONDITIONS OF SERVICE
1. The customer's usage months for this Rider must be contained by the following meter reading schedule. The two month fall season begins no earlier than the billing cycle 11 meter reading date in mid-September and ends no later than the billing cycle 10 meter reading date in mid-December. The two month spring season begins no earlier than the billing cycle 11 meter reading date in mid-March and ends no later than the billing cycle 10 meter reading date in mid-June.

2. Customer must compensate Company for the costs associated with local distribution facilities required to serve customer load during the months of April, May, October, and November, which is in excess of customer's base load during the remaining months.

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

OFF SEASON LOAD RIDER

Section No. 5
6th Revised Sheet No. 100

AVAILABILITY
Available to any General Service customer whose maximum monthly demand occurs during the usage months of April, May, October, or November. Typical applications would be agricultural grain drying and handling loads.

RATE
The General Service rate provisions apply except the adjusted demands established during the usage months of April, May, October, and November are not included in determining the 50% demand ratchet contained in the General Service determination of demand provision.

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the “Interim Rate Surcharge Rider” to service provided beginning January 1, 2022. N N

TERMS AND CONDITIONS OF SERVICE
1. The customer's usage months for this Rider must be contained by the following meter reading schedule. The two month fall season begins no earlier than the billing cycle 11 meter reading date in mid-September and ends no later than the billing cycle 10 meter reading date in mid-December. The two month spring season begins no earlier than the billing cycle 11 meter reading date in mid-March and ends no later than the billing cycle 10 meter reading date in mid-June.

2. Customer must compensate Company for the costs associated with local distribution facilities required to serve customer load during the months of April, May, October, and November, which is in excess of customer's base load during the remaining months.

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STANDBY SERVICE RIDER

Section No. 5
20th Revised Sheet No. 101

AVAILABILITY

Applicable to customers that use a customer-sited generation source with a capacity greater than 100 kW to serve a defined portion of the customer's total electric energy requirements and where customer chooses to use the Company's electric service to serve that defined load when the customer-sited generation is either partly or wholly unavailable. Customer must select one of the following services types: Firm Unscheduled Maintenance, Firm Scheduled Maintenance, or Non-Firm service. This Rider is not available to solar photovoltaic generation systems and is closed to new wind generation systems.

Under this tariff the Company will provide Standby Service in accordance with the provisions of this tariff as well as those of Section 2.4 of the General Rules and Regulations.

RATE

	Firm Standby		Non-Firm	
	Unscheduled Maintenance	Scheduled Maintenance	Standby	
Customer Charge per Month	$25.64	$25.64	$25.64	
Reservation Demand Charge per Month per kW of Contracted Standby Capacity				
Secondary Voltage Service	$3.06	$2.96	$2.35	R
Primary Voltage Service	$2.26	$2.16	$1.55	R
Transmission Transformed Voltage Service	$1.51	$1.41	$0.80	R
Transmission Voltage Service	$0.71	$0.61	$0.00	R
Peak Period Standby Energy Surcharge per kWh				
June – September		$0.06312		R
Other Months		$0.04130		R

Energy Charge per kWh. All energy used under this Rider will be charged at the applicable energy rate of the base tariff to which this Rider is attached and is not applicable to the base tariff Energy Charge Credit.

STANDBY ENERGY USAGE

Standby energy usage occurs when the customer-sited generation source output in kW is less than contracted standby kW capacity. Standby energy usage in kWh is measured in 15-minute intervals and is defined as the kWh energy associated with constant operation of customer-sited generation at the contract standby kW capacity level less actual energy production of customer-sited generation, but not less than zero kWh for each 15-minute interval. Actual energy production of customer-sited generation will be measured by Company-owned and installed production metering equipment.

(Continued on Sheet No. 5-101.1)

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STANDBY SERVICE RIDER

Section No. 5
21st Revised Sheet No. 101

AVAILABILITY

Applicable to customers that use a customer-sited generation source with a capacity greater than 100 kW to serve a defined portion of the customer's total electric energy requirements and where customer chooses to use the Company's electric service to serve that defined load when the customer-sited generation is either partly or wholly unavailable. Customer must select one of the following services types: Firm Unscheduled Maintenance, Firm Scheduled Maintenance, or Non-Firm service. This Rider is not available to solar photovoltaic generation systems and is closed to new wind generation systems.

Under this tariff the Company will provide Standby Service in accordance with the provisions of this tariff as well as those of Section 2.4 of the General Rules and Regulations.

RATE

	Firm Standby		Non-Firm
	Unscheduled Maintenance	Scheduled Maintenance	Standby
Customer Charge per Month	$25.64	$25.64	$25.64
Reservation Demand Charge per Month per kW of Contracted Standby Capacity			
Secondary Voltage Service	$3.06	$2.96	$2.35
Primary Voltage Service	$2.26	$2.16	$1.55
Transmission Transformed Voltage Service	$1.51	$1.41	$0.80
Transmission Voltage Service	$0.71	$0.61	$0.00

INTERIM RATE ADJUSTMENT N

A 13.52% Interim Rate Surcharge will be applied to rates components specified in the “Interim Rate Surcharge Rider” to service provided beginning January 2022. N N

Peak Period Standby Energy Surcharge per kWh	
June – September	$0.06312
Other Months	$0.04130

Energy Charge per kWh. All energy used under this Rider will be charged at the applicable energy rate of the base tariff to which this Rider is attached and is not applicable to the base tariff Energy Charge Credit.

STANDBY ENERGY USAGE

Standby energy usage occurs when the customer-sited generation source output in kW is less than contracted standby kW capacity. Standby energy usage in kWh is measured in 15-minute intervals and is defined as the kWh energy associated with constant operation of customer-sited generation at the contract standby kW capacity level less actual energy production of customer-sited generation, but not less than zero kWh for each 15-minute interval. Actual energy production of customer-sited generation will be measured by Company-owned and installed production metering equipment.

(Continued on Sheet No. 5-101.1)

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STANDBY SERVICE RIDER (Continued)

Section No. 5
Original Sheet No. 101.1

PEAK PERIOD STANDBY ENERGY USAGE

Peak period standby energy usage is the amount of Standby Energy Usage occurring during the peak period that does not occur during a qualifying scheduled maintenance period or is associated with Non-Firm service. Peak period standby energy usage is subject to the Peak Period Standby Energy Surcharge.

DEFINITION OF PEAK PERIOD

Peak period hours are the six hours between 1:00 p.m. and 7 p.m. for all days.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

FUEL CLAUSE

Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT

Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER

Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE

In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER

Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

LATE PAYMENT CHARGE

Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

(Continued on Sheet No. 5-102)

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STANDBY SERVICE RIDER (Continued)

Section No. 5
14th Revised Sheet No. 102

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C

DETERMINATION OF DEMAND

The billing demand in kW for application to the Standby Service Reservation Demand Charge rate will be the contracted Standby capacity specified in the customer's Electric Service Agreement, which is the maximum capacity of Standby Service the Company is obligated to supply, and is the amount of load expected to be served by the customer-sited generation source. In no case shall the contracted Standby capacity be established at more than the capacity of the customer-sited generation source. Contracted Standby capacity may be different for the summer and winter seasons or by month.

The metered capacity in kW supplied by Company for Standby Energy Usage by customer will be excluded from the actual demand in kW used to determine any billed demand for the base tariff to which this Rider is attached. This exclusion is determined as the maximum total customer demand, defined as the total of capacity supplied by the customer-sited generation source and the Company measured in 15-minutes intervals, less contracted Standby capacity. All demand measurements will be determined with Company owned and installed meters. The exclusion of capacity supplied by Company for Standby Energy Usage by customer from any base tariff determination of demand calculation is represented by the equation: Base tariff actual demand in kW = Site load (Company supplied capacity in kW measured by the base tariff service meter + Customer supplied capacity in kW measured by production metering of customer-sited generation) – Contracted Standby capacity in kW as determined by the customer nomination in effect for the applicable billing period.

Any billing demand in kW for the base tariff to which this Rider is attached will be calculated using the applicable determination of demand provision defined in the base tariff. For a time of day base tariff, the on-peak and off-peak periods used for billed demand calculations will be based on the definition of peak periods included in the time of day base tariff.

C

TERMS AND CONDITIONS OF SERVICE

1. Standby Service Rider is applicable to any customer who requires greater than 100 kW of Standby capacity. Standby Service may not be used by a customer to serve controllable demand that is subject to interruption as determined by the Company under the Company's controllable service schedules.

(Continued on Sheet No. 5-103)

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STANDBY SERVICE RIDER (Continued)

Section No. 5
7th Revised Sheet No. 103

TERMS AND CONDITIONS OF SERVICE (Continued)

2. Customer will execute an Electric Service Agreement with the Company which will specify:
   a. Type of Standby Service elected by the customer and the base tariff to which this Rider is attached.
   b. The total Standby capacity requirements for which Company will be providing Standby power and to which the Standby Service reservation rate applies as well as the expected level of standard service the customer will take, even if the standard service level is expected to be zero. T
   c. The process and requirements for nominating contracted Standby capacity, including seasonal or monthly levels. N N

3. The Company's standard service meter will be detented to measure only the amount of capacity and energy provided by the Company to the customer.

4. Company will not be obligated to supply Standby Service to back-up a customer's generator at a level in excess of the Standby capacity for which customer has contracted. This restriction in no way limits the amount of standard service the customer requires from the Company under the standard service tariff to which this Rider is attached. Any limits on standard service are governed by the provisions contained in the standard service tariffs.

5. Customer will be liable for all damages allowed by law to the extent caused by customer's use of Standby power in excess of contracted Standby capacity.

6. Company will require customer to revise the Electric Service Agreement to contract for additional Standby capacity if the customer exceeds the contract amount in any three of the preceding 12 months.

7. Customer will annually furnish documentation to Company confirming the maximum capacity and reliability of the power source for which customer requires Standby Service. The Company and the customer will review the actual output and performance of the power source relative to the capacity nominated for Standby Service in the Electric Service Agreement. If this review shows a significant and consistent shortfall between the power source's actual performance and the nominated capacity due to factors reasonably within the customer's control, the Company will notify the customer of its intent to refuse to provide Standby Service. Upon receipt of such notice, the customer may agree to reduce the Standby Service nomination in its Electric Service Agreement or to take such action as necessary to operate the power source at or reasonably near the nominated Standby Service capacity. If the customer's power source does not operate at or reasonably near that level during the 12 months immediately following the Company's notice, the Company may refuse to provide Standby Service until such time as the customer agrees to reduce its Standby Service nomination or provide the Company with documentation demonstrating the power source's actual performance at or reasonably near the nominated Standby Service capacity for a trial period of three consecutive months.

8. Customer will remain on Standby Service for a period of not less than 12 months.

(Continued on Sheet No. 5-104)

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MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

STANDBY SERVICE RIDER (Continued)

Section No. 5
8th Revised Sheet No. 104

TERMS AND CONDITIONS OF SERVICE (Continued)

9. In the event Company provides advance notice to customer of expected system peak load conditions for a specified time period and customer uses unscheduled standby backup demand during that time period, the backup demand quantity used will be billed at the firm service demand charge from the base tariff to which this Rider is attached instead of the Reservation Demand charge. The quantity of unscheduled standby backup demand used for this provision will be the maximum 15-minute measured interval of unscheduled standby backup demand used during the specified system peak hours, measured as contracted standby capacity less the capacity provided by the customer-sited generation source. Company notice of expected system peak load conditions for this provision will be provided through the same means Company uses to notify interruptible customers of an interruption requirement. N N N N N N N N N

10. Company will install and charge customer for the additional metering necessary, to allow for determining Peak Period Standby Energy usage. In particular, the Company will install a separate meter that measures the flow of power and energy from the customer's own generating facility. Customer shall reimburse the Company for the costs of installing, operating, and maintaining the required additional metering and for any other facilities required to serve the customer's Standby load. If, as a result of the customer's construction and installation of their generating facility, it is more practical for the customer to install some or all of the metering equipment required, the customer may be permitted to do so, subject to Company's approval of such equipment. LC C L

(Continued on Sheet No. 5-105)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STANDBY SERVICE RIDER (Continued)

Section No. 5
8th Revised Sheet No. 105

ADDITIONAL TERMS AND CONDITIONS OF SERVICE ASSOCIATED WITH THE SCHEDULED MAINTENANCE OPTION

1. The optional Scheduled Maintenance rates are available to Standby Service customers who agree to schedule maintenance of their power source during qualifying scheduled maintenance periods.

2. Qualifying Scheduled Maintenance Periods

   Maintenance may occur within the calendar months of April, May, October, and November without written customer notice to Company prior to the beginning of the maintenance period regardless of the size of the contracted Standby capacity.

   In other months for customers with a base time of day tariff to which this Rider is attached, regardless of the size of the contracted Standby capacity, scheduled maintenance may occur, with Company approval, during weekends and holidays as identified in the time of day base tariff, where a documented customer request is provided no less than 48 hours prior to the beginning of the planned maintenance period. Company will endeavor to approve or deny the customer request within 24 hours of receiving the request.

   For months other than April, May, October, and November, customers with a minimum contracted Standby capacity of 1,000 kW may schedule maintenance at a time period mutually agreed to by Company and customer, following a documented customer request. These time periods for scheduled maintenance will normally not include those times when Company expects high system seasonal peak load conditions or high energy production costs.

   Customer shall provide an annual projection of scheduled maintenance to the Company. Customer shall be allowed changes or additions to this projection upon notice to the Company based on the following schedule:

Outage Length	Required Notice
Less than 72 hours	24 hours
3 days to 30 days	7 days
Over 30 days	90 days

3. The duration of qualifying scheduled maintenance periods may not exceed a total of 56 days in any 12 month period.

(Continued on Sheet No. 5-106)

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STANDBY SERVICE RIDER (Continued)

Section No. 5
8th Revised Sheet No. 106

ADDITIONAL TERMS AND CONDITIONS OF SERVICE ASSOCIATED WITH THE SCHEDULED MAINTENANCE OPTION (Continued)

4. If customer does not comply with all terms and conditions for qualifying scheduled maintenance periods during any billing month, all use of Standby Service for the same month will be subject to the Peak Period Standby Energy charge provision. Company may determine partial non-compliance and limit the quantity of Standby Service usage subject to the Peak Period Standby Energy charge provision. Company reserves the right to remove availability of the Scheduled Maintenance Option for any customer upon a determination of significant and multiple occurrences of failure to comply with all associated terms and conditions.

5. The use of Standby Service during qualifying scheduled maintenance periods will not be included in the determination of Peak Period Standby Energy usage.

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(Continued on Sheet No. 5-107)

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MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

STANDBY SERVICE RIDER (Continued)

Section No. 5
5th Revised Sheet No. 107

ADDITIONAL TERMS AND CONDITIONS OF SERVICE FOR NON-FIRM STANDBY OPTION

1. Non-firm standby rates are available to customers who agree to use Standby Service only by prearrangement with the Company.

2. Company makes no guarantee that Standby Service will be available to Non-Firm Standby Service customers; however, the Company will make reasonable efforts to provide Standby Service whenever possible.

3. Customer must request use of Standby Service and receive approval from the Company prior to actually using Standby Service.

4. Use of Standby Service without prior approval by the Company shall subject the Non-Firm Standby Service customer to the following:
   a. The monthly demand charges from the base tariff applied to the unapproved Standby Service used in the month in which unapproved use of Standby Service occurred, plus
   b. Firm Standby Service unscheduled maintenance option reservation fees retroactively applied to the six months prior to the month in which unapproved use of Standby Service occurred.

5. If unapproved use of Standby Service occurs twice in any 12 month period, the Company reserves the right to convert the Non-Firm Standby Service customer to Firm Standby Service.

6. Non-Firm Standby Service customers will remain on Non-Firm Standby Service for a period of not less than five years which includes a one year trial period.

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SUPPLEMENTAL GENERATION SERVICE RIDER Section No. 5
12th Revised Sheet No. 108

AVAILABILITY
Applicability of Supplemental Service is similar to that of Standby Service Rider, where customers with an alternative generation source greater than 60 kW, which serves all or a portion of the customer's electric energy requirements and where customer chooses to use the Company's electric service when the alternative generation is either partly or wholly unavailable.

Specifically, Supplemental Service is targeted at applications where the output of the alternative generation is designed primarily to meet the customer's thermal-load requirements and as such, the generator's electric energy output is variable because it is dependent on the customer's thermal requirements.

The normal expectation of this Rider is that the customer will contract for a firm portion of their backup supply from the Company under the Standby Service Rider and will contract for the variable portion under this Supplemental Generation Service Rider. Each customer request for service under this Rider will be evaluated on a customer specific basis to determine eligibility.

Under this service, the Company will provide Supplemental Generation Service in accordance with the provisions of the General Rules and Regulations, Section 2.4.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

RESERVATION RATES

Customer Charge per Month	$25.64	
Demand Charge per Month per kW of Contracted Supplemental Service		
Secondary Voltage Service	$3.40	R
Primary Voltage Service	$2.60	R
Transmission Transformed Voltage Service	$1.85	R
Transmission Voltage Service	$1.05	R

USAGE RATES
Demand Charge per Month per kW of Supplemental Generation Capacity Used. There will be no Usage Rate demand charge for Supplemental capacity actually used under this Rider except if that capacity is used during one of the Company's energy controlled or peak controlled interrupt periods. In such case, the demand will be charged as described below.

Energy Charge per kWh of Supplemental Generation Energy Used. Energy actually used under this Rider during normal time periods will be charged at the same energy and fuel cost charges as contained in the base tariff to which this Rider is attached. However, if energy is used during one of the Company's energy controlled or peak controlled interrupt periods, the energy will be charged as described below.

(Continued on Sheet No. 5-109)

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SUPPLEMENTAL GENERATION SERVICE RIDER Section No. 5
13th Revised Sheet No. 108

AVAILABILITY
Applicability of Supplemental Service is similar to that of Standby Service Rider, where customers with an alternative generation source greater than 60 kW, which serves all or a portion of the customer's electric energy requirements and where customer chooses to use the Company's electric service when the alternative generation is either partly or wholly unavailable.

Specifically, Supplemental Service is targeted at applications where the output of the alternative generation is designed primarily to meet the customer's thermal-load requirements and as such, the generator's electric energy output is variable because it is dependent on the customer's thermal requirements.

The normal expectation of this Rider is that the customer will contract for a firm portion of their backup supply from the Company under the Standby Service Rider and will contract for the variable portion under this Supplemental Generation Service Rider. Each customer request for service under this Rider will be evaluated on a customer specific basis to determine eligibility.

Under this service, the Company will provide Supplemental Generation Service in accordance with the provisions of the General Rules and Regulations, Section 2.4.

INTERIM RATE ADJUSTMENT N
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022. N N

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

RESERVATION RATES

Customer Charge per Month	$25.64
Demand Charge per Month per kW of Contracted Supplemental Service	
Secondary Voltage Service	$3.40
Primary Voltage Service	$2.60
Transmission Transformed Voltage Service	$1.85
Transmission Voltage Service	$1.05

USAGE RATES
Demand Charge per Month per kW of Supplemental Generation Capacity Used. There will be no Usage Rate demand charge for Supplemental capacity actually used under this Rider except if that capacity is used during one of the Company's energy controlled or peak controlled interrupt periods. In such case, the demand will be charged as described below.

Energy Charge per kWh of Supplemental Generation Energy Used. Energy actually used under this Rider during normal time periods will be charged at the same energy and fuel cost charges as contained in the base tariff to which this Rider is attached. However, if energy is used during one of the Company's energy controlled or peak controlled interrupt periods, the energy will be charged as described below.

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SUPPLEMENTAL GENERATION SERVICE RIDER Section No. 5
(Continued) 15th Revised Sheet No. 109

FUEL CLAUSE
Bills are subject to the adjustments provided for in the Fuel Clause Rider.

RESOURCE ADJUSTMENT
Bills are subject to the adjustments provided for in the Conservation Improvement Program Adjustment Rider, the State Energy Policy Rate Rider, and the Renewable Development Fund Rider, the Transmission Cost Recovery Rider, the Renewable Energy Standard Rider and the Mercury Cost Recovery Rider.

ENVIRONMENTAL IMPROVEMENT RIDER
Bills are subject to the adjustments provided for in the Environmental Improvement Rider.

SURCHARGE
In certain communities, bills are subject to surcharges provided for in a Surcharge Rider.

LOW INCOME ENERGY DISCOUNT RIDER
Bills are subject to the adjustment provided for in the Low Income Energy Discount Rider.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

LATE PAYMENT CHARGE
Any unpaid balance over $10.00 is subject to a 1.5% late payment charge or $1.00, whichever is greater, after the date due. The charge may be assessed as provided for in the General Rules and Regulations, Section 3.5.

DETERMINATION OF SUPPLEMENTAL GENERATION DEMAND
The billing demand applicable to this Supplemental Generation Service Rider is determined separately from the billing demand applicable to the base tariff to which this Rider is attached. The billing demand for this Rider will be the quantity specified in the customer's Electric Service Agreement which is the maximum capacity of Supplemental Generation Service the Company is obligated to supply. The demand applicable to this Rider may be a different amount specified for each month where it is dependent on the variable thermal load requirements.

The amount of Supplemental Service capacity actually used by the customer, when customer's generator is wholly or partly out of service, will have no effect on the billing demand under the base tariff and will be subtracted from the total metered demand, to determine the demand for standard service, to which the base tariff demand charge applies. The amount of Supplemental Service capacity actually used, is the amount of the Supplemental Service capacity contracted for, less the actual capacity supplied by the customer's generating facilities (assuming it is operating, but not at full capacity) but not less than zero. For applying the Usage Rate, as referenced in Section 10 below of this Rider, the Supplemental Generation Demand will be the maximum actual demand (as adjusted for power factor) that is supplied by the Company to serve that portion of the customer's load, up to the contracted Supplemental Generation Capacity, not served by the customer's alternative source of electric energy supply.

(Continued on Sheet No. 5-110)

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SUPPLEMENTAL GENERATION SERVICE RIDER Section No. 5
(Continued) 8th Revised Sheet No. 110

DETERMINATION OF SUPPLEMENTAL GENERATION ENERGY

Supplemental Generation Energy shall be that portion of the customer's total energy requirements provided by the Company to supplement the customer's generation. Supplemental Generation Energy shall be calculated hourly, and shall be Supplemental Generation Capacity for which the customer has contracted, less generation output above the contracted Standby capacity (as defined in the Standby Service Rider), but not less than zero.

TERMS AND CONDITIONS OF SERVICE

1. This Supplemental Generation Service Rider is applicable to any customer who requires greater than 60 kW of backup capacity from the Company. Supplemental Generation Service may not be used by a customer to serve controllable demand that is subject to interruption as determined by the Company under the Company's controllable service schedules.

   The Company and customer will develop and attach to the Electric Service Agreement, a load control procedure for the customer that specifies the customer's demand side load reductions or alternative generation capacity the customer intends to use to avoid Supplemental Generation Demand Usage Rate charges. This attachment will specifically state that when customer has been notified that an energy control or peak control period has been initiated, the customer must reduce the load served by Company by an amount equal to the difference between actual generator output and contracted Supplemental Generation Capacity. Additionally, the customer's demand served under the base tariff to which this rider is attached, shall not increase during any energy control or peak control period. If customer fails at either of these requirements, customer will incur Supplemental Generation usage charges as defined in Section 10 below.

2. Customer will execute an Electric Service Agreement with the Company which will specify:
   a. Type of Standby Service elected by the customer under the Standby Service Rider and the base tariff to which the Standby and Supplement Service Riders are attached,
   b. The individual and total capacity requirements for which Company will be providing Standby and Supplemental Generation Service and to which the respective Rider charges apply, and
   c. The expected initial level of firm service the customer will take under their base tariff, even if that expected level is zero, as well as any expected changes in load over the term of the agreement.

(Continued on Sheet No. 5-111)

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SUPPLEMENTAL GENERATION SERVICE RIDER Section No. 5
(Continued) 7th Revised Sheet No. 111

TERMS AND CONDITIONS OF SERVICE (Continued)

3. The Company's standard service meter will be detented to measure only the amount of capacity and energy provided by the Company to the customer.

4. Company will not be obligated to supply Supplemental Generation Service to backup a customer's generator at a level in excess of the Supplemental Generation Capacity for which customer has contracted. This restriction in no way limits the amount of standard service the customer requires from the Company under the base tariff to which this Rider is attached. Any limits on standard service are governed by the provisions contained in the standard service tariffs.

5. Customer will be liable for all damages allowed by law to the extent caused by customer's use of Supplemental power in excess of contracted Supplemental Generation Capacity.

6. Company will require customer to revise the Electric Service Agreement to contract for additional Supplemental Generation Capacity if the customer exceeds the contract amounts in any three of the preceding 12 months.

7. Customer will annually furnish documentation to Company confirming the maximum capacity and reliability of the power source for which customer requires Supplemental Generation Service. Company and customer will review actual output and performance of the power source relative to the capacity nominated for Supplemental Generation Service in the Electric Service Agreement. If this review shows a significant and consistent shortfall between the power source's actual performance and the nominated capacity due to factors reasonably within customer's control, Company will notify customer of its intent to refuse to provide Supplemental Generation Service. Upon receipt of such notice, customer may agree to reduce the Supplemental Generation Service nomination in its Electric Service Agreement or to take such action as necessary to operate the power source at or reasonably near the nominated Supplemental Generation Service Capacity. If customer's power source does not operate at or reasonably near that level during the 12 months immediately following Company's notice, Company may refuse to provide Supplemental Generation Service until such time as customer agrees to reduce its Supplemental Generation Service nomination or provide Company with documentation demonstrating the power source's actual performance at or reasonably near the nominated Supplemental Generation Service for a trial period of three consecutive months.

8. Customer will remain on Supplemental Generation Service for a period of not less than 12 months.

(Continued on Sheet No. 5-112)

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SUPPLEMENTAL GENERATION SERVICE RIDER Section No. 5
(Continued) 8th Revised Sheet No. 112

TERMS AND CONDITIONS OF SERVICE (Continued)

9. Customer will be allowed to take Supplemental Generation Energy from the Company at any time, up to the maximum contracted level of Supplemental Generation Demand, without incurring any usage demand charges except during the periods listed below.

10. In the event customer requires Supplemental Generation Service during one of the Company's energy control periods, customer will pay for the Supplemental Generation Energy used during the energy control period at the applicable control period energy rate as listed in Company's Energy Controlled Service tariff.

    In the event customer requires Supplemental Generation Service during one of the Company's peak control periods, as defined in the Rules for Application of Peak Controlled Services, customer will pay for the Supplemental Generation Energy used during the peak control period at twice the applicable control period energy rate as listed in Company's Energy Controlled Service tariff plus a fee of $10.00 per kW of maximum Supplemental Generation Capacity used during the peak control period.

    However, if this use occurs at the times of Company's system peak hours in which the Company would have insufficient Accredited Capacity under the Midwest Reliability Organization (MRO) or any successor organization, and the Company incurs additional capacity costs as a result of such Supplemental Generation Service used by customer, customer shall pay Peak Demand Charges for the month in which such Supplemental Generation Service use occurs and for each of the five succeeding months, instead of the above listed demand charges and/or Reservation Fees. Such Peak Demand Charges shall be based upon the following:

    a. If customer has notified Company of the need to use Supplemental Generation Service at least three hours prior to Company's system peak hour, such Supplemental Generation Peak Demand charges shall be based on one-sixth of any additional capacity costs incurred by the Company as a result of using Supplemental Generation Service. Such additional capacity costs shall not include any after-the-fact capacity purchase costs incurred by the Company.

    b. If customer has not notified the Company of any need for Supplemental Generation Service at least three hours prior to the Company's system peak hour, such Supplemental Generation Peak Demand charges shall be based on one-sixth of any additional capacity costs or after-the-fact purchase costs incurred by the Company as a result of using Supplemental Generation Service. The demand for billing purposes for the succeeding five months shall be equal to the Supplemental Generation Demand placed on the system during the time of the Company's system peak hour.

(Continued on Sheet No. 5-113)

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SUPPLEMENTAL GENERATION SERVICE RIDER Section No. 5
(Continued) 8th Revised Sheet No. 113

TERMS AND CONDITIONS OF SERVICE (Continued)

The potential capacity charge provisions of this Section 10 shall not apply if appropriate capacity accreditation has been obtained for the customer's generation from the Midwest Reliability Organization (MRO), or any successor organization. Customer must take responsibility for the preparation of the information necessary for the accreditation filing. The Company can advise and assist the Customer in this process but failure of customer in the preparation of the information and/or failure to obtain accreditation of the customer's generation will result in the customer being ineligible for the exemption from the capacity charge provisions of this Section 10.

11. In the event any portion of the capacity obtained by the Company at additional costs and which is attributable to the customer's use of Supplemental Service under Section 10 above, is subsequently also used to satisfy the requirements of the Company's other customers, the peak demand charges under Section 10 above shall be reduced relative to the portion of said capacity used to serve the other customers.

12. The Company shall provide notice to the Supplemental Generation Service customers when energy control or peak control conditions are expected to occur through the same means that the Company notifies interruptible customers of the potential interruption.

13. Company will install and charge customer for the additional metering necessary, as determined by the Company, to allow for determination of the separate billing demands applicable to the base tariff, Standby Service Rider and Supplemental Generation Service Rider demands. In particular, the Company will install a separate meter that measures the flow of power and energy from the customer's own generating facility. Customer shall reimburse the Company for the costs of installing, operating, and maintaining the required additional metering and for any other facilities required to serve the customer's Supplemental Generation load. If, as a result of the customer's construction and installation of their generating facility, it is more practical for the customer to install some or all of the metering equipment required, customer may be permitted to do so subject to Company's approval of such equipment.

(Continued on Sheet No. 5-114)

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SUPPLEMENTAL GENERATION SERVICE RIDER Section No. 5
(Continued) 7th Revised Sheet No. 114

ADDITIONAL TERMS AND CONDITIONS ASSOCIATED WITH SCHEDULING MAINTENANCE

1. Supplemental Generation Service customers shall schedule maintenance of their power source during qualifying scheduled maintenance periods.

2. Qualifying Scheduled Maintenance Periods

   Customers With Greater than 60 kW up to 10,000 kW of Contracted Standby and Supplemental Generation Capacity. Maintenance must occur within the calendar months of April, May, October, and November. Customer must provide Company with written notice of scheduled maintenance prior to the beginning of the maintenance period.

   Customers With Greater Than 10,000 kW of Contracted Standby and Supplemental Generation Capacity. Maintenance must occur at a time period mutually agreed to by Company and customer. These time periods will normally not include those times when Company expects system seasonal peak load conditions to occur, nor at those times when Company is required to use generation equipment or to purchase power that results in production costs of $70 or more per MWh. Customer shall provide an annual projection of scheduled maintenance to the Company. Customer shall be allowed changes or additions to this projection upon notice to the Company based on the following schedule:

Outage Length	Required Notice
Less than 48 hours	24 hours
2 days to 30 days	7 days
Over 30 days	90 days

3. The duration of qualifying scheduled maintenance periods may not exceed a total of six weeks in any 12 month period.

4. An additional charge shall apply if customer does not comply with all terms and conditions for qualifying scheduled maintenance periods. The additional charge shall be determined by calculating the additional charges which would have applied if customer were billed on the Unscheduled Maintenance Option for the period extending back to the customer's last scheduled maintenance period.

5. The demand charges of the base tariffs of General Service or General Time of Day Service shall not apply to use of Supplemental Service during qualifying scheduled maintenance periods.

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TIER 1 ENERGY CONTROLLED SERVICE RIDER Section No. 5
RATE CODE A27 13th Revised Sheet No. 115

AVAILABILITY
Availability is restricted to customers who are taking service on the Tier 1 option of the Peak Controlled Time of Day Service.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

RATE
The rates and provisions of Tier 1 of the Peak Controlled Time of Day Service schedule shall apply except that the on peak and off peak energy charges for secondary voltage are replaced as follows:

Energy Charge per kWh		
Firm On Peak Period Energy	$0.04855	R
Firm Off Peak Period Energy	$0.02341	R
Controllable On Peak Period Energy	$0.04647	R
Controllable Off Peak Period Energy	$0.02280	R
Control Period Energy	$0.09000	

TERMS AND CONDITIONS OF SERVICE
1. Failure to Control Charge: Except as provided for under Control Period Energy Service described below, the following charges will apply in any month customer fails to control load to Predetermined Demand Level or fails to control the full amount of their fixed Controllable Demand under the Optional PDL:
   a. An additional charge of $10.00 per kW will apply during each Company specified control period to the amount by which customer's Maximum Adjusted Demand exceeds their Predetermined Demand Level, and
   b. The Control Period Energy charge will apply to the energy used during the control period that is associated with the customer's Controllable Demand.

   After three such customer failures to control load to their Predetermined Demand Level, Company reserves the right to increase the Predetermined Demand Level or remove customer from Tier 1 Energy Controlled Service Rider and apply the cancellation charge specified in customer's Electric Service Agreement.

(Continued on Sheet No. 5-116)

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

TIER 1 ENERGY CONTROLLED SERVICE RIDER Section No. 5
RATE CODE A27 14th Revised Sheet No. 115

AVAILABILITY2
Availability is restricted to customers who are taking service on the Tier 1 option of the Peak Controlled Time of Day Service.

INTERIM RATE ADJUSTMENT
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the "Interim Rate Surcharge Rider" to service provided beginning January 1, 2022.

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In addition, customer bills under this rate are subject to the following adjustments and/or charges.

RATE
The rates and provisions of Tier 1 of the Peak Controlled Time of Day Service schedule shall apply except that the on peak and off peak energy charges for secondary voltage are replaced as follows:

Energy Charge per kWh

Firm On Peak Period Energy	$0.04855
Firm Off Peak Period Energy	$0.02341
Controllable On Peak Period Energy	$0.04647
Controllable Off Peak Period Energy	$0.02280
Control Period Energy	$0.09000

TERMS AND CONDITIONS OF SERVICE

1. Failure to Control Charge: Except as provided for under Control Period Energy Service described below, the following charges will apply in any month customer fails to control load to Predetermined Demand Level or fails to control the full amount of their fixed Controllable Demand under the Optional PDL:
   a. An additional charge of $10.00 per kW will apply during each Company specified control period to the amount by which customer's Maximum Adjusted Demand exceeds their Predetermined Demand Level, and
   b. The Control Period Energy charge will apply to the energy used during the control period that is associated with the customer's Controllable Demand.

   After three such customer failures to control load to their Predetermined Demand Level, Company reserves the right to increase the Predetermined Demand Level or remove customer from Tier 1 Energy Controlled Service Rider and apply the cancellation charge specified in customer's Electric Service Agreement.

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TIER 1 ENERGY CONTROLLED SERVICE RIDER Section No. 5
(Continued) 8th Revised Sheet No. 116
RATE CODE A27

TERMS AND CONDITIONS OF SERVICE (Continued)

2. The duration and frequency of interruption periods shall be at the discretion of Company. Interruption periods will normally occur at such times when:
   a. Company is required to use generation equipment or to purchase power that results in production costs in excess of $70 per MWH,
   b. Company expects a reasonable possibility of system load levels surpassing the level for which NSP has sufficient accredited capacity under the Midwest Reliability Organization (MRO) or any successor organization, including reserve requirements, or
   c. In Company's opinion, the reliability of the system is endangered.

3. Customer's Electric Service Agreement with Company will include a maximum of 300 hours of interruption per year.

4. All other provisions of Tier 1 of the Peak Controlled Time of Day Service schedule not in conflict with the Tier 1 Energy Controlled Service Rider shall apply.

CONTROL PERIOD ENERGY SERVICE

AVAILABILITY

Available to Tier 1 Energy Controlled Service Rider customers for supply of Controllable Demand related energy during control periods. The Control Period Energy charge will apply when the Company is required to use generation equipment or to purchase power that results in production costs in excess of $70 per MWh. Control Period Energy Service will not be available when Company expects system peak load conditions or during system emergencies.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

RATE

The control period energy charge will apply to all Controllable Demand related energy used during the control period.

TERMS AND CONDITIONS OF SERVICE

1. Control Period Energy Service will be available provided such service will not adversely affect firm service to any customer.

2. Company reserves the right to refuse or control the supply of Control Period Energy Service if its capacity is not adequate to furnish such service.

(Continued on Sheet No. 116.1)

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

TIER 1 ENERGY CONTROLLED SERVICE RIDER Section No. 5
(Continued) 5th Revised Sheet No. 116.1
RATE CODE A27

TERMS AND CONDITIONS OF SERVICE (Continued)

3. All other provisions of the Tier 1 Energy Controlled Service Rider not in conflict with Control Period Energy Service shall apply.

4. Company notice of commencement of control period will include notice of availability of Control Period Energy Service.

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

REVENUE DECOUPLING MECHANISM RIDER Section No. 5
PILOT PROGRAM 7th Revised Sheet No. 117

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(Continued on Sheet No. 5-118)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

REVENUE DECOUPLING MECHANISM RIDER (Continued) Section No. 5
PILOT PROGRAM 4th Revised Sheet No. 118

CANCELED D T

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

AREA DEVELOPMENT RIDER

Section No. 5
5th Revised Sheet No. 119

AVAILABILITY

Available to new or existing demand metered customers located in Area Development Zones whose proper Standard Industrial Classification (SIC) is manufacturing or wholesale trade and who qualify for other development incentives offered by local government entities. The availability of this Rider is limited to specific Area Development Zones that meet the criteria listed below as set forth by the Commission.

ZONE DESIGNATION

Area Development Zones in the seven county Twin Cities' metropolitan area (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington Counties) must be located within one of the cities lying within the "Fully Developed Area" as classified by the Metropolitan Council in the document entitled "Metropolitan Development and Investment Framework (December 1988)" that has experienced a decline in combined employment in manufacturing and wholesale trade between 1980 and the most recent year for which data are available as published by the Minnesota Department of Economic Security. Eligible communities are Bloomington, Columbia Heights/Hilltop, Crystal, Fridley, Golden Valley, Hopkins, Minneapolis, New Brighton, Roseville, South St. Paul, St. Louis Park, and St. Paul. Area Development Zones in cities located outside the seven county Twin Cities' metropolitan area must be located in a city with a minimum population of 25,000 based on the most recent U.S. Census of Population and must be located in a county (or counties) that have experienced a decline in combined employment in manufacturing and wholesale trade between 1987 and the most recent year for which data are available as published by the Minnesota Department of Economic Security. The Area Development Zone must be an existing or proposed industrial park with a minimum size of ten acres. The maximum total number of active zones at any time is 18; the maximum number of active zones in the seven county Twin Cities' metropolitan area is 15. The maximum number of active zones in any community is three. A zone can be "decertified" and a new Area Development Zone established at any time as long as there are no more than three Area Development Zones in a community at any point in time.

RATE

The rates and provisions of the customer's regular rate schedule shall apply except monthly demand charges for customer's Qualified Billing Demand shall be reduced as follows:

Years	Percent Reduction
1 - 3	50%
4	30%
5	20%
6	0%

(Continued on Sheet No. 5-120)

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AREA DEVELOPMENT RIDER (Continued)
Section No. 5
5th Revised Sheet No. 120

QUALIFIED BILLING DEMAND
The portion of the customer's billing demand that qualifies for reduced demand charges.

New Customers. The total billing demand of new customers shall be defined as Qualified Billing Demand.

Existing Customers. The billing demand in excess of customer's base billing demand shall be defined as qualified billing demand. The base billing demand for each month will be calculated by averaging the monthly billing demands from the two-year period immediately preceding the customer's application for this Rider.

NEW CUSTOMERS
To be considered a new customer for the purpose of this Rider, an applicant must demonstrate one of the following:

1. That business has not been conducted at the premises for at least three monthly billing periods prior to application,
2. That the predecessor customer is in bankruptcy and the applicant has obtained the business in a liquidation of assets sale,
3. Customer's activities are largely or entirely different in nature from that of the previous customer, or
4. If the activities are not so different, that the owner(s), operator(s), or manager(s) are substantially different.

EXISTING CUSTOMERS
Existing customers who materially increase their use of electric service may qualify for service under this Rider, provided such material increase is the result of the addition of equipment, or expansion of the customer's facility or operations. The customer shall notify the Company in writing and document the basis for the material increase in its use of electric service. Following such notification, the Company will review the customer's monthly billing demands. If the billing demands for each of the next three consecutive months exceed that from the comparable monthly period of the preceding year by at least 25%, the customer will be eligible thereafter to receive service under this Rider.

RIGHT TO REFUSE SERVICE
The Company reserves the right to refuse applicants for service under this Rider if it determines that significant additional capital expenditures will be required to provide service to that applicant. In such cases, an applicant may be able to qualify for service by making a non-refundable contribution to compensate for the significant additional capital costs incurred by the Company to supply service to the applicant.

(Continued on Sheet No. 5-121)

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AREA DEVELOPMENT RIDER (Continued)
Section No. 5
5th Revised Sheet No. 121

ENERGY EFFICIENCY
For service taken on this Rider, the Company will conduct an energy audit and inform the customer of the conservation programs available from the Company.

ELECTRIC SERVICE AGREEMENT
Any customer taking service under this Area Development Rider shall execute an Electric Service Agreement, or amend their existing Electric Service Agreement, with the Company for a period of six years beginning on the effective date on which the customer commences taking service under this Rider; however, customers who began service under the Pilot Area Development Rider before June 28, 1995, with Electric Service Agreement terms of five years, will not be required to amend or modify those agreements. Such Electric Service Agreements (new or amended) shall state the increased or new load level of the customer as well as the customer's obligation to continue to purchase all of their electric power and electric energy from the Company during the term of the agreement.

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COMPETITIVE RESPONSE RIDER

Section No. 5
6th Revised Sheet No. 122

AVAILABILITY

Available at Company's discretion to demand-metered commercial and industrial customers that are subject to effective competition.

Effective competition exists if a customer is located in Company's service territory and has the ability to obtain its energy requirements from an energy supplier not rate regulated by the Minnesota Public Utilities Commission ("Alternate Supplier") for: T N

1. Existing customers with a minimum load of 2 MW that are located in Company's service territory and subject to effective competition by having the ability to obtain its energy requirements from an Alternate Supplier, or N N N
2. New customers with a minimum initial load of 10 MW with the ability to increase total load to 75 MW within five years that are subject to effective competition by having the ability to locate a new facility outside Company's service territory with energy requirements provided by an Alternate Supplier. N N N

RATE

Standard service rates and provisions, including controllable service provisions, apply except the level of the demand charges, energy charges, or both may be reduced for each customer as described below.

TERMS AND CONDITIONS OF SERVICE

1. Customer must provide Company with information that documents that service to the customer is subject to effective competition. The Company will treat information provided by the customer to the Company concerning load levels and effective competition that meets the definition of trade secret information under the Minnesota Government Data Practices Act ("Act") as trade secret information and, if provided to the Commission or other state agency, will request that the Commission or any other state agency treat the information as trade secret under the Act. T T

2. Minimum load served under this Rider is 2 MW for existing customers and 10 MW for new customers. Any rate offered under this Rider shall not be available for any month in which the load served under this Rider falls below the required minimum load level. N C

3. Customer must execute an Electric Service Agreement with Company, or amend its existing Electric Service Agreement with the Company, to include:
   a. The rate under this Rider, which:
      i) must recover at least the incremental cost of providing service, including the cost of incremental capacity that is to be added while the rate is in effect and any applicable on peak or off peak differential;
      ii) must not exceed the difference between the standard tariff and the cost to the customer of the lowest cost competitive energy supply; and
      iii) includes an annual minimum charge to fully recover distribution costs.

(Continued on Sheet No. 5-123)

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COMPETITIVE RESPONSE RIDER (Continued)
Section No. 5
7th Revised Sheet No. 123

TERMS AND CONDITIONS OF SERVICE

3. Customer must execute an Electric Service Agreement with Company, or amend its existing Electric (Continued)
   b. The term of service under this Rider, which must be no less than one year and no longer than seven years for existing customers and ten years for new customers, beginning on the date the customer begins taking service under this Rider, N T
   c. The size of the load served under this Rider,
   d. Verification that customer has been fully informed of the availability of energy audits. If no energy audit is performed for customer, an explanation of why an energy audit was not necessary will be included.
   e. Establishing the effective date of the rate, which must be at least 60 days after the date upon which the Company files its petition for Commission approval of the Electric Service Agreement,
   f. If the Customer requests that the rate be implemented on an interim rate basis, a statement that the rate will be treated as an interim rate as of the effective date and until Commission approval, modification or disapproval is received. If a modified rate is approved and accepted by the customer and Company, or if the rate is disapproved, the Company will recover the difference between the interim rate and the approved rate (modified or base) from the customer, and
   g. Requirements for a bond or other security acceptable to the Company to provide full recovery of any portion of any interim rate discount disallowed by the Commission.

4. For existing customers receiving a discount, the Company, within a general rate case, is allowed to seek recovery of the difference between the applicable commercial and industrial tariff and this Rider times the usage level during the test year period.

5. A rate under this Rider shall meet the conditions of Minnesota Statutes, Section 216B.03, Reasonable Rate, for other customers in this same customer class.

6. Unless the Commission determines that it would be in the public interest, a rate under this Rider shall not compete with district heating or cooling provided by a district heating utility defined by Minnesota Statutes, Section 216B.166, Subdivision 2, Paragraph (c).

7. A rate offered under this Rider may not be offered to a customer in which the Company has a financial interest greater than 50%.

(Continued on Sheet No. 5-124)

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COMPETITIVE RESPONSE RIDER (Continued)

Section No. 5
6th Revised Sheet No. 124

REGULATORY REVIEW

If the Customer requests that the rate be implemented on an interim rate basis, the rate offered under this Rider will be effective on an interim basis after filing by Company of the proposed rate with the Commission and upon the date specified in the Electric Service Agreement. If the Commission does not approve the rate, Company may seek to recover the difference in revenues between the interim competitive rate and the modified rate or the standard tariff rate, as applicable, from the customer who was offered the competitive rate.

The Commission has the authority to approve, modify, or reject a rate under this Rider. If the Commission approves the rate, it is effective as agreed to by the Company and customer. If the rate is modified by the Commission, the Commission shall issue an order modifying the rate subject to the approval of the Company and the customer. Each party has ten days in which to reject the proposed modification. If no party rejects the proposed modifications, the Commission's order becomes final. If either party rejects the Commission's proposed modifications, the Company on its behalf or on the behalf of the customer, may submit to the Commission a modified version of the Commission's proposal, which modified rate shall become an interim rate. The Commission shall accept or reject the modified version within 30 days. If the Commission rejects the rate, it shall issue an order indicating the reasons for the rejection.

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PHOTOVOLTAIC DEMAND CREDIT RIDER
RATE CODE A85 (CLOSED)
RATE CODE A86

Section No. 5
5th Revised Sheet No. 125

AVAILABILITY – GENERAL
Applicable by customer request to demand-metered commercial and industrial customers that use Solar Photovoltaic as a customer-sited generation source with a capacity greater than 40 kW (AC) with a single production meter to serve all or a portion of customer's electric energy requirements. Not available to customer-sited generation that is the subject of another incentive program such as Solar*Rewards.

AVAILABILITY – CLOSED RATE
Availability of the closed rate is limited to qualifying customer account locations that: 1) were receiving Standby Service Rider tariff service with the Photovoltaic Solar Credit on the date this Rider was originally approved by the Commission, or 2) have enrolled by submitting to the Company a complete interconnection application for a planned qualifying generation source before February 14, 2020. The closed rate will expire April 20, 2027. After expiration of the closed rate, the applicable standard rate will replace the closed rate. C C

The standard rate will apply to customer account locations that do not qualify for the closed rate. The standard rate may be revised at any time subject to approval by the Commission.

RATE
Customer Charge per Month $25.75

Credit per kWh of Peak Period Solar Photovoltaic Generation (A85 - Closed)	$0.071390
Credit per kWh of Peak Period Solar Photovoltaic Generation (A86 - Standard)	$0.069648

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CREDIT KWH LIMIT
The maximum kWh applied to the Rider credit per kWh each billing period is the Peak Period maximum 15-minute Solar Photovoltaic kW output for the billing period times 100 hours for billing periods ending in the months of June, July, August or September and 75 hours for billing periods ending in other months.

CREDIT LIMIT
The maximum credit for each billing period is the applicable standard or on-peak billed demand charge from the base tariff associated with this Rider. For Peak-Controlled Service and Peak-Controlled Time of Day Service customers, the maximum credit for each billing period is the billed demand charge for Firm Demand.

DEFINITION OF PEAK PERIOD
Peak period hours are the six hours between 1:00 p.m. and 7 p.m. for all days.

TERMS AND CONDITIONS OF SERVICE
1. Customer will execute an Electric Service Agreement with the Company that will specify:
   a) The base tariff associated with this Rider, and
   b) The installed capacity (AC) of customer's Solar Photovoltaic generation.
2. Company will install, own, and maintain the metering to measure the electric power and energy supplied by customer generation to allow for proper billing of the customer under this Rider. If, as a result of the customer's construction and installation of their generating facility, it is more practical for the customer to install some or all of the metering equipment required, the customer may be permitted to do so, subject to Company's approval of such equipment.
3. Company reserves the right to limit availability of this Rider to customer situations where the Solar Photovoltaic generation used by customer does not significantly affect the monthly peak demand of customer.
4. For Solar Photovoltaic generation, this Rider supersedes other Standby Service tariff provisions.

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PHOTOVOLTAIC DEMAND CREDIT RIDER
RATE CODE A85 (CLOSED)
RATE CODE A86

Section No. 5
6th Revised Sheet No. 125

AVAILABILITY – GENERAL
Applicable by customer request to demand-metered commercial and industrial customers that use Solar Photovoltaic as a customer-sited generation source with a capacity greater than 40 kW (AC) with a single production meter to serve all or a portion of customer's electric energy requirements. Not available to customer-sited generation that is the subject of another incentive program such as Solar*Rewards.

AVAILABILITY – CLOSED RATE
Availability of the closed rate is limited to qualifying customer account locations that: 1) were receiving Standby Service Rider tariff service with the Photovoltaic Solar Credit on the date this Rider was originally approved by the Commission, or 2) have enrolled by submitting to the Company a complete interconnection application for a planned qualifying generation source before February 14, 2020. The closed rate will expire April 20, 2027. After expiration of the closed rate, the applicable standard rate will replace the closed rate.

The standard rate will apply to customer account locations that do not qualify for the closed rate. The standard rate may be revised at any time subject to approval by the Commission.

RATE
Customer Charge per Month $25.75

Credit per kWh of Peak Period Solar Photovoltaic Generation (A85 - Closed)	$0.071390
Credit per kWh of Peak Period Solar Photovoltaic Generation (A86 - Standard)	$0.069648

INTERIM RATE ADJUSTMENT
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the “Interim Rate Surcharge Rider” to service provided beginning January 1, 2022. N N N

CREDIT KWH LIMIT
The maximum kWh applied to the Rider credit per kWh each billing period is the Peak Period maximum 15-minute Solar Photovoltaic kW output for the billing period times 100 hours for billing periods ending in the months of June, July, August or September and 75 hours for billing periods ending in other months.

CREDIT LIMIT
The maximum credit for each billing period is the applicable standard or on-peak billed demand charge from the base tariff associated with this Rider. For Peak-Controlled Service and Peak-Controlled Time of Day Service customers, the maximum credit for each billing period is the billed demand charge for Firm Demand.

DEFINITION OF PEAK PERIOD
Peak period hours are the six hours between 1:00 p.m. and 7 p.m. for all days.

TERMS AND CONDITIONS OF SERVICE
1. Customer will execute an Electric Service Agreement with the Company that will specify:
   a) The base tariff associated with this Rider, and
   b) The installed capacity (AC) of customer’s Solar Photovoltaic generation.
2. Company will install, own, and maintain the metering to measure the electric power and energy supplied by customer generation to allow for proper billing of the customer under this Rider. If, as a result of the customer’s construction and installation of their generating facility, it is more practical for the customer to install some or all of the metering equipment required, the customer may be permitted to do so, subject to Company’s approval of such equipment.
3. Company reserves the right to limit availability of this Rider to customer situations where the Solar Photovoltaic generation used by customer does not significantly affect the monthly peak demand of customer.
4. For Solar Photovoltaic generation, this Rider supersedes other Standby Service tariff provisions.

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TIER 1 PEAK CONTROLLED SHORT NOTICE RIDER

Section No. 5
11th Revised Sheet No. 126

AVAILABILITY

Availability is restricted to customers who are taking service on the Tier 1 option of Peak Controlled Service or Peak Controlled Time of Day Service. Customers choosing service under this rider shall agree to allow the Company to interrupt customer's load to a predetermined level within 10 minutes notice of a control period. Availability is restricted to customers with a minimum certified controllable load of 3,000 kW. Participation is limited to 100,000 kW of controllable demand, which may be exceeded if part of a customer's controllable load is within the participation limit, subject to Company approval.

CONTRACT

Customers must contract for this service rider through an Electric Service Agreement with Company. Contract period will normally be for 24 months.

RATE

The rates and provisions of Tier 1 of the applicable Peak Controlled Service schedule shall apply with the customer's Controllable Demand billed at the Short Notice Controllable Demand charge.

TERMS AND CONDITIONS OF SERVICE

1. Within 10-minutes of notification from the Company, customer's controllable load shall be curtailed by Company-initiated automatic control for the duration of the control period as determined by the Company.

2. Customers taking service under this rider will be required to certify their interruptible load as described below under Certification of Interruptible Load. Customer will cooperate fully with and assist in the required certification process. Failure of customer to assist in the certification process and/or failure to obtain certification of the Controllable Demand level will result in the customer being ineligible for this tariff.

3. Certification of Interruptible Load: To be eligible, the customer's interruptible load must complete an annual control test, prior to the beginning of the Company's summer peak load season. The control test must:
   - Demonstrate that the load is controlled by the Company from its control center;
   - That the load is curtailed within ten minutes of a Company declared control period.
   - The controlled load must remain off for at least four (4) hours in the first year of application and at least one (1) hour in subsequent years.
   - The timing of the control test will be coordinated with the customer but must be conducted at a time when the customer's load is at or near the level expected during actual control periods.

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TIER 1 PEAK CONTROLLED SCHEDULE L Section No. 5
INTERRUPTION RIDER (Continued) 10th Revised Sheet No. 127

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(Continued on Sheet No. 5-128)

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TIER 1 PEAK CONTROLLED SCHEDULE L
INTERRUPTION RIDER (Continued)

Section No. 5
4th Revised Sheet No. 128

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MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

CITY REQUESTED FACILITIES SURCHARGE RIDER Section No. 5
7th Revised Sheet No. 131

APPLICABILITY
Applicable to bills for electric service provided under the Company's retail rate schedules in a City ordering the installation of non-standard underground Distribution Facilities. The Excess Expenditure costs for these Special Facilities are to be collected from customers located within such City in accordance with the provisions in the General Rules and Regulations, Section 5.3, SPECIAL FACILITIES.

The Company will provide notice to the affected City of any miscellaneous rate filing by Company under Minn. Stat. §216.B16, Subd. 1 to establish a Special Facilities surcharge applicable to customers in such City.

RATE
In each applicable City, there shall be included in the monthly minimum billing on each customer's bill a separately itemized surcharge line item determined in accordance with this Rider entitled "City Req Fac Srchg". The City Requested Special Facilities Surcharge shall not be subject to current month billing adjustments or City surcharges and shall be subject to any applicable sales taxes.

DETERMINATION OF CITY REQUESTED FACILITIES SURCHARGE
The City Requested Special Facilities Surcharge for each applicable City project shall be calculated by determining a Class Facilities Surcharge to be applied to the Average Monthly Customers in the designated City such that the total Excess Expenditure plus carrying charges in the City Project Tracker Account are recovered over the designated Recovery Period.

Average Monthly Customers shall be the projected average number of active customers in each applicable customer classification located in the City for the designated Recovery Period.

Class Facilities Surcharge shall be the surcharge amount for each applicable customer classification determined in accordance with the Rules for Application.

City Project Tracker Account is a regulatory asset account representing the sum of the following:

(1) The total Excess Expenditures for each Distribution Facilities undergrounding project in such City,

(2) Monthly carrying charges on the under recovered or over recovered monthly balance in the City Project Tracker Account based on the overall rate of return from the Company's most recent electric general rate case decision,

(3) Less the recovered project costs collected to date through the applicable City's Facilities Surcharge.

Recovery Period is the number of months the City Requested Special Facilities Surcharge shall be applied to bills for a designated City project determined in accordance with the Rules for Application.

Excess Expenditures shall be determined in accordance with the provisions in the General Rules and Regulations, Section 5.3.

(Continued on Sheet No. 5-132)

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MINNESOTA ELECTRIC RATE BOOK – MPUC NO. 2

CITY REQUESTED FACILITIES SURCHARGE RIDER Section No. 5
(Continued) 6th Revised Sheet No. 132

RULES FOR APPLICATION

1. The Recovery Period shall not commence until the City Requested Facilities Surcharge to be applied to bills is at least $0.25 per customer per month. A surcharge of $0.25 up to and including $1.00 per customer regardless of customer class may be applied for a Recovery Period of exactly one month (e.g., a one-time surcharge).

2. For a Recovery Period greater than one month, the Class Facilities Surcharge per month per customer in each non-residential customer class for any month in which a Residential Class Facilities Surcharge is applicable shall be as follows:

   a. Commercial & Industrial (C&I), Street Lighting and Municipal – Non-Demand Billed: Equal to the Residential Class Facilities Surcharge.

   b. Small C&I and Small Municipal – Demand Billed: Three times the Residential Class Facilities Surcharge.

   c. Large C&I – Demand Billed (actual demand greater than 100 kW): Four times the Residential Class Facilities Surcharge.

   However, whenever the Non-residential Class Facilities Surcharges to be billed exceed the Customer Charge applicable on a customer account, the Class Facilities Surcharge for that account shall be equal to such Customer Charge.

3. A Residential Class Facilities Surcharge of $0.25 up to and including $1.00 per Residential customer per month will be applied each month whenever the City Project Tracker Account balance to be collected allows for a Recovery Period of 36 months or less.

4. A Residential Class Facilities Surcharge of over $1.00, up to and including $5.00, per Residential customer per month will be applied each month for a Recovery Period of 36 months whenever the City Project Tracker Account balance is uncollectable at a Residential Class Facilities Surcharge level of $1.00 or less, provided that the surcharge amount for any Residential class customer account receiving a Low Income Energy Discount shall not exceed $1.00 per month.

5. A Residential Class Facilities Surcharge of $5.00 per Residential customer per month for a Recovery Period of 36 months up to and including 60 months will be applied only when necessary to recover the City Project Tracker Account balance, provided a surcharge of $5.00 may be collected pending Commission action on a Company petition or City complaint to modify the design of the rate surcharge for a specific project which cannot be recovered in 60 months.

(Continued on Sheet No. 5-133)

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CITY REQUESTED FACILITIES SURCHARGE RIDER Section No. 5
(Continued) 6th Revised Sheet No. 133

RULES FOR APPLICATION (Continued)

6. The Class Facilities Surcharges may be adjusted annually and in the last 6 months of the Recovery Period to more closely recover the balance remaining in the City Project Tracker Account.

7. Subject to the limits on monthly surcharge amounts set forth above, the Class Facilities Surcharges may also be increased at any time and the Recovery Period may be updated, with notice as provided in Section 5.3 of the General Rules and Regulations, in order to recover Excess Expenditures associated with additional Distribution Facilities undergrounding projects requested or ordered by City.

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VOLUNTARY RENEWABLE AND HIGH-EFFICIENCY ENERGY PURCHASE (WINDSOURCE PROGRAM) RIDER

Section No. 5
7th Revised Sheet No. 134

AVAILABILITY
Available to any customer who elects to apply an adjustment to the customer's electric energy usage to contribute to the development of renewable and high-efficiency energy resources as defined by Minn. Stat. §216B.169.

In addition, customer bills under this rate are subject to the following adjustments and/or charges.

RIDER
A Voluntary Renewable Adjustment ("Adjustment") may be elected in blocks of 100 kWh or for the customer's entire monthly usage or for a single event. Each month the Adjustment will add **$3.53** per 100 kWh block of renewable usage and will be prorated on a kWh basis based on the customer's actual metered energy usage for the billing period not to exceed their subscription level. The Adjustment shall be applied to the customer's bill under the standard retail tariff each billing month according to the number of energy block(s) or total amount purchased. The Adjustment is not subject to the Fuel Clause Rider but is subject to any other applicable adjustments and surcharges, including city surcharge or sales tax. The Voluntary Renewable Adjustment will appear on the bill as "Windsource Program." Amounts collected pursuant to the Adjustment will be expended on a program, filed with the Commission, to develop renewable and high efficiency energy resources.

DETERMINATION OF VOLUNTARY RENEWABLE ADJUSTMENT
The Voluntary Renewable Adjustment shall be calculated by dividing the recoverable program expenses and annual tracker balance by the forecasted renewable energy for a designated recovery period. The recoverable program expenses include renewable energy purchases, marketing, other costs and true up of tracker balance for this program. The Adjustment may be revised annually with approval of the Minnesota Public Utilities Commission.

FORECASTED RENEWABLE ENERGY
Forecasted renewable energy sales shall be the estimated total Windsource MWh sales for the designated annual tracker recovery period.

TRACKER ACCOUNT
Due to the variability of renewable resources, the Windsource program may have an excess or shortage of supply in any given hour but will approximately balance out during the year. The Company will maintain accounting of the monthly balance of total revenues collected under the Adjustment and the expenses associated with offering this Adjustment, including the renewable energy purchases, marketing and other costs for this program. The Company may petition the Commission annually to true up the tracker balance in its November 1st report.

(Continued on Sheet No. 134.1)

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VOLUNTARY RENEWABLE AND HIGH-EFFICIENCY ENERGY PURCHASE (WINDSOURCE PROGRAM) RIDER (Continued)

Section No. 5
6th Revised Sheet No. 134.1

TERMS AND CONDITIONS OF SERVICE

1. A customer may elect to subscribe either by purchasing a specified number of 100 kWh blocks or the customer's entire usage. The minimum subscription to be billed each month is one 100 kWh block. In the event a customer's metered energy usage results in the partial consumption of a 100 kWh block, the charge on that block will be prorated accordingly.

2. The minimum subscription periods are one year for residential customers and three years for non-residential customers. After the minimum period, a customer may continue to subscribe on a month to month basis and may terminate the customer's subscription with a 30-day notice.

3. The Company will submit reports to the Commission each May 1 and November 1, or as otherwise ordered in relation to the tracker accounting.

4. For customers on time of day tariffs, their Windsource usage and any excess, non-Windsource usage shall both be assigned to the on-peak and off-peak periods in proportion to the customer's total billing period on-peak and off-peak usage.

5. Xcel Energy may in its discretion allow a non-Windsource customer a limited subscription to Windsource to apply the Adjustment to the energy used by a single event or series of events without making a long-term purchase commitment.

6. The discounts under Residential Controlled Air Conditioning and Water Heating Rider and Commercial and Industrial Controlled Air Conditioning Riders are not applicable to the charges under this Rider.

7. This Rider is provided to satisfy the conditions of Minn. Stat. §216B.169, subd.2 related to renewable and high-efficiency energy rate options. The sales arrangements of renewable energy from the Windsource program supplies are such that the power supply is sold only once to retail customers.

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WAPA BILL CREDITING PROGRAM RIDER
Section No. 5
5th Revised Sheet No. 135

AVAILABILITY
This rider is available on a voluntary basis and is limited to customers who are eligible for the Western Area Power Administration ("Western" or "WAPA") Bill Crediting Program.

TERM OF SERVICE
Service under this rider shall be for a period not less than 90 days.

PRICING METHODOLOGY
The WAPA Bill Credit shall be calculated as specified in the Commission approved Bill Crediting Agreement between the customer and the Company.

BILL DETERMINATION
The WAPA Bill Credit will be applied to the customer's standard monthly bill rendered after each monthly billing period.

SPECIAL PROVISIONS
1. Eligibility for the Program, and thus this Rider, is determined by the customer and Western, and not by Xcel Energy.

2. If there is a change in the legal identity of the customer receiving service under this Rider, credit under this Rider shall be terminated unless Xcel Energy, Western and the customer determine otherwise.

3. Changes are subject to the Agreement for Bill Crediting arrangements between Xcel Energy, Western and the customer, a copy of which is contained in Section 7 of this Electric Rate Book.

RULES AND REGULATIONS
Service under this Rider is subject to orders of the Minnesota Public Utilities Commission and to the General Rules and Regulations section of this Electric Rate Book.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

MERCURY COST RECOVERY RIDER Section No. 5
8th Revised Sheet No. 136

APPLICATION
Applicable to bills for electric service provided under the Company's retail rate schedules.

RIDER
There shall be included on each customer's monthly bill a Mercury Cost Recovery (MCR) Rider adjustment which will be the MCR Adjustment Factor multiplied by the customer's monthly billing kWh for electric service. This MCR adjustment shall be calculated before city charges and sales tax.

DETERMINATION OF MERCURY COST RECOVERY FACTOR
The MCR Adjustment Factor shall be the average retail cost per kWh. The average retail cost per kWh shall be determined by the forecasted balance of the MCR Tracker Account plus the Mercury Costs divided by the forecast retail sales for the designated period. The MCR Adjustment Factor shall be rounded to the nearest $0.000001 per kWh.

The MCR Adjustment Factor may be adjusted with the approval of the Minnesota Public Utilities Commission (Commission). The MCR Adjustment Factor for each rate schedule is:

All Classes	$0.000000 per kWh

MERCURY COSTS
Recoverable mercury costs shall be the revenue requirements for the designated period including operation and maintenance (O&M) expenses associated with projects eligible for recovery under Minnesota Statute Sections 216B.68 to 216B.688 that are determined by the Commission to be eligible for recovery under this Mercury Cost Recovery Rider. A standard model will be used to calculate the total forecasted revenue requirements for eligible projects for the designated period that is determined by the Commission to be eligible for recovery under this MCR Rider.

FORECASTED RETAIL SALES
Forecasted Retail Sales shall be the estimated total retail electric sales for the designated recovery period.

MCR TRACKER ACCOUNT
For each designated true-up period, a true-up adjustment to the MCR Tracker Account will be calculated reflecting the difference between the MCR Adjustment recoveries and the actual expenditures for such period. The true-up adjustment shall be included in calculating the MCR Adjustment Factor effective with the start of the next designated recovery period.

The MCR Adjustment Factor includes a true-up of actuals as available for the previous recovery period and forecast information for the remainder of the recovery period. The Final true-up adjustment for a previous recovery period will be determined by October 1 of the following year, at which time the Company will record a Final adjustment to the MCR Tracker Account. All costs appropriately charged to the MCR Tracker Account shall be eligible for recovery through this rider.

(Continued on Sheet No. 5-136.1)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MNNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

MERCURY COST RECOVERY RIDER (Continued)
Section No. 5
7th Revised Sheet No. 136.1

PROVISION OF FORECAST DATA

To assist commercial and industrial customers in budgeting and managing their energy costs, the Company will annually make available on October 1st a 24-month forecast of the MCR Adjustment Factor applicable to demand billed C&I customers under this Rider. The forecast period begins January 1st of the following year. This forecast will be provided only to customers who have signed a protective agreement with the Company.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ENVIRONMENTAL IMPROVEMENT RIDER Section No. 5
12th Revised Sheet No. 137

APPLICATION
Applicable to bills for electric service provided under the Company's retail rate schedules.

RIDER
There shall be included on each customer's monthly bill an Environmental Improvement Rider (EIR) adjustment. For all but demand-billed customers, the adjustment shall be the Full EIR Energy Adjustment Factor multiplied by the customer's monthly billing kWh for electric service. For demand-billed customers, the adjustment shall be the Reduced EIR Energy Adjustment Factor multiplied by the customer's monthly billing kWh for electric service, plus the EIR Demand Adjustment Factor multiplied by the customer's monthly kW billing demand. These EIR adjustments shall be calculated before city surcharge and sales tax.

DETERMINATION OF EIR ADJUSTMENT FACTORS
The Full EIR Energy Adjustment Factor shall be the quotient obtained by dividing the forecasted balance of the EIR Tracker Account by the forecasted retail sales for the calendar year. The Reduced EIR Energy Adjustment Factor shall be the Full EIR Energy Adjustment Factor multiplied by 50%. The EIR Demand Adjustment Factor shall be the difference between the Full and Reduced factors, multiplied by the class load factor of 53.27% and multiplied by 730 hours in an average month. All factors shall be rounded to the nearest $0.000001 per kWh. The EIR Adjustment Factors may be adjusted annually with approval of the Minnesota Public Utilities Commission (Commission). The EIR Adjustment Factors shall apply to bills rendered on and after January 1st of the year.

The EIR Adjustment Factor for each customer group may be adjusted annually. Each EIR Adjustment Factor shall apply to bills rendered on and after January 1 of the year. The EIR factor for each rate schedule is:

Non-Demand Customers	$0.000000 per kWh
Demand Customers	$0.000000 per kWh and $0.00 per kW

Recoverable EIR Costs shall be the annual revenue requirements associated with emissions reduction projects (a) not recovered through base rates, (b) recorded in the EIR Tracker Account for the designated period, and (c) determined by the Commission to be eligible for recovery under this Rider pursuant to the terms of the Settlement Agreement approved by the Commission on March 8, 2004. A standard model will be used to calculate the total forecasted revenue requirements for eligible projects for the designated period. All costs appropriately charged to the EIR Tracker Account shall be eligible for recovery through this Rider, and all revenues recovered from the EIR Adjustment shall be credited to the EIR Tracker Account.

Forecasted retail sales shall be the estimated retail electric sales for the designated recovery period.

(Continued on Sheet No. 5-138)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

ENVIRONMENTAL IMPROVEMENT RIDER (Continued)

Section No. 5
5th Revised Sheet No. 138

TRUE-UP

For each 12-month period ending December 31, a true-up adjustment to the EIR Tracker Account will be calculated reflecting the difference between the EIR Adjustment recoveries and the revenue requirements for such period. The true-up adjustment shall be calculated and recorded by no later than May 1 of the following calendar year and will be included in calculating the EIR Adjustment Factor for each customer group effective with the start of the next designated recovery period. No carrying cost shall be applied.

PROVISION OF FORECAST DATA

To assist commercial and industrial customers in budgeting and managing their energy costs, the Company will annually make available on October 1st a 24-month forecast of the EIR Adjustment Factors applicable to demand billed C&I customers under this Rider. The forecast period begins January 1st of the following year. This forecast will be provided only to customers who have signed a protective agreement with the Company.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

BUSINESS INCENTIVE AND SUSTAINABILITY RIDER
Section No. 5
3rd Revised Sheet No. 139

AVAILABILITY
Available to new or existing demand-metered commercial and industrial customers with significant new Qualified Billing Demand. Service under the Rider is limited to customers whose application for service under the Rider is approved by the Company. Also available on a temporary and limited basis to existing demand-metered commercial and industrial customers with substantial load reductions directly associated with the COVID-19 coronavirus pandemic according to the provisions of the pandemic section of this rate schedule. N N N

RATE
The rates and provisions of the customer's regular demand-metered rate schedule shall apply except monthly demand charges for customer's Qualified Billing Demand, before the application of voltage discounts, shall be reduced as follows:

Years:	1 - 3	4	5	6
Percent Reduction:	40%	20%	10%	0%

QUALIFIED BILLING DEMAND
The portion of the customer's billing demand that qualifies for reduced demand charges. Qualified billing demand includes billing demands for standard demand, on-peak period demand, firm demand and controllable demand. Qualified billing demand does not include billing demands for off-peak period demand, distribution demand, transmission and distribution demand, contracted standby demand or contracted supplemental demand.

New Customers. This Rider is available for new load that is associated with initial permanent service. For new Customers, the Qualified Billing Demand under this Rider must be a minimum of 350 kW at any single delivery point. A customer may receive the rate at multiple delivery points so long as each delivery point independently qualifies. The demand charge reduction shall not apply during any month in which the Qualified Billing Demand is below 350 kW; provided, however, the demand charge reduction shall apply during any month in which the Qualified Billing Demand is below 350 kW as a consequence of new conservation or load control by the customer. T T T

Existing Customers. For existing customers, Qualified Billing Demand is the new load of 350 kW or greater at any single delivery point incremental to that existing prior to approval for service under this Rider. A customer may receive the rate at multiple delivery points so long as each delivery point independently qualifies. The demand charge reduction shall not apply during any month in which the Qualified Billing Demand is below 350 kW; provided, however, the demand charge reduction shall apply during any month in which the Qualified Billing Demand is below 350 kW as a consequence of new conservation or load control by the customer. T T

NEW CUSTOMERS
To be considered a new customer for the purpose of this Rider, an applicant must demonstrate one of the following:
1. That business has not been conducted at the premises for at least three monthly billing periods prior to application,
2. That the predecessor customer is in bankruptcy and the applicant has obtained the business in a liquidation of assets sale; or
3. Customer's activities are largely or entirely different in nature from that of the previous customer.

(Continued on Sheet No. 5-140)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

BUSINESS INCENTIVE AND SUSTAINABILITY RIDER
Section No. 5
4th Revised Sheet No. 139

AVAILABILITY
Available to new or existing demand-metered commercial and industrial customers with significant new Qualified Billing Demand. Service under the Rider is limited to customers whose application for service under the Rider is approved by the Company. Also available on a temporary and limited basis to existing demand-metered commercial and industrial customers with substantial load reductions directly associated with the COVID-19 coronavirus pandemic according to the provisions of the pandemic section of this rate schedule.

RATE
The rates and provisions of the customer's regular demand-metered rate schedule shall apply except monthly demand charges for customer's Qualified Billing Demand, before the application of voltage discounts, shall be reduced as follows:

Years:	1 - 3	4	5	6
Percent Reduction:	40%	20%	10%	0%

INTERIM RATE ADJUSTMENT
A 13.52% Interim Rate Surcharge will be applied to rate components specified in the “Interim Rate Surcharge Rider” to service provided beginning January 1, 2022. N N N

QUALIFIED BILLING DEMAND
The portion of the customer's billing demand that qualifies for reduced demand charges. Qualified billing demand includes billing demands for standard demand, on-peak period demand, firm demand and controllable demand. Qualified billing demand does not include billing demands for off-peak period demand, distribution demand, transmission and distribution demand, contracted standby demand or contracted supplemental demand.

New Customers. This Rider is available for new load that is associated with initial permanent service. For new Customers, the Qualified Billing Demand under this Rider must be a minimum of 350 kW at any single delivery point. A customer may receive the rate at multiple delivery points so long as each delivery point independently qualifies. The demand charge reduction shall not apply during any month in which the Qualified Billing Demand is below 350 kW; provided, however, the demand charge reduction shall apply during any month in which the Qualified Billing Demand is below 350 kW as a consequence of new conservation or load control by the customer.

Existing Customers. For existing customers, Qualified Billing Demand is the new load of 350 kW or greater at any single delivery point incremental to that existing prior to approval for service under this Rider. A customer may receive the rate at multiple delivery points so long as each delivery point independently qualifies. The demand charge reduction shall not apply during any month in which the Qualified Billing Demand is below 350 kW; provided, however, the demand charge reduction shall apply during any month in which the Qualified Billing Demand is below 350 kW as a consequence of new conservation or load control by the customer.

NEW CUSTOMERS
To be considered a new customer for the purpose of this Rider, an applicant must demonstrate one of the following:
1. That business has not been conducted at the premises for at least three monthly billing periods prior to application,
2. That the predecessor customer is in bankruptcy and the applicant has obtained the business in a liquidation of assets sale; or
3. Customer's activities are largely or entirely different in nature from that of the previous customer.

(Continued on Sheet No. 5-140)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

BUSINESS INCENTIVE AND SUSTAINABILITY RIDER Section No. 5
(Continued) 3rd Revised Sheet No. 140

EXISTING CUSTOMERS
Existing customers who materially increase their use of electric service may qualify for service under this Rider, provided (1) such material increase is the result of the addition of equipment, or expansion of the customer's facility or operations and (2) the delivery point is not currently receiving service under this Rider. The customer shall notify the Company in writing and document the basis for the material increase in its use of electric service. Following such notification, the Company will review the customer's monthly billing demands. If the billing demands for each of the next three consecutive months exceed that from the comparable monthly period of the preceding year by at least 350 kW at one delivery point, the customer will be eligible thereafter to receive service under this Rider. If a customer's activities are very similar to the customer's previous activities, then the customer is considered to be an existing customer whether or not the owner(s) operator(s), or manager(s) are substantially different. T T

APPLICATION
As a condition of qualifying for a discount, Customer must make an application on a Commission approved form demonstrating that it meets the Qualified Billing Demand requirement. Information related to the Qualified Billing Demand and Investment is trade secret information under the Minnesota Government Data Practices Act ("Act").

RIGHT TO REFUSE SERVICE
The Company reserves the right to refuse applicants for service under this Rider. When the Company determines that significant additional capital expenditures will be required to provide service to that applicant, an applicant may be able to qualify for service by making a non-refundable contribution to compensate for the significant additional capital costs incurred by the Company to supply service to the applicant. T T T

ENERGY EFFICIENCY
For service taken on this Rider, the Company will conduct an energy audit and inform the customer of the conservation programs available from the Company. Customer will be responsible for some portion of the cost of the energy audit. Customer must also participate in the Company's Energy Assistance Design program or other energy efficiency program.

ELECTRIC SERVICE AGREEMENT
Any customer taking service under this Rider shall execute an Electric Service Agreement, or amend their existing Electric Service Agreement, with the Company for a period of six years beginning on the effective date on which the customer commences taking service under this Rider. Such Electric Service Agreements (new or amended) shall state the increased or new load level of the customer as well as the customer's obligation to continue to purchase all of their electric power and electric energy from the Company during the term of the agreement. The effective date of service under this rider will be set forth in the Electric Service Agreement but not before three months of qualified billing demand has occurred after the application. The Electric Service Agreement entered into pursuant to this Agreement and provision of the discount is not subject to Commission Approval. T

(Continued on Sheet No. 5-141)

Northern States Power Company, a Minnesota corporation

Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

BUSINESS INCENTIVE AND SUSTAINABILITY RIDER Section No. 5
(Continued) 3rd Revised Sheet No. 141

REPORTING REQUIREMENT
No later than 30 days after the Company signs a new ESA with a customer to be served under the BIS Rider, the Company must file with the Commission a report showing the incremental revenues and the incremental costs associated with the new ESA. If no party objects to the ESA within 30 days of the filing date, the ESA is deemed to be approved. One year from the effective date of this tariff, and annually thereafter, the Company shall file a report with the Commission identifying the number of customers receiving service under this Rider and the associated incremental additional revenues received by the Company and the incremental additional costs experienced by the Company.

REVENUE RECOVERY
The Company, within a general rate case, is allowed to seek recovery of the difference between the applicable commercial and industrial tariff and this Rider times the usage level during the test year period.

PANDEMIC AFFECTED CUSTOMER SECTION OF BUSINESS INCENTIVE AND SUSTAINABILITY RIDER N

AVAILABILITY
Available to existing demand-metered commercial and industrial customers with pre-pandemic average monthly peak load between 100 kW and 2000 kW as measured during the 12 months ending February 2020, which is substantially reduced as a direct result of the COVID-19 coronavirus pandemic. Participation in the Pandemic Affected Customer Section of this Rider is subject to Company approval and is limited to a pre-pandemic total load level of 200 MW.

RATE
The rates and provisions of the customer's regular demand-metered rate schedule shall apply except a 25 percent credit shall be applied to the total monthly base rate charges excluding customer charges, after the application of voltage discounts, for the period ending March 31, 2021.

QUALIFICATION REQUIREMENTS
Existing customers must have experienced a material and minimum 25 percent peak load reduction in direct response to government mandated requirements associated with the COVID-19 pandemic. The customer shall notify the Company in writing and document the COVID-19 basis for the electric load reduction and the associated kW load reduction. Following such notification, the Company will review the customer's monthly billing demands to confirm a material and qualifying peak load reduction. If approved by the Company, Rider credits will be applied to the customer's bill from the beginning of the billing period during which the customer for this section of the Rider is approved until March 31, 2021. The Company may discontinue the Rider credits if customer peak loads return to levels prior to the COVID-19 pandemic.

APPLICATION
As a condition of qualifying for the Rider credit, Customer must provide an application to the Company demonstrating that the COVID-19 pandemic has materially impacted its business and is responsible for a qualifying load reduction. Information tying the Customer's identification to its qualified billing demand and COVID-19 impacts to business and energy usage is trade secret information under the Minnesota Government Data Practices Act ("Act"). N

(Continued on Sheet No. 5-141.1)

Northern States Power Company, a Minnesota corporation

Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

BUSINESS INCENTIVE AND SUSTAINABILITY RIDER Section No. 5
(Continued) Original Sheet No. 141.1

ENERGY EFFICIENCY
For service taken under the Pandemic Affected Customer Section of this Rider, the Customer must have participated, or agree to participate, in at least one of the Company's energy efficiency programs.

REPORTING REQUIREMENT
Monthly during the availability of the Pandemic Affected Customer section of the Rider, the Company will file with the Commission a listing of Customers deemed eligible and participating in this section of the Rider. In its annual filing on the BIS Rider, the Company shall file a report with the Commission identifying the number of customers receiving service under this section of the Rider and the total amount of the discount.

REVENUE RECOVERY
The Company, within a general rate case, is allowed to seek recovery of the customer credits provided through the pandemic section of this Rider.

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Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

STATE ENERGY POLICY RATE RIDER Section No. 5
15th Revised Sheet No. 142

APPLICATION
Applicable to bills for electric service provided under the Company's retail rate schedules.

RIDER
There shall be included on each customer's monthly bill a State Energy Policy Rate Rider which shall be the applicable State Energy Policy Rate Rider factor multiplied by the customer's monthly kWh electric consumption.

DETERMINATION OF STATE ENERGY POLICY RATE FACTOR
The applicable State Energy Policy Rate Rider shall be the quotient obtained by dividing the annual State Energy Policy Tracker amount by the annual forecasted kWh sales. The factor may be adjusted annually with approval of the Minnesota Public Utilities Commission.

Residential	$0.000000 per kWh
Commercial	$0.000000 per kWh

Recoverable State Energy Policy Rate Expense
All costs appropriately charged to the State Energy Policy Tracker account shall be eligible for recovery through this Rider, and all revenues received from the State Energy Policy adjustment portion of the Resource Adjustment shall be credited to the State Energy Policy Tracker account.

PROVISION OF FORECAST DATA
To assist commercial and industrial customers in budgeting and managing their energy costs, the Company will annually make available on March 1st a 24-month forecast of the State Energy Policy Rate Factor applicable to demand billed C&I customers under this Rider. The forecast period begins January 1st of the following year. This forecast will be provided only to customers who have signed a protective agreement with the Company.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RENEWABLE DEVELOPMENT FUND RIDER
Section No. 5
24th Revised Sheet No. 143

APPLICATION
Applicable to bills for electric service provided under the Company's retail rate schedules.

RIDER
There shall be included on each customer's monthly bill a Renewable Development Fund charge that shall be the applicable Renewable Development Fund factor multiplied by the customer's monthly kWh electric consumption.

DETERMINATION OF RENEWABLE DEVELOPMENT FUND FACTOR
The applicable Renewable Development Fund factor shall be the quotient obtained by dividing the annual Renewable Development Fund Tracker amount by the annual forecasted kWh sales. The factor may be adjusted annually with approval of the Minnesota Public Utilities Commission.

Residential	$0.001212 per kWh	R
Commercial	$0.001212 per kWh	R

Recoverable Renewable Development Fund Expense
All costs appropriately charged to the Renewable Development Fund Tracker account shall be eligible for recovery through this Rider, and all revenues received from the Renewable Development Fund portion of the Resource Adjustment shall be credited to the Renewable Development Fund Tracker account.

PROVISION OF FORECAST DATA
To assist commercial and industrial customers in budgeting and managing their energy costs, the Company will annually make available on October 1st a 24-month forecast of the Renewable Development Fund Factor applicable to demand billed C&I customers under this Rider. The forecast period begins January 1st of the following year. This forecast will be provided only to customers who have signed a protective agreement with the Company.

EXEMPTION
For customer premises recognized by the Company as not being subject to any of the costs of satisfying the solar energy standard under Minn. Stat. § 216B.1691, subd. 2f ("SES Costs"), the SES Costs reflected in the Renewable Development Fund charge assessed to the accounts associated with these premises may be credited to these accounts, and the dollar amount of these credits shall be added as part of the annual Renewable Development Fund Tracker applicable to the time period when the credit is issued.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RENEWABLE DEVELOPMENT FUND RIDER Section No. 5
25th Revised Sheet No. 143

APPLICATION
Applicable to bills for electric service provided under the Company's retail rate schedules.

RIDER
There shall be included on each customer's monthly bill a Renewable Development Fund charge that shall be the applicable Renewable Development Fund factor multiplied by the customer's monthly kWh electric consumption.

DETERMINATION OF RENEWABLE DEVELOPMENT FUND FACTOR
The applicable Renewable Development Fund factor shall be the quotient obtained by dividing the annual Renewable Development Fund Tracker amount by the annual forecasted kWh sales. The factor may be adjusted annually with approval of the Minnesota Public Utilities Commission.

Residential	$0.000902 per kWh	R
Commercial	$0.000902 per kWh	R

Recoverable Renewable Development Fund Expense
All costs appropriately charged to the Renewable Development Fund Tracker account shall be eligible for recovery through this Rider, and all revenues received from the Renewable Development Fund portion of the Resource Adjustment shall be credited to the Renewable Development Fund Tracker account.

PROVISION OF FORECAST DATA
To assist commercial and industrial customers in budgeting and managing their energy costs, the Company will annually make available on October 1st a 24-month forecast of the Renewable Development Fund Factor applicable to demand billed C&I customers under this Rider. The forecast period begins January 1st of the following year. This forecast will be provided only to customers who have signed a protective agreement with the Company.

EXEMPTION
For customer premises recognized by the Company as not being subject to any of the costs of satisfying the solar energy standard under Minn. Stat. § 216B.1691, subd. 2f ("SES Costs"), the SES Costs reflected in the Renewable Development Fund charge assessed to the accounts associated with these premises may be credited to these accounts, and the dollar amount of these credits shall be added as part of the annual Renewable Development Fund Tracker applicable to the time period when the credit is issued.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

TRANSMISSION COST RECOVERY RIDER

Section No. 5
15th Revised Sheet No. 144

APPLICATION
Applicable to bills for electric service provided under the Company's retail rate schedules.

RIDER
There shall be included on each customer's monthly bill a Transmission Cost Recovery (TCR) adjustment, which shall be the TCR Adjustment Factor multiplied by the customer's monthly billing energy or demand for electric service as described below. This TCR Adjustment shall be calculated before city surcharge and sales tax.

DETERMINATION OF TCR ADJUSTMENT FACTORS
A separate TCR Adjustment Factor shall be calculated for the following three customer groups: (1) Residential, (2) Commercial Non-Demand, and (3) Demand Billed. The TCR Adjustment Factor for each group shall be the value obtained by multiplying each group's weighting factor by the average retail cost per kWh. The average retail cost per kWh shall be determined by the forecasted balance of the TCR Tracker Account, divided by the forecasted retail sales for the calendar year. The Demand Billed customers' TCR Adjustment Factor is calculated similarly, but the resulting per kWh charge is converted to a per kW charge for application to billed kW rather than billed kWh. TCR Adjustment Factors shall be rounded to the nearest $0.000001 per kWh or $0.001 per kW.

The TCR Adjustment Factor for each customer group may be adjusted annually with approval of the Minnesota Public Utilities Commission (Commission). Each TCR Adjustment Factor shall apply to bills rendered subsequent to approval by the Commission. The TCR factor for each rate schedule is:

Residential	$0.003607 per kWh	R
Commercial (Non-Demand)	$0.003185 per kWh	R
Demand Billed	$0.982 per kW	R

Recoverable Transmission and Distribution Costs shall be the annual revenue requirements for transmission and distribution costs associated with transmission projects and distribution planning and facilities eligible for recovery under Minnesota Statute Sections 216B.1645 or 216B.16, subd. 7b that are determined by the Commission to be eligible for recovery under this Transmission Cost Recovery Rider. A standard model will be used to calculate the total forecasted revenue requirements for eligible projects for the designated period. All costs appropriately charged to the Transmission Tracker Account shall be eligible for recovery through this Rider, and all revenues recovered from the TCR Adjustment shall be credited to the Transmission Tracker Account.

Forecasted retail kWh sales and kW demands shall be those for the designated recovery period.

(Continued on Sheet No. 5-145)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

TRANSMISSION COST RECOVERY RIDER

Section No. 5
16th Revised Sheet No. 144

APPLICATION
Applicable to bills for electric service provided under the Company's retail rate schedules.

RIDER
There shall be included on each customer's monthly bill a Transmission Cost Recovery (TCR) adjustment, which shall be the TCR Adjustment Factor multiplied by the customer's monthly billing energy or demand for electric service as described below. This TCR Adjustment shall be calculated before city surcharge and sales tax.

DETERMINATION OF TCR ADJUSTMENT FACTORS
A separate TCR Adjustment Factor shall be calculated for the following three customer groups: (1) Residential, (2) Commercial Non-Demand, and (3) Demand Billed. The TCR Adjustment Factor for each group shall be the value obtained by multiplying each group's weighting factor by the average retail cost per kWh. The average retail cost per kWh shall be determined by the forecasted balance of the TCR Tracker Account, divided by the forecasted retail sales for the calendar year. The Demand Billed customers' TCR Adjustment Factor is calculated similarly, but the resulting per kWh charge is converted to a per kW charge for application to billed kW rather than billed kWh. TCR Adjustment Factors shall be rounded to the nearest $0.000001 per kWh or $0.001 per kW.

The TCR Adjustment Factor for each customer group may be adjusted annually with approval of the Minnesota Public Utilities Commission (Commission). Each TCR Adjustment Factor shall apply to bills rendered subsequent to approval by the Commission. The TCR factor for each rate schedule is:

Residential	$0.003614 per kWh	R
Commercial (Non-Demand)	$0.003191 per kWh	R
Demand Billed	$0.984 per kW	R

Recoverable Transmission and Distribution Costs shall be the annual revenue requirements for transmission and distribution costs associated with transmission projects and distribution planning and facilities eligible for recovery under Minnesota Statute Sections 216B.1645 or 216B.16, subd. 7b that are determined by the Commission to be eligible for recovery under this Transmission Cost Recovery Rider. A standard model will be used to calculate the total forecasted revenue requirements for eligible projects for the designated period. All costs appropriately charged to the Transmission Tracker Account shall be eligible for recovery through this Rider, and all revenues recovered from the TCR Adjustment shall be credited to the Transmission Tracker Account.

Forecasted retail kWh sales and kW demands shall be those for the designated recovery period.

(Continued on Sheet No. 5-145)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MNNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

TRANSMISSION COST RECOVERY RIDER Section No. 5
(Continued) 5th Revised Sheet No. 145

TRUE-UP

For each 12-month period ending December 31, a true-up adjustment to the Tracker Account will be calculated reflecting the difference between the TCR Adjustment recoveries and the revenue requirements for such period. The total retail true-up adjustment shall be calculated and recorded by no later than May 1 of the following calendar year and will be included in average retail cost used to calculate the TCR Adjustment Factor for each customer group effective with the start of the next designated recovery period.

For example, the Year 1 revenue requirements versus TCR Adjustment recoveries would be determined by May 1 of Year 2, at which time the Company would record an adjustment to the Tracker Account. The difference between the Year 1 revenue requirements and Year 1 TCR Adjustment recoveries would be included in the calculation of the TCR Adjustment factors filed on September 1 of Year 2 to be effective January 1 of Year 3.

PROVISION OF FORECAST DATA

To assist commercial and industrial customers in budgeting and managing their energy costs, the Company will annually make available on September 1st a 24-month forecast of the TCR Adjustment Factor applicable to demand billed C&I customers under this Rider. The forecast period begins January 1st of the following year. This forecast will be provided only to customers who have signed a protective agreement with the Company.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RENEWABLE ENERGY STANDARD RIDER

Section No. 5
11th Revised Sheet No. 146

APPLICATION
Applicable to bills for electric service provided under the Company's retail rate schedules.

RIDER
There shall be included on each customer's monthly bill a Renewable Energy Standard (RES) adjustment which will be the RES Adjustment Factor applied to:

1. Customer, Energy, Demand and Minimum Charges
2. Energy Charge Credits
3. Limited Energy Surcharges
4. Controllable Demand Credits
5. Voltage Discounts
6. Lighting Rates per Luminaire and Lighting Rates per Unit
7. Siren Service Rate per Horsepower
8. Residential Controlled Air Conditioning and Water Heating Discounts (Energy and Fuel Cost Charges)
9. Commercial and Industrial Controlled Air Conditioning Credits
10. Standby Service Rider
11. Supplemental Service Rider
12. Tier 1 Energy Controlled Service Rider
13. Tier 1 Peak Controlled Short Notice Rider
14. Area Development Rider
15. Fixed Charges for Low Wattage Unmetered Devices

The RES Adjustment Factor does not apply to:

1. Fuel Clause Rider
2. Conservation Improvement Program Rider
3. Off Season Load Rider
4. Competitive Response Rider
5. City Requested Facilities Surcharge Rider
6. Windsource Program Rider
7. WAPA Bill Credit Program Rider
8. Mercury Cost Recovery Rider
9. Environmental Improvement Rider
10. Business Incentive and Sustainability Rider
11. State Energy Policy Rate Rider
12. Renewable Development Fund Rider
13. Transmission Cost Recovery Rider
14. Renewable Energy Standard Rider
15. Net Energy Billing Service
16. Late Payment Charge
17. Any currently applicable Interim Rate Surcharge Rider
18. Low Income Program Surcharge
19. Low Income Discounts

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This RES adjustment shall be calculated before city surcharge and sales tax.

(Continued on Sheet No. 5-147)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RENEWABLE ENERGY STANDARD RIDER (Continued)

Section No. 5
15th Revised Sheet No. 147

DETERMINATION OF RES ADJUSTMENT FACTOR

The Renewable Energy Standard ("RES") Adjustment Factor shall be the RES annual forecasted revenue requirement as a percentage of "base" revenues. The RES annual forecasted revenue requirement shall be the sum of the Renewable Energy Standard Costs for the forecast period and any residual Tracker balance in the RES Tracker Account.

The RES Adjustment Factor may be adjusted with the approval of the Minnesota Public Utilities Commission (Commission). The RES Factor is:

All Classes	5.091%	R

RENEWABLE ENERGY STANDARD COSTS

The RES Costs shall be the annual revenue requirements including operation and maintenance (O&M) expenses for Company owned Renewable Energy Project costs and capacity related renewable energy purchased power costs not recoverable through the FCR, that are eligible for recovery under Minnesota Statute Section 216B.1645. A standard model will be used to calculate the total forecasted revenue requirements for each annual period that is determined by the Commission to be eligible for recovery under this Renewable Energy Standard Rider.

RES TRACKER ACCOUNT

For each annual true-up period, a true-up adjustment to the RES Tracker Account (residual Tracker balance) will be calculated reflecting the difference between the RES Adjustment recoveries and the actual expenditures for such period. The true-up adjustment shall be included in calculating the RES Adjustment Factor effective with the start of the next annual recovery period.

The RES Adjustment Factor includes a true-up of actuals as available for the previous recovery period and forecast information for the remainder of the recovery period. The Final true-up adjustment for a previous recovery period will be determined by September 1 of the following year, at which time the Company will record a Final adjustment to the RES Tracker Account.

All costs appropriately charged to the RES Tracker Account shall be eligible for recovery through this rider.

PROVISION OF FORECAST DATA

To assist commercial and industrial customers in budgeting and managing their energy costs, the Company will annually make available on September 1st a 24-month forecast of the RES Adjustment Factor applicable to demand billed C&I customers under this Rider. The forecast period begins January 1st of the following year. This forecast will be provided only to customers who have signed a protective agreement with the Company.

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

RENEWABLE ENERGY STANDARD RIDER (Continued)

Section No. 5
16th Revised Sheet No. 147

DETERMINATION OF RES ADJUSTMENT FACTOR

The Renewable Energy Standard ("RES") Adjustment Factor shall be the RES annual forecasted revenue requirement as a percentage of "base" revenues. The RES annual forecasted revenue requirement shall be the sum of the Renewable Energy Standard Costs for the forecast period and any residual Tracker balance in the RES Tracker Account.

The RES Adjustment Factor may be adjusted with the approval of the Minnesota Public Utilities Commission (Commission). The RES Factor is:

All Classes	9.765%	R

RENEWABLE ENERGY STANDARD COSTS

The RES Costs shall be the annual revenue requirements including operation and maintenance (O&M) expenses for Company owned Renewable Energy Project costs and capacity related renewable energy purchased power costs not recoverable through the FCR, that are eligible for recovery under Minnesota Statute Section 216B.1645. A standard model will be used to calculate the total forecasted revenue requirements for each annual period that is determined by the Commission to be eligible for recovery under this Renewable Energy Standard Rider.

RES TRACKER ACCOUNT

For each annual true-up period, a true-up adjustment to the RES Tracker Account (residual Tracker balance) will be calculated reflecting the difference between the RES Adjustment recoveries and the actual expenditures for such period. The true-up adjustment shall be included in calculating the RES Adjustment Factor effective with the start of the next annual recovery period.

The RES Adjustment Factor includes a true-up of actuals as available for the previous recovery period and forecast information for the remainder of the recovery period. The Final true-up adjustment for a previous recovery period will be determined by September 1 of the following year, at which time the Company will record a Final adjustment to the RES Tracker Account.

All costs appropriately charged to the RES Tracker Account shall be eligible for recovery through this rider.

PROVISION OF FORECAST DATA

To assist commercial and industrial customers in budgeting and managing their energy costs, the Company will annually make available on September 1st a 24-month forecast of the RES Adjustment Factor applicable to demand billed C&I customers under this Rider. The forecast period begins January 1st of the following year. This forecast will be provided only to customers who have signed a protective agreement with the Company.

Northern States Power Company d/b/a Xcel Energy
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

MANUAL METER READING SERVICE RIDER
(AMI OPT-OUT OPTION)

Section No. 5
Original Sheet No. 148

AVAILABILITY

Available as an option to Residential Service, Residential Time of Day, Small General Service and Small General Time of Day Service customers who elect on-site meter reading service to opt out of energy usage measurements by standard advanced meters with two-way communication capabilities. N

RATE

Fixed Charge per Month	$15.00
Non-Standard Meter Installation Charge	$40.00
Non-Standard Meter Removal Charge	$40.00

TERMS AND CONDITIONS OF SERVICE

1. Customers who elect to receive this service will be subject to the Non-Standard Meter Installation Charge upon request for this service.
2. A one-time waiver of the Non-Standard Meter Installation Charge will apply to customers who elect this service prior to the installation of a standard advanced meter at their premise(s) as part of the Company's implementation of Advanced Metering Infrastructure.
3. Customers who cancel this service or vacate the premise where the service was requested will be subject to the Non-Standard Meter Removal Charge.
4. This rider will separately apply to each individual non-standard meter the customer requests be read manually.
5. The Company reserves the right to refuse availability of this rider if the:
   a. Manual meter reading service would create a safety hazard for the customer, the public, or Company's personnel or facilities,
   b. Customer does not allow the Company's employees or agents access to the non-standard meter(s) at the customer's premise(s), or
   c. Customer has a history of meter tampering.
6. Entities such as multi-unit dwelling associations are not authorized to elect this rider on behalf of individually metered customers.
7. Customers electing manual meter reading with this rider may receive bills based on estimated meter readings in any month where circumstances prevent a meter reading. N

(Continued on Sheet No. 5-1.1)

Northern States Power Company, a Minnesota corporation
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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

VOLUNTARY RENEWABLE*CONNECT PILOT PROGRAM Section No. 5
RIDER Original Sheet No. 149

AVAILABILITY N
The Voluntary Renewable*Connect™ ("R*C") Pilot program will be available, subject to capacity made available within the program, to any customer who elects to participate in the program that would otherwise receive service under a rate schedule that is subject to the adjustments provided for in the Fuel Clause Rider.

DEFINITIONS
The following definitions apply:

"Applicable Retail Electric Usage" means the measured retail electric usage of the Customer on the account(s) during the monthly billing cycle for the Customer's premises identified in the Service Agreement as being associated with the Customer's subscription to the R*C Service.

"R*C Adjustment" means the product resulting from the multiplication of the R*C Price by the Subscription Level.

"R*C Price" means the price as shown in the Rate section below.

"R*C Resources" for this pilot program means portions of renewable sources applicable to the R*C Service.

"R*C Service" means the service offered under this Voluntary Renewable*Connect Pilot Program Rider.

"Service Agreement" means the tariffed service agreement associated with the R*C Service which the Customer signs.

"Subscription Level" means the Customer's allocated share set forth in the Service Agreement, in kWh, of the energy from the R*C Resources. The Subscription Level is a blend of renewable resources.

RIDER
Customer may elect to receive R*C Service. The following types of R*C Service are available ("R*C Service Type") in the following billing methods ("R*C Billing Method"):

R*C Service Types	R*C Billing Methods
Month-to-Month	100 kWh Blocks
5 Years	Entire Monthly Usage
10 Years	Single Event Usage
Single Event	

Each billing month the R*C Price associated with the R*C Service Type chosen by the Customer will be applied to the Subscription Level chosen by the Customer, the product of the R*C Price and Subscription Level being the R*C Adjustment. Customers receiving R*C Service shall not be subject to the Minnesota Electric Fuel Clause Rider for the portion of its Applicable Retail Electric Usage that is less than or equal to the Customer's Subscription Level. All usage shall be subject to any other applicable adjustments and surcharges, including city surcharge or sales tax. The cost to the Customer for participating in the R*C Service will appear on the Customer's retail electric bill.

DETERMINATION OF R*C PRICE
The R*C Price shall be calculated as follows: for the month-to-month and single event R*C Service Type, pricing will be based on the partially levelized delivered cost of the R*C Resources, adjusted for capacity credits and neutrality charges, plus recoverable program expenses. For the 5-year and 10-year R*C Service Types, pricing shall be based on the actual delivered cost of the R*C Resources, adjusted for capacity credits and neutrality charges, plus recoverable program expenses. Recoverable program expenses include renewable energy purchases, marketing, and other costs approved by the Minnesota Public Utilities Commission ("Commission"). The R*C Price for the month-to-month R*C Service Type may be revised annually with approval of the Commission. N

(Continued on Sheet No. 5-150)

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Minneapolis, Minnesota 55401
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VOLUNTARY RENEWABLE*CONNECT PILOT PROGRAM RIDER (Continued)

Section No. 5
7th Revised Sheet No. 150

RATE
The R*C Price for the pilot phase R*C Resources of each R*C Service Type shall be as follows based on year of production, unless otherwise provided for in this tariff:

Month-To-Month R*C or Single Event R*C Service Type	
Year number	$/kWh
4 (2020)	$0.03623
5 (2021)	$0.03647

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5-Year and 10-Year R*C Service Type

Year	5-Year Contract ($/kWh)	10-Year Contract ($/kWh)
2017	$0.03243	$0.03193
2018	$0.03280	$0.03230
2019	$0.03317	$0.03267
2020	$0.03330	$0.03280
2021	$0.03345	$0.03295
2022	$0.03361	$0.03349
2023	$0.03429	$0.03404
2024	$0.03497	$0.03460
2025	$0.03569	$0.03519
2026	$0.03642	$0.03580

NEUTRALITY CHARGE
The R*C Price includes a neutrality charge to mitigate the impact of the R*C Pilot program on non-participating customers. The standard neutrality charge is as follows:

Year number	$/kWh
4 (2020)	$0.00488
5 (2021)	$0.00493

DL
LN

Customers receiving service under the Company's Business Incentive and Sustainability Rider, Competitive Response Rider, Residential Electric Vehicle Service (Rate Code A08), Residential Electric Vehicle Pilot Service (Rate Code A80, A81), or Residential Electric Vehicle Subscription Pilot Service (Rate Code A82, A83) shall not be subject to the neutrality charge portion of the R*C Price.

TRACKER ACCOUNT
Due to the variability of renewable resources, the Renewable*Connect program tracker account may have an excess or shortage of supply in any given hour or month. The Company will balance Renewable*Connect program usage at the end of the program year in accordance with the expected resource blend. As a result, the program may require more or less of a share of the expected program allocation. Energy produced by the R*C Resources that is not associated with any R*C Service subscription and therefore not allocated to an R*C Customer will be sold to all customers at the delivered cost through the Fuel Clause Adjustment. The Company will maintain accounting of the monthly balance of total R*C Resources production, total program usage, total revenues collected under the program and the expenses associated with offering the R*C Service, including the renewable energy purchases, marketing and other costs for this program. The Company may petition the Commission annually to true up the marketing and administrative cost tracker balance and apply the resulting true-up factors to the Month-To-Month R*C Price.

(Continued on Sheet No. 5-151)

Northern States Power Company, a Minnesota corporation

Minneapolis, Minnesota 55401

MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

VOLUNTARY RENEWABLE*CONNECT PILOT PROGRAM Section No. 5
RIDER (Continued) 8th Revised Sheet No. 150

RATE
The R*C Price for the pilot phase R*C Resources of each R*C Service Type shall be as follows based on year of production, unless otherwise provided for in this tariff:

Month-To-Month R*C or Single Event R*C Service Type	
Year number	$/kWh
4 (2020)	$0.03623
5 (2021)	$0.03647

5-Year and 10-Year R*C Service Type

Year	5-Year Contract ($/kWh)	10-Year Contract ($/kWh)
2017	$0.03243	$0.03193
2018	$0.03280	$0.03230
2019	$0.03317	$0.03267
2020	$0.03330	$0.03280
2021	$0.03345	$0.03295
2022	$0.03361	$0.03349
2023	$0.03429	$0.03404
2024	$0.03497	$0.03460
2025	$0.03569	$0.03519
2026	$0.03642	$0.03580

NEUTRALITY CHARGE
The R*C Price includes a neutrality charge to mitigate the impact of the R*C Pilot program on non-participating customers. The standard neutrality charge is as follows:

Year number	$/kWh
4 (2020)	$0.00488
5 (2021)	$0.00493

Customers receiving service under the Company's Business Incentive and Sustainability Rider, Competitive Response Rider, Residential Electric Vehicle Service (Rate Code A08), Residential Electric Vehicle Pilot Service (Rate Code A80, A81), or Residential Electric Vehicle Subscription Pilot Service (Rate Code A82, A83), or Multi-Dwelling Unit Electric Vehicle Service Pilot (Rate Code A91, A92, A93) shall not be subject to the neutrality charge portion of the R*C Price. T N

TRACKER ACCOUNT
Due to the variability of renewable resources, the Renewable*Connect program tracker account may have an excess or shortage of supply in any given hour or month. The Company will balance Renewable*Connect program usage at the end of the program year in accordance with the expected resource blend. As a result, the program may require more or less of a share of the expected program allocation. Energy produced by the R*C Resources that is not associated with any R*C Service subscription and therefore not allocated to an R*C Customer will be sold to all customers at the delivered cost through the Fuel Clause Adjustment. The Company will maintain accounting of the monthly balance of total R*C Resources production, total program usage, total revenues collected under the program and the expenses associated with offering the R*C Service, including the renewable energy purchases, marketing and other costs for this program. The Company may petition the

(Continued on Sheet No. 5-151)

Northern States Power Company, a Minnesota corporation

Minneapolis, Minnesota 55401

MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

VOLUNTARY RENEWABLE*CONNECT PILOT PROGRAM Section No. 5
RIDER (Continued) 8th Revised Sheet No. 150

Commission annually to true up the marketing and administrative cost tracker balance and apply the resulting true-up factors to the Month-To-Month R*C Price.

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VOLUNTARY RENEWABLE*CONNECT PILOT PROGRAM Section No. 5
RIDER (Continued) 1st Revised Sheet No. 151

TERMS AND CONDITIONS OF SERVICE

1. Any Customer enrolling in this R*C Service shall execute the Service Agreement with the Company. The effective date of such service, and the Customer's Subscription Level, will be set forth in the Service Agreement. A Customer's ability to continue receiving this R*C Service terminates upon the termination of the Service Agreement.

2. A Customer may elect to subscribe by: (i) purchasing a specified number of 100 kWh blocks; (ii) the Customer's entire Applicable Retail Electric Usage; or (iii) the Customer's entire Retail Electric Usage for a special event; provided, however, that in no event shall the customer's total Subscription Level exceed 10% of the total expected average output of the available R*C Resources.

2a. Limited Exception to Subscription Level. Customers who subscribe to the first tranche of resources approved for the Renewable*Connect Pilot Program may purchase a total Subscription Level from the first tranche without limitation. N N N

3. Unless otherwise agreed to by the Company, for a Customer electing to receive the R*C Service by the 100 kWh Blocks R*C Billing Method, the Subscription Level shall be set so that when combined with other distributed generation resources serving the premises designated in the Service Agreement the subscription size does not exceed one hundred (100) percent of the previous annual (12-month) consumption of electric energy by Customer at Premises. If twelve (12) months of historical electric energy consumption data is not available for a particular Customer Premise, the Company will calculate the estimated annual electric energy consumption as follows: if there is less than twelve (12) months but four (4) months or more of consumption history, the average monthly consumption is multiplied by twelve (12) to figure the yearly consumption. In cases where there is less than four (4) months of consumption history, home usage is estimated based on the historical average energy use of homes of a similar size. Homes are assumed to have central A/C, electric appliances, and natural gas water and space heating. For commercial properties and all properties over 4,500 square feet with less than four (4) months of consumption history, the Customer must submit an energy audit (HERS Rating or similar) or load calculations for the property stating the estimated annual consumption. Load calculations must be documented and sent to the Renewable*Connect Program Manager for approval. The compliance check by the Company with this 100% rule will be performed once at the beginning of a subscription and later only if the Customer changes his or her subscription size or relocates to a new premise. In the event a customer's Applicable Retail Electric Usage in a given billing month results in the partial consumption of a 100 kWh Block, the charge on that partial block will be prorated accordingly.

4. For a Customer electing to receive its entire Applicable Retail Electric Usage pursuant to the R*C Service, Xcel Energy reserves the right to provide system energy in any given billing month for any portion of the Customer's Applicable Retail Electric Usage that exceeds its monthly average usage (calculated as the actual or estimated 12-month annual electric energy consumption described in paragraph 3, divided by 12).

(Continued on Sheet No. 5-152)

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VOLUNTARY RENEWABLE*CONNECT PILOT PROGRAM Section No. 5
RIDER (Continued) 1st Revised Sheet No. 152

TERMS AND CONDITIONS OF SERVICE (Continued)

5. A Customer's subscription period becomes effective on the first day of Customer's billing period immediately following the Company counter-signing the Service Agreement (but not before January 1, 2017). Subscription periods are month-to-month, 5 years and 10 years, or are for a designated Special Event. Any termination by the Customer ahead of the 5 year, 10 year or Special Event term shall be provided by notice by the Customer to the Company at least 30 days prior to the Termination Date. The Termination Date is the last day of the billing month following 30 days from Company receipt of the termination notice provided by the Customer. Month-to-month subscriptions shall continue until terminated by the customer, and shall end on the last day of the billing month following 30 days from Company receipt of the termination notice provided by the Customer. A Customer that terminates a 5-Year or 10-Year R*C Service prior to the completion of that 5-Year or 10-Year term shall be subject to an Early Termination Fee. The Early Termination Fee shall be equal to the customer's actual R*C Service usage for the 12-month billing period ending on the Termination Date multiplied by a per MWh amount of $10 (R*C Early Termination Fee Rate). If the Customer does not have at least 12 billing months of R*C Service usage, the anticipated 12-month R*C Service usage will be calculated as follows:
    a. For Customers choosing the 100 kWh Blocks R*C Billing Method, the number of 100 kWh Blocks subscribed will be multiplied by twelve (12).
    b. For Customers choosing the Entire Monthly Usage R*C Billing Method, the estimated annual (12-month) usage for the Customer using the methodology described in paragraph 3.

    This anticipated 12-month R*C Service usage will then be multiplied by the R*C Early Termination Fee Rate to determine the value of the Early Termination Fee.

6. Xcel Energy may cancel this R*C Service and any Service Agreement applicable to the R*C Service on written order from the Commission based on good cause shown. Additionally, Xcel Energy may, upon reasonable notice to a Customer, cancel any Service Agreement applicable to the R*C Service to assure that the Service Agreement does not extend beyond the term of this R*C Pilot Program. The term of this R*C Pilot Program ends on December 31, 2026. N N N N

7. The Company will submit reports to the Commission each April 1, or as otherwise ordered in relation to the tracker accounting.

8. For customers on time of day tariffs, their usage met by R*C Service and any excess usage not met by R*C Service shall both be assigned to the on-peak and off-peak periods in proportion to the Customer's total billing period on-peak and off-peak usage.

9. Xcel Energy may, in its discretion, allow customers to subscribe to the R*C Program on a limited basis for the energy used by a single event or series of events without making a long-term purchase commitment.

10. The discounts under Residential Controlled Air Conditioning and Water Heating Rider and Commercial and Industrial Controlled Air Conditioning Riders are not applicable to the charges under this Rider.

(Continued on Sheet No. 5-153)

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VOLUNTARY RENEWABLE*CONNECT PILOT PROGRAM RIDER (Continued)
Section No. 5
Original Sheet No. 153

TERMS AND CONDITIONS OF SERVICE (Continued)

11. This Rider is provided to satisfy the conditions of Minn. Stat. §216B.169, subd. 2 related to renewable and high-efficiency energy rate options. The sales arrangements of renewable energy from the Renewable*Connect program supplies are such that the power supply is sold only once to retail customers.

12. The R*C Service shall only apply to the Applicable Retail Electric Usage of a Customer in excess of other renewable or other energy self-supplied by the Customer or supplied to the Customer by a different entity.

13. Any customer taking service under this Rider shall execute a Renewable*Connect Service Agreement. The effective date of service under this Rider will be set forth in the Service Agreement.

14. All R*C Resources are located in Minnesota. The Company shall assign to Customer, or retire on Customer's behalf, all renewable energy credits (RECs) associated with the Customer's Subscription Level for which the Customer has paid to the Company the applicable R*C Price. RECs assigned to Customer or retired on the Customer's behalf will not also be claimed by the Company as its renewable energy for other purposes.

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VOLUNTARY RENEWABLE*CONNECT GOVERNMENT PILOT PROGRAM RIDER
Section No. 5
Original Sheet No. 154

AVAILABILITY

The Voluntary Renewable*Connect™ Government ("R*CG") Pilot Program will be available, subject to capacity made available within the program, to any political subdivision or agency customer that: (i) elects to participate in the program; (ii) would otherwise receive service under a rate schedule that is subject to the adjustments provided for in the Minnesota Electric Fuel Clause Rider; and (iii) has the equivalent of an Investment Grade Credit Rating or, if such rating is unavailable, has satisfactory creditworthiness as determined by Northern States Power Company in its reasonably exercised discretion. For purposes of this Rider, a political subdivision or agency means a regional, territorial, or local authority, such as a county or municipality (including a municipal corporation) that is created or recognized by statute or other authority to exercise sovereign powers and that has governing officers appointed by officials of a recognized political subdivision or that are publicly elected. As used in this Pilot Program, a political subdivision or agency includes the Minnesota Department of Administration and those State of Minnesota agencies it assists in administering. Investment Grade Credit Rating, for the purposes of this Rider, means a senior unsecured bond rating (unenhanced by third party support) assigned by Standard & Poors Rating Group (or its successor) of BBB- or higher and/or Moody's Investor Service Inc. (or its successor) of Baa3 or higher; provided, however, that if any senior unsecured bond rating (unenhanced by third party support) is exactly equivalent to BBB-/Baa3, the rated entity shall not be on credit watch by such rating agency, and, provided further, that if the ratings of S&P and Moody's are not equivalent, the lower rating shall apply.

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DEFINITIONS

The following definitions apply:

(i) "Applicable Retail Electric Usage" means the measured retail electric usage of the Customer on the account(s) during the monthly billing cycle for the Customer's premises identified in the Service Agreement as being associated with the Customer's subscription to the R*CG Service.

(ii) "R*CG Adjustment" means the product resulting from the multiplication of the R*CG Price by the R*CG Energy.

(iii) "R*CG Energy" means the electric power, in kWh, from the R*CG Resources associated with the Customer's Subscription Level.

(iv) "R*CG Price" means the price as shown in the Rate section below.

(v) "R*CG Resources" for this pilot program means portions of renewable sources applicable to the R*CG Service.

(vi) "R*CG Service" means the service offered under this Voluntary Renewable*Connect-Government Pilot Program Rider.

(vii) "Service Agreement" means the tariffed service agreement associated with the R*CG Service which the Customer signs.

(viii) "Subscription Level" means the Customer's allocated share set forth in the Service Agreement, in MW, of the capacity from the R*CG Resources. The Subscription Level is a blend of renewable resources.

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(Continued on Sheet No. 5-155)

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VOLUNTARY RENEWABLE*CONNECT GOVERNMENT PILOT PROGRAM RIDER (Continued)

Section No. 5
Original Sheet No. 155

RIDER

Customer may elect to receive R*CG Service. Under the R*CG Service, the Customer shall subscribe for a fixed amount of the capacity of the R*CG Resources. Each billing month, the R*CG Price will be applied to the Customer's R*CG Energy, the product being the R*CG Adjustment.

If the Customer's Applicable Retail Electric Usage is less than the R*CG Energy in any given billing month, then:

1. The Company will bill the Customer for the Customer's Applicable Retail Electric Usage based on the R*CG Price for that billing month;
2. The kWh surplus shall be carried over and applied to a subsequent billing month for the Customer.
3. Any such surplus may be carried over up to the day before the yearly anniversary of the Customer's Subscription Term as defined in the Service Agreement. If there is a positive kWh carry-over balance at the end of that day, the Customer shall incur a charge on its retail bill for that balance in kWh multiplied by the then-current R*CG Price along with a credit for the balance in kWh multiplied by the Net Resources Cost (defined as the resource cost less the current capacity credit). The accumulated Customer surplus then will be reduced to zero.

Customer receiving R*CG Service shall only be subject to the Minnesota Electric Fuel Clause Rider for the portion of its Applicable Retail Electric Usage that is greater than the Customer's R*CG Energy plus any applicable applied kWh surplus. All usage shall be subject to any other applicable adjustments and surcharges, including city surcharge or sales tax. The cost to the Customer for participating in the R*CG Service will appear on the Customer's retail electric bill.

DETERMINATION OF R*CG PRICE

The R*CG Price is based on the actual delivered cost of the R*CG Resources adjusted for capacity credits and neutrality charges, plus recoverable program expenses. Recoverable program expenses include renewable energy purchases, marketing, and other costs approved by the Minnesota Public Utilities Commission ("Commission").

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(Continued on Sheet No. 5-156)

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VOLUNTARY RENEWABLE*CONNECT GOVERNMENT PILOT PROGRAM RIDER (Continued)
Section No. 5
Original Sheet No. 156

RATE

The R*CG Price for the pilot phase R*CG Resources shall be as follows based on year of production, unless otherwise provided for in this tariff:

Year	R*CG Price ($/kWh)
2017	$0.03093
2018	$0.03130
2019	$0.03167
2020	$0.03230
2021	$0.03295
2022	$0.03349
2023	$0.03404
2024	$0.03460
2025	$0.03519
2026	$0.03580
2027	$0.03617
2028	$0.03680
2029	$0.03745
2030	$0.03813
2031	$0.03881
2032	$0.03951
2033	$0.04025
2034	$0.04100
2035	$0.04176
2036	$0.04224

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RENEWABLE*CONNECT GOVERNMENT RESOURCES

The Renewable*Connect Government program will be supplied by R*CG Resources, which produce renewable energy as set forth in Minn. Stat. § 216B.169 (as the same may be amended or revised from time to time). The Customer's share of the output of the R*CG Resources is the "R*CG Energy".

The Company shall not be liable to the Customer in the event that the R*CG Energy is greater than or less than the Customer's Applicable Retail Electric Usage. The Customer assumes all production risk of the R*CG Resources.

To the extent the Company is not required to pay the operator of the R*CG Service because R*CG Resources are unavailable, then on a pro-rata basis the R*CG Energy level of the Customer shall be reduced while such resources are unavailable.

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(Continued on Sheet No. 5-157)

Northern States Power Company, a Minnesota corporation
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

VOLUNTARY RENEWABLE*CONNECT GOVERNMENT Section No. 5
PILOT PROGRAM RIDER (Continued) Original Sheet No. 157

TRACKER ACCOUNT

Customers enrolled in the R*CG Service subscribe to a fixed amount of the capacity of the R*CG Resources, which is the Customer's Subscription Level. The R*CG Resources are variable in nature and may produce more or less energy than the Customer's Applicable Retail Electric Usage. The Company shall apply the R*CG Price to the Customer's Applicable Retail Electric Usage up to the level of the R*CG Energy plus any applied kWh surplus from previous months. If the Customer's Applicable Retail Electric Usage in a given billing month is greater than the R*CG Energy plus unused kWh surplus, then to that extent the Customer's electric usage will be subject to the Minnesota Electric Fuel Clause Rider. The Company will balance the usage of R*CG Service Customers at the end of the program month and year with the actual output of the R*CG Resources over the same periods in accordance with the expected resource blend. Energy produced by the R*CG Resources that is not associated with any R*CG Service subscription and therefore not allocated to an R*CG Customer will be sold to all customers at the delivered cost through the Fuel Clause Adjustment.

The Company will maintain accounting of the monthly balance of total program production, total program usage, total revenues collected under the program and the expenses associated with offering the R*CG Service, including the renewable energy purchases, marketing and other costs for this program.

TERMS AND CONDITIONS OF SERVICE

1. Any Customer enrolling in this R*CG Service shall execute the Service Agreement with the Company. The effective date of such service, and the Customer's Subscription Level, will be set forth in the Service Agreement. A Customer's ability to continue receiving this R*CG Service terminates upon the termination of the Service Agreement.

2. Unless otherwise agreed to by the Company, a Customer's Subscription Level initially shall be set so that when combined with other distributed generation resources serving the premises designated in the Service Agreement the subscription size does not exceed one hundred (100) percent of the previous annual (12-month) consumption of electric energy by Customer at Premises to which the subscription is attributed (using a conversion factor based on expected production from the R*CG Resources). If twelve (12) months of historical electric energy consumption data is not available for a particular Customer premise, the Company will calculate the estimated annual electric energy consumption as follows: if there is less than twelve (12) months but four (4) months or more of consumption history, the average monthly consumption is multiplied by twelve (12) to figure the yearly consumption. In cases where there is less than four (4) months of consumption history, for commercial properties and all properties over 4,500 square feet with less than four (4) months of consumption history, the Customer must submit an energy audit (HERS Rating or similar) or load calculations for the property stating the estimated annual consumption. Load calculations must be documented and sent to the Renewable*Connect Government Program Manager for approval. The compliance check by the Company with this 100% rule will be performed once at the beginning of a subscription and later only if the Customer changes the Premise(s) associated with the Customer's Subscription Level.

N
N

(Continued on Sheet No. 5-158)

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VOLUNTARY RENEWABLE*CONNECT GOVERNMENT PILOT PROGRAM RIDER (Continued)

Section No. 5
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3. Subscription periods become effective on the first day of Customer's billing period immediately following the Company counter-signing the Service Agreement (but not before January 1, 2017), and shall expire on December 31, 2035. Customers that terminate R*CG Service prior to the termination date in the Service Agreement shall be subject to an early termination fee (the "Early Termination Fee"). The Early Termination Fee shall be equal to the Subscription Level in kW multiplied by $20/kW. N

4. A Customer may assign all or part of its Subscription Level to one or more other accounts associated with other premises where it receives retail electric service from the Company and which otherwise qualify under this program under a process which the Company establishes for this.

5. Xcel Energy may cancel this R*CG Service and any Service Agreement applicable to the R*CG Service on written order from the Commission based on good cause shown.

6. The Company will submit reports to the Commission each April 1, for the prior calendar year, or as otherwise ordered in relation to the tracker accounting.

7. For Customers on time of day tariffs, their usage met by R*CG Service and any excess usage not met by R*CG Service shall both be assigned to the on-peak and off-peak periods in proportion to the Customer's total billing period on-peak and off-peak usage.

8. The discounts under Residential Controlled Air Conditioning and Water Heating Rider and Commercial and Industrial Controlled Air Conditioning Riders are not applicable to the charges under this Rider.

9. This R*CG Service shall only apply to the Applicable Retail Electric Usage of a Customer in excess of net metering or other renewable energy supplied by or for the Customer for the premises designated in the Service Agreement.

10. All R*CG Resources are located in Minnesota.

11. The Company shall assign to Customer, or retire on Customer's behalf, all renewable energy credits (RECs) associated with the Customer's R*CG Energy for which the Customer has paid to the Company the applicable R*CG Price. RECs assigned to Customer or retired on the Customer's behalf will not also be claimed by the Company as its renewable energy for other purposes. N

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MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

PANDEMIC AND CIVIL UNREST RECOVERY PROGRAM
Section No. 5
Original Sheet No. 159

AVAILABILITY
Available to existing commercial and industrial customers with pre-pandemic average monthly peak load below 100 kW as measured during the 12 months ending February 2020, which is substantially reduced as a direct result of the COVID-19 coronavirus pandemic or recent civil unrest. Participation in this Program is subject to Company approval and is limited to a pre-pandemic total load level of 50 MW. N

RATE
The rates and provisions of the customer's regular rate schedule shall apply except a 25 percent credit shall be applied to the total monthly base rate charges excluding customer charges, after the application of voltage discounts, for the period of January 1, 2021 through August 31, 2021.

QUALIFICATION REQUIREMENTS
Existing customers must have experienced a material and minimum 25 percent peak load reduction in direct response to civil unrest or government mandated requirements associated with the COVID-19 pandemic. The customer shall notify the Company in writing and document the qualifying basis for the electric load reduction and the associated kW load reduction. Following such notification, the Company will review the customer's monthly billing demands to confirm a material and qualifying peak load reduction or estimate the load reduction based on energy usage for non-demand billed customers. If approved by the Company, Program credits will be applied to the customer's bill from the beginning of the billing period during which the customer is approved for the Program until August 31, 2021. The Company may discontinue the Program credits if customer peak loads or energy usage return to levels prior to qualifying load reductions.

APPLICATION
As a condition of qualifying for this Program, Customer must provide an application to the Company demonstrating that civil unrest or the COVID-19 pandemic has materially impacted its business and is responsible for a qualifying load reduction. Information tying the Customer's identification to the billing demands or energy usage considered for the Program is trade secret information under the Minnesota Government Data Practices Act ("Act").

REPORTING REQUIREMENT
Monthly during the of the availability of the Program, the Company will file with the Commission a listing of Customers deemed eligible and participating in the program. Following Program completion, the Company will file a final report with the Commission identifying the number of customers that participated in the Program and the total amount of Program credits provided.

REVENUE RECOVERY
The Company, within a general rate case, is allowed to seek recovery of the Program credits made to customers. N

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SCHEDULE 1. IDENTIFICATION

SURVEY CONTACTS: Persons to contact with question about this form

RESPONSE DUE DATE: Please submit by April 30th following the close of calendar year

Contact Jared Trueman
Title: Senior Accounting Analyst
Phone: (651) 235-3927 FAX: Email: jared.w.trueman@xcelenergy.com

REPORT FOR: Northern States Power Co - Minnesota 13781
REPORTING PERIOD: 2022

Supervisor Marc Glende
Title: Sr. Director, Accounting and Reporti
Phone: (612) 330-7785 FAX: Email: marc.a.glende@xcelenergy.com

Logged By / Date:
Logged In: ☐ Receipt Date (mm/dd/yyyy):

1	Legal Name of Industry Participant	Northern States Power Co - Minnesota	**Submission Status/Date:**	Submitted	05/03/2023
2	Current Address of Principal Business Office	414 Nicollet Mall Minneapolis MN 55401 0000			
3	Preparer's Legal Name Operator (if different than line 1)				
4	Current Address of Preparer's Office (if different than line 2)				
5	Respondent Type (Check One)	☐ Federal ☐ Political Subdivision ☐ Municipal Marketing Authority ☐ Cooperative ☐ Independent Power Producer or Qualifying Facility	☐ State ☐ Municipal ☒ Investor-Owned ☐ Retail Power Marketer (or Energy Service Provider) ☐ Community Choice Aggregator	☐ Transmission ☐ Behind the Meter ☐ Wholesale Power Marketer ☐ DSM Administrator	

For questions or additional information about the Form EIA-861 contact the Survey Manager: Fax: (202) 287 - 1938 Email: EIA-861@eia.gov
Stephen Scott Phone: (202) 586-5140 Email: stephen.scott@eia.gov

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SCHEDULE 2. PART A. GENERAL INFORMATION

LINE NO.		
1	Regional North American Electric Reliability Council (Not applicable for power marketers)	[ ] TRE (formerly ERCOT) [ ] NPCC [ ] SPP [ ] FRCC [ ] RFC (formerly ECAR, MAIN. MAAC) [ ] WECC [x] MRO [ ] SERC
2	Name of RTO or ISO	[ ] California ISO [ ] Southwest Power Pool [ ] Electric Reliability Council of Texas [X] Midwest ISO [ ] PJM Interconnection [ ] ISO New England [ ] New York ISO [ ] None
3	(For EIA Use Only) Identify the North American Electric Reliability Council where you are physically located	MRO
4	Did Your Company Operate Generating Plants(s)?	[x] Yes [ ] No
5	Identify The Activities Your Company Was Engaged In During The Year (Check appropriate activities)	[x] Generation from company owned plant [ ] Buying distribution on other electrical system [x] Transmission [x] Wholesale power marketing [x] Buying transmission services on other electrical system [ ] Retail power marketing [x] Distribution using owned/leased electric wires [x] Bundled Services (electricity plus other services such as gas, water, etc. in addition to electric service))
6	Highest Hourly Electrical Peak System Demand	Summer (Megawatts) 7,882.0 Prior Year 7,548.0 Winter (Megawatts) 5,352.0 Prior Year 5,125.0
7	Did Your Company Operate Alternative-Fueled Vehicles During the Year?	[x] Yes [ ] No
	Does Your Company Plan to Operate Such Vehicles During the Coming Year?	[x] Yes [ ] No
	If "Yes", Please Provide Additional Contact Information	Name: Gordon Clouse Title: Manager, Fleet Business Ops Telephone: 303 - 571 - 3726 Fax: - - Email: gordon.b.clouse@xcelenergy.com

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SCHEDULE 2. PART B. ENERGY SOURCES AND DISPOSITION

	SOURCE OF ENERGY		MEGAWATTHOURS		DISPOSITION OF ENERGY	MEGAWATTHOURS
1	Net Generation		37,833,977	11	Sales to Ultimate Consumers	33,396,282
2	Purchases from Electricity Suppliers		19,761,674	12	Sales For Resale	22,584,911
3	Exchanged Received (In)			13	Energy Furnished Without Charge	319
4	Exchanged Delivered (Out)			14	Energy Consumed By Respondent Without Charge	49,813
5	Exchanged Net					
6	Wheeled Received (In)					
7	Wheeled Delivered (Out)			15	Total Energy Losses (positive number)	1,564,326
8	Wheeled Net					
9	Transmission by Others Losses (Negative Number)					
10	Total Sources (sum of lines 1, 2, 5, 8 & 9)		57,595,651	16	Total Disposition (sum of lines 11, 12, 13, 14, & 15)	57,595,651

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SCHEDULE 2. PART C. ELECTRIC OPERATING REVENUE

LINE NO.	TYPE OF OPERATING REVENUE		(THOUSAND DOLLARS to the nearest 0.1)
1	Electrical Operating Revenue From Sales to Ultimate Customers (Schedule 4: Parts A, B, and D)	$	4,344,662.5
2	Revenue From Unbundled (Delivery) Customers (Schedule 4: Part C)	$	
3	Electric Operating Revenue from Sales for Resale	$	752,798.4
4	Electric Credits/Other Adjustments	$	51,100.0
5	Revenue from Transmission	$	335,474.9
6	Other Electric Operating Revenue	$	-4,836.6
7	Total Electric Operating Revenue (sum of lines 1, 2, 3, 4, 5 and 6)	$	5,479,199.2

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SCHEDULE 3. PART A.
DISTRIBUTION SYSTEM RELIABILITY DATA

INSTRUCTIONS: For the purpose of this schedule, a distribution circuit is any circuit with a voltage of 34kV or below that emanate from a substation and that serves end use customers.

State/Territory **MN**

1	Total Number of Distribution Circuits	1,067.0
2	Number of Distribution Circuits that employ voltage/VAR optimization (VVO)	60.0

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SCHEDULE 3. PART A.
DISTRIBUTION SYSTEM RELIABILITY DATA

INSTRUCTIONS: For the purpose of this schedule, a distribution circuit is any circuit with a voltage of 34kV or below that emanate from a substation and that serves end use customers.

State/Territory **ND**

1	Total Number of Distribution Circuits	65.0
2	Number of Distribution Circuits that employ voltage/VAR optimization (VVO)	

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SCHEDULE 3. PART A.
DISTRIBUTION SYSTEM RELIABILITY DATA

INSTRUCTIONS: For the purpose of this schedule, a distribution circuit is any circuit with a voltage of 34kV or below that emanate from a substation and that serves end use customers.

State/Territory **SD**

1	Total Number of Distribution Circuits	70.0
2	Number of Distribution Circuits that employ voltage/VAR optimization (VVO)	

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SCHEDULE 3. PART B.
DISTRIBUTION SYSTEM RELIABILITY DATA

Who is required to complete this schedule?

This schedule collects System Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI) statistics. If your organization does not compute these indexes, answer 'no' to Question 1 and then skip to Schedule 4A. You do not have to complete any other part of this schedule 3B or 3C.

Should you complete Part B or Part C?

If your organization computes the SAIFI and SAIDI indexes and determines Major Event Days using the IEEE 1366-2003 or the IEEE 1366-2012 standard, answer 'YES' to Questions 1 and 2, and complete Part B. Then skip to Schedule 4A. (You do not complete Schedule 3, Part C.)

If your organization does not use the IEEE 1366-2003 or the IEEE 1366-2012 standard but calculates SAIDI and SAIFI indexes via other method, answer 'yes' to question 1 and 'no' to question 2 and complete Part C. Then go to Schedule 4A.

1	Do you calculate SAIDI and SAIFI by any method? If Yes, go to Question 2. If No, go to Schedule 4, Part A.	[x] Yes	[ ] No
2	Do you calculate SAIDI and SAIFI and determine Major Event Days using the IEEE1366-2003 standard or IEEEE-2012 standard? If Yes, complete Part B. If No, go to complete Part C.	[x] Yes	[ ] No

Part B: SAIDI and SAIFI in accordance with IEEE 1366-2003 standard or IEEE 1366-2012 standard

		State	MN
3a.	SAIDI value including Major Event days		184.179
3b.	SAIDI value excluding Major Event days		89.989
4	SAIDI value including Major Event days minus loss of supply		177.315
5a.	SAIFI value including Major Event days		1.083
5b.	SAIFI value excluding Major Event days		0.871
6.	SAIFI value including Major Event days minus loss of supply		1.038
7.	Total number of customers used in these calculations		1,328,578.0
8.	What is the highest voltage that you consider part of the distribution system, as opposed to the supply system? (kV)		34.5
9.	Do you receive information about a customer outage in advance of a customer reporting it?	[x] Yes	[ ] No

Thank You for completing this part. Skip Part C and go directly to Schedule 4 Part A.

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SCHEDULE 3. PART B.
DISTRIBUTION SYSTEM RELIABILITY DATA

Who is required to complete this schedule?

This schedule collects System Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI) statistics. If your organization does not compute these indexes, answer 'no' to Question 1 and then skip to Schedule 4A. You do not have to complete any other part of this schedule 3B or 3C.

Should you complete Part B or Part C?

If your organization computes the SAIFI and SAIDI indexes and determines Major Event Days using the IEEE 1366-2003 or the IEEE 1366-2012 standard, answer 'YES' to Questions 1 and 2, and complete Part B. Then skip to Schedule 4A. (You do not complete Schedule 3, Part C.)

If your organization does not use the IEEE 1366-2003 or the IEEE 1366-2012 standard but calculates SAIDI and SAIFI indexes via other method, answer 'yes' to question 1 and 'no' to question 2 and complete Part C. Then go to Schedule 4A.

1	Do you calculate SAIDI and SAIFI by any method? If Yes, go to Question 2. If No, go to Schedule 4, Part A.	[x] Yes	[ ] No
2	Do you calculate SAIDI and SAIFI and determine Major Event Days using the IEEE1366-2003 standard or IEEEE-2012 standard? If Yes, complete Part B. If No, go to complete Part C.	[x] Yes	[ ] No

Part B: SAIDI and SAIFI in accordance with IEEE 1366-2003 standard or IEEE 1366-2012 standard

		State	SD
3a.	SAIDI value including Major Event days		465.935
3b.	SAIDI value excluding Major Event days		57.935
4	SAIDI value including Major Event days minus loss of supply		460.358
5a.	SAIFI value including Major Event days		1.350
5b.	SAIFI value excluding Major Event days		0.543
6.	SAIFI value including Major Event days minus loss of supply		1.234
7.	Total number of customers used in these calculations		100,076.8
8.	What is the highest voltage that you consider part of the distribution system, as opposed to the supply system? (kV)		34.5
9.	Do you receive information about a customer outage in advance of a customer reporting it?	[x] Yes	[ ] No

Thank You for completing this part. Skip Part C and go directly to Schedule 4 Part A.

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SCHEDULE 3. PART B.
DISTRIBUTION SYSTEM RELIABILITY DATA

Who is required to complete this schedule?

This schedule collects System Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI) statistics. If your organization does not compute these indexes, answer 'no' to Question 1 and then skip to Schedule 4A. You do not have to complete any other part of this schedule 3B or 3C.

Should you complete Part B or Part C?

If your organization computes the SAIFI and SAIDI indexes and determines Major Event Days using the IEEE 1366-2003 or the IEEE 1366-2012 standard, answer 'YES' to Questions 1 and 2, and complete Part B. Then skip to Schedule 4A. (You do not complete Schedule 3, Part C.)

If your organization does not use the IEEE 1366-2003 or the IEEE 1366-2012 standard but calculates SAIDI and SAIFI indexes via other method, answer 'yes' to question 1 and 'no' to question 2 and complete Part C. Then go to Schedule 4A.

1	Do you calculate SAIDI and SAIFI by any method? If Yes, go to Question 2. If No, go to Schedule 4, Part A.	[x] Yes	[ ] No
2	Do you calculate SAIDI and SAIFI and determine Major Event Days using the IEEE1366-2003 standard or IEEEE-2012 standard? If Yes, complete Part B. If No, go to complete Part C.	[x] Yes	[ ] No

Part B: SAIDI and SAIFI in accordance with IEEE 1366-2003 standard or IEEE 1366-2012 standard

		State	ND
3a.	SAIDI value including Major Event days		78.108
3b.	SAIDI value excluding Major Event days		67.862
4	SAIDI value including Major Event days minus loss of supply		75.322
5a.	SAIFI value including Major Event days		0.810
5b.	SAIFI value excluding Major Event days		0.759
6.	SAIFI value including Major Event days minus loss of supply		0.770
7.	Total number of customers used in these calculations		94,679.0
8.	What is the highest voltage that you consider part of the distribution system, as opposed to the supply system? (kV)		34.5
9.	Do you receive information about a customer outage in advance of a customer reporting it?	[x] Yes	[ ] No

Thank You for completing this part. Skip Part C and go directly to Schedule 4 Part A.

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Part C: SAIDI and SAIFI calculated by other methods

	State
10a. SAIDI value including Major Events	
10b. SAIDI value excluding Major Events	
11a. SAIFI value including Major Events	
11b. SAIFI value excluding Major Events	
12. Total number of customers used in these calculations	
13. Do you include inactive accounts?	☐ Yes ☐ No
14. How do you define momentary interruptions	☐ Less than 1 min. ☐ Less than 5 min. ☐ Other
15. What is the highest voltage that you consider part of the distribution system, as opposed to the supply system?	kv
16. Is information about customer outages recorded automatically?	☐ Yes ☐ No

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SCHEDULE 4. PART A. SALES TO ULTIMATE CUSTOMERS. FULL SERVICE - ENERGY AND DELIVERY SERVICE (BUNDLED)

	RESIDENTIAL (a)	COMMERCIAL (b)	INDUSTRIAL (c)	TRANSPORTATION (d)	TOTAL (e)
State MN **Balancing Authority**	56669				
Revenue (thousand dollars)	1,419,019.4	1,675,272.9	743,149.3	2,450.2	3,839,891.8
Megawatthours	9,095,482	12,638,135	7,241,299	19,941	28,994,857
Number of Customers	1,199,122	143,021	490	1	1,342,634
Are your rates decoupled?	[x] Yes [ ] No	[x] Yes [ ] No	[x] Yes [ ] No	[x] Yes [ ] No	
If the answer is YES, is the revenue adjustment automatic or does it require a rate-making proceeding?	[N] automatic	[N] automatic	[N] automatic	[N] automatic	
	[N] proceeding	[N] proceeding	[N] proceeding	[N] proceeding	
Cents/Kwh	15.601	13.256	10.263	12.287	13.243
State ND **Balancing Authority**	56669				
Revenue (thousand dollars)	100,518.6	118,660.2	32,365.9	0.0	251,544.7
Megawatthours	796,023	1,033,842	350,501	0	2,180,366
Number of Customers	82,122	13,317	24	0	95,463
Are your rates decoupled?	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No	
If the answer is YES, is the revenue adjustment automatic or does it require a rate-making proceeding?	[N] automatic	[N] automatic	[N] automatic	[N] automatic	
	[N] proceeding	[N] proceeding	[N] proceeding	[N] proceeding	
Cents/Kwh	12.628	11.478	9.234		11.537

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SCHEDULE 4. PART A. SALES TO ULTIMATE CUSTOMERS. FULL SERVICE - ENERGY AND DELIVERY SERVICE (BUNDLED)

	RESIDENTIAL (a)	COMMERCIAL (b)	INDUSTRIAL (c)	TRANSPORTATION (d)	TOTAL (e)
State SD **Balancing Authority**	56669				
Revenue (thousand dollars)	109,777.0	109,793.8	33,655.2	0.0	253,226.0
Megawatthours	830,054	1,010,743	380,262	0	2,221,059
Number of Customers	87,577	13,007	26	0	100,610
Are your rates decoupled?	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	
If the answer is YES, is the revenue adjustment automatic or does it require a rate-making proceeding?	[N] automatic	[N] automatic	[N] automatic	[N] automatic	
	[N] proceeding	[N] proceeding	[N] proceeding	[N] proceeding	
Cents/Kwh	13.225	10.863	8.851		11.401
State					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Are your rates decoupled?					
If the answer is YES, is the revenue adjustment automatic or does it require a rate-making proceeding?					
Cents/Kwh					
Total					
Revenue (thousand dollars)	1,629,315.0	1,903,726.9	809,170.4	2,450.2	4,344,662.5
Megawatthours	10,721,559	14,682,720	7,972,062	19,941	33,396,282
Number of Customers	1,368,821	169,345	540	1	1,538,707

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SCHEDULE 4. PART B. SALES TO ULTIMATE CUSTOMERS. ENERGY -- ONLY SERVICE (WITHOUT DELIVERY SERVICE)

	RESIDENTIAL (a)	COMMERCIAL (b)	INDUSTRIAL (c)	TRANSPORTATION (d)	TOTAL (e)
State **Balancing Authority**					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Cents/Kwh					
State					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Cents/Kwh					
Total					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					

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SCHEDULE 4. PART C. SALES TO ULTIMATE CUSTOMERS. DELIVERY -- ONLY SERVICE (AND OTHER RELATED CHARGES)

	RESIDENTIAL (a)	COMMERCIAL (b)	INDUSTRIAL (c)	TRANSPORTATION (d)	TOTAL (e)
State **Balancing Authority**					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Cents/Kwh					
State					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Cents/Kwh					

Total
Revenue (thousand dollars)
Megawatthours
Number of Customers

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SCHEDULE 4. PART D. BUNDLED SERVICE BY RETAIL ENERGY PROVIDERS AND POWER MARKETERS

	RESIDENTIAL (a)	COMMERCIAL (b)	INDUSTRIAL (c)	TRANSPORTATION (d)	TOTAL (e)
State **Balancing Authority**					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Cents/Kwh					
State					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Cents/Kwh					
Total					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					

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SCHEDULE 5. MERGERS and/or ACQUISITIONS

Mergers and/or acquisitions during the reporting month

If Yes, Provide:

Date of Merger or Acquisition

Company merged with or acquired

Name of new parent company

Address

City

State, Zip

New Contact Name

Telephone No.

Email address

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SCHEDULE 6. PART A. ENERGY EFFICIENCY PROGRAMS
Adjusted Gross Energy and Demand Savings -- Energy Efficiency

If you have a non utility DSM administrator that reports your DSM activity for you please select them from the list

State/Territory **MN** **Balancing Authority** **56669**

		RESIDENTIAL	COMMERCIAL	INDUSTRIAL	TRANS	Total
		(a)	(b)	(c)	(d)	(e)
	Reporting Year Incremental Annual Savings					
1	Energy Savings (MWh)	277,811.351	255,486.416	67,620.229		600,917.996
2	Peak Demand Savings (MW)	51.409	44.283	10.407		106.099
	Increment Life Cycle Savings					
3	Energy Savings (MWh)	4339524.860	4,116,611.606	1,169,563.100		9,625,699.566
4	Peake Demand Savings (MW)	51.409	44.283	10.407		106.099
	Reporting Year Incremental Costs					
5	Customer Incentives	17,879.450	27,999.508	5,592.797		51,471.755
6	All other costs	14,412.589	17,444.721	10,989.494		42,846.804
	Incremental Life Sycle Costs					
7	Customer Incentives	17,879.450	27,999.508	5,592.797		51,471.755
8	All other costs	14,412.589	17,444.721	10,989.494		42,846.804
	Weighted Average Life for Portfolio (Years) - Use Spreadsheet to Calculate					
9	Weighted Average Life	15.620	16.113	17.296		49.000

Please provide website address to your energy efficiency program reports:

US Department of Energy Energy Information Administration Form EIA-861	ANNUAL ELECTRIC POWER INDUSTRY REPORT	Form Approved OMB No. 1905-0129 Approved Expires 05/31/2023

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SCHEDULE 6. PART A. ENERGY EFFICIENCY PROGRAMS
Adjusted Gross Energy and Demand Savings -- Energy Efficiency

State/Territory **SD** **Balancing Authority** **56669**

		RESIDENTIAL (a)	COMMERCIAL (b)	INDUSTRIAL (c)	TRANS (d)	Total (e)
	Reporting Year Incremental Annual Savings					
1	Energy Savings (MWh)	3,285.204	4,967.243			8,252.447
2	Peak Demand Savings (MW)	1.170	1.180			2.350
	Increment Life Cycle Savings					
3	Energy Savings (MWh)	40349.254	85,724.336			126,073.590
4	Peake Demand Savings (MW)	1.170	1.180			2.350
	Reporting Year Incremental Costs					
5	Customer Incentives	61.458	467.128			528.586
6	All other costs	17.341	19.296			36.637
	Incremental Life Sycle Costs					
7	Customer Incentives	61.458	467.128			528.586
8	All other costs	17.341	19.296			36.637
	Weighted Average Life for Portfolio (Years) - Use Spreadsheet to Calculate					
9	Weighted Average Life	12.282	17.258			30.000

Please provide website address to your energy efficiency program reports:

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SCHEDULE 6. PART A. ENERGY EFFICIENCY PROGRAMS

DMS Administration only. List all utilities that you provide service for.

State	Utility Name

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Schedule 6. Part B. Yearly Energy and Demand Savings - Demand Response

Reporting Year Savings

State/Territory **MN** **Balancing Authority** **56669**

		(a) Residential	(b) Commercial	(c) Industrial	(d) Transportation	(e) Total
1	Number of Customers Enrolled	398,375	17,700	1,654		417,729
2	Energy Savings (Mwh)	499.000	120.000	1,511.000		2,130.000
3	Potential Peak Demand Savings (MW)	336.000	84.400	255.000		675.400
4	Actual Peak Demand Savings (MW)	336.000	84.400	255.000		675.400

Schedule 6. Part B. Program Cost -- Demand Response (Thousand Dollars)

Reporting Year Costs

5	Customer Incentives	29,599.184	5,046.055	212.824		34,858.063
6	All other costs	7,542.105	1,620.837	626.652		9,789.594
7	If you have a demand side management (DMS) program for grid-interactive water heaters (as defined by DOE), how many grid interactive water heaters were added to your program this year?					

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Schedule 6. Part B. Yearly Energy and Demand Savings - Demand Response

Reporting Year Savings

State/Territory **ND** **Balancing Authority** **56669**

		(a) Residential	(b) Commercial	(c) Industrial	(d) Transportation	(e) Total
1	Number of Customers Enrolled	12,328	620	123		13,071
2	Energy Savings (Mwh)	13.952	1.718	308.166		323.836
3	Potential Peak Demand Savings (MW)	8.000	1.950	52.000		61.950
4	Actual Peak Demand Savings (MW)	8.000	1.950	52.000		61.950

Schedule 6. Part B. Program Cost -- Demand Response (Thousand Dollars)

Reporting Year Costs

5	Customer Incentives	493.120	149.735	0.000		642.855
6	All other costs	174.280	5.109	2.105		181.494
7	If you have a demand side management (DMS) program for grid-interactive water heaters (as defined by DOE), how many grid interactive water heaters were added to your program this year?					

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Schedule 6. Part B. Yearly Energy and Demand Savings - Demand Response

Reporting Year Savings

		(a) Residential	(b) Commercial	(c) Industrial	(d) Transportation	(e) Total
State/Territory	**SD** **Balancing Authority** **56669**					
1	Number of Customers Enrolled	21,464	602	102		22,168
2	Energy Savings (Mwh)	22.484	2.786	88.894		114.164
3	Potential Peak Demand Savings (MW)	14.900	2.900	15.000		32.800
4	Actual Peak Demand Savings (MW)	14.900	2.900	15.000		32.800

Schedule 6. Part B. Program Cost -- Demand Response (Thousand Dollars)

Reporting Year Costs

5	Customer Incentives	1,620.951	202.990	0.000		1,823.941
6	All other costs	182.461	17.226	3.151		202.838
7	If you have a demand side management (DMS) program for grid-interactive water heaters (as defined by DOE), how many grid interactive water heaters were added to your program this year?					

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SCHEDULE 6. PART C. DYNAMIC PRICING PROGRAMS
Number of Customers

INSTRUCTIONS: Report the number of customers participating in dynamic pricing programs, e.g. Time-of-Use-Pricing, Real-Time-Pricing, Variable Peak Pricing, Critical Peak Pricing Programs.

State/Territory SD Balancing Authority 56669

		Residential (a)	Commercial (b)	Industrial (c)	Transportatio (d)	Total (e)
1	Number of Customers enrolled in dynamic pricing programs, by customer class	19	566	8	0	593

Types of Dynamic Pricing Programs

INSTRUCTIONS: For each customer class, mark the types of dynamic pricing programs in which the customers are participating.

		Residential (a)	Commercial (b)	Industrial (c)	Transportatio (d)
2	Time-of-Use Pricing	[x] Yes [ ] No	[x] Yes [ ] No	[x] Yes [ ] No	[ ] Yes [x] No
3	Real-Time Pricing	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No
4	Variable Peak Pricing	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No
5	Critical Peak Pricing	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No
6	Critical Peak Rebate	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No

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SCHEDULE 6. PART C. DYNAMIC PRICING PROGRAMS
Number of Customers

INSTRUCTIONS: Report the number of customers participating in dynamic pricing programs, e.g. Time-of-Use-Pricing, Real-Time-Pricing, Variable Peak Pricing, Critical Peak Pricing Programs.

State/Territory MN Balancing Authority 56669

		Residential (a)	Commercial (b)	Industrial (c)	Transportatio (d)	Total (e)
1	Number of Customers enrolled in dynamic pricing programs, by customer class	12,997	15,274	3	1	28,275

Types of Dynamic Pricing Programs

INSTRUCTIONS: For each customer class, mark the types of dynamic pricing programs in which the customers are participating.

		Residential (a)	Commercial (b)	Industrial (c)	Transportatio (d)
2	Time-of-Use Pricing	[x] Yes [ ] No	[x] Yes [ ] No	[x] Yes [ ] No	[x] Yes [ ] No
3	Real-Time Pricing	[ ] Yes [x] No	[x] Yes [ ] No	[x] Yes [ ] No	[ ] Yes [x] No
4	Variable Peak Pricing	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No
5	Critical Peak Pricing	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No
6	Critical Peak Rebate	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No

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SCHEDULE 6. PART C. DYNAMIC PRICING PROGRAMS
Number of Customers

INSTRUCTIONS: Report the number of customers participating in dynamic pricing programs, e.g. Time-of-Use-Pricing, Real-Time-Pricing, Variable Peak Pricing, Critical Peak Pricing Programs.

State/Territory ND Balancing Authority 56669

		Residential (a)	Commercial (b)	Industrial (c)	Transportatio (d)	Total (e)
1	Number of Customers enrolled in dynamic pricing programs, by customer class	35	736	13	0	784

Types of Dynamic Pricing Programs

INSTRUCTIONS: For each customer class, mark the types of dynamic pricing programs in which the customers are participating.

		Residential (a)	Commercial (b)	Industrial (c)	Transportatio (d)
2	Time-of-Use Pricing	[x] Yes [ ] No	[x] Yes [ ] No	[x] Yes [ ] No	[ ] Yes [x] No
3	Real-Time Pricing	[ ] Yes [x] No	[x] Yes [ ] No	[x] Yes [ ] No	[ ] Yes [x] No
4	Variable Peak Pricing	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No
5	Critical Peak Pricing	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No
6	Critical Peak Rebate	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No	[ ] Yes [x] No

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SCHEDULE 6. PART D. ADVANCED METERING

Only customers from schedule 4A and 4C need to be reported on this schedule.
AMR- data transmitted one-way, to the utility.
AMI- data transmitted in both directions, to the utility and customer

State MN Balancing Authority 56669

		Residential (a)	Commercial (b)	Industrial (c)	Transportation (d)	Total (e)
1	Number of AMR Meters	1,087,914	142,199	790	15	1,230,918
2	Number of AMI Meters	137,996	994	0	0	138,990
3	Number of AMI Meters with home area network (HAN) gateway enabled					
4	Number of non AMR/AMI Meters	21	2,066	329	1	2,417
5	Total Number of Meters (All Types), line 1+2+4	1,225,931	145,259	1,119	16	1,372,325
6	Energy Served Through AMI	281,755	673			282,428
7	Number of Customers able to access daily energy usage through a webportal or other electronic means					
8	Number of customers with direct load control	378,263	14,829	46		393,138

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SCHEDULE 6. PART D. ADVANCED METERING

Only customers from schedule 4A and 4C need to be reported on this schedule.
AMR- data transmitted one-way, to the utility.
AMI- data transmitted in both directions, to the utility and customer

State ND Balancing Authority 56669

		Residential (a)	Commercial (b)	Industrial (c)	Transportation (d)	Total (e)
1	Number of AMR Meters	83,745	13,672	82		97,499
2	Number of AMI Meters					0
3	Number of AMI Meters with home area network (HAN) gateway enabled					
4	Number of non AMR/AMI Meters	1	35	5		41
5	Total Number of Meters (All Types), line 1+2+4	83,746	13,707	87		97,540
6	Energy Served Through AMI					
7	Number of Customers able to access daily energy usage through a webportal or other electronic means					
8	Number of customers with direct load control	12,676	587	0		13,263

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SCHEDULE 6. PART D. ADVANCED METERING

Only customers from schedule 4A and 4C need to be reported on this schedule.
AMR- data transmitted one-way, to the utility.
AMI- data transmitted in both directions, to the utility and customer

State SD Balancing Authority 56669

		Residential (a)	Commercial (b)	Industrial (c)	Transportation (d)	Total (e)
1	Number of AMR Meters	89,479	13,320	56		102,855
2	Number of AMI Meters					0
3	Number of AMI Meters with home area network (HAN) gateway enabled					0
4	Number of non AMR/AMI Meters		27			27
5	Total Number of Meters (All Types), line 1+2+4	89,479	13,347	56		102,882
6	Energy Served Through AMI					
7	Number of Customers able to access daily energy usage through a webportal or other electronic means					
8	Number of customers with direct load control	20,641	572	2		21,215

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SCHEDULE 7. PART A. NET METERING

Net Metering programs allow customers to sell excess power they generated back to the electrical grid to offset consumption. Provide the information about programs by State balancing authority, customer class, and technology for all net metering applications.

State	MN	Balancing Authority	56669	Residential (a)	Commercial (b)	Industrial (c)	Transportation (d)	Total (e)
	Net Metering Installed Capacity (MW)			58.497	42.273	18.264		119.034
	Net Metering Installations			7,766	1,035	229		9,030
	Storage Installed Capacity (MW)							
	Storage Installations							
Photovoltaic	Virtual NM Installed Capacity (1 MW and greater)							
	Virtual NM Customers (1 MW and greater)							
	Virtual NM Installed Capacity (less than 1MW)							
	Virtual NM Customers (less than 1MW)							
	If Available, Enter the Electric Energy Sold Back to the Utility (MWh)							0.000
	Installed Net Metering Capacity (MW)							0.000
Wind	Number of Net Metering Customers							0
	If Available, Enter the Electric Energy Sold Back to the Utility (MWh)							0.000
	Installed Net Metering Capacity (MW)							0.000
Other	Number of Net Metering Customers							0
	If Available, Enter the Electric Energy Sold Back to the Utility (MWh)							0.000
	Installed Net Metering Capacity (MW)			58.497	42.273	18.264	0.000	119.034
Total	Number of Net Metering Customers			7,766	1,035	229	0	9,030
	If Available, Enter the Electric Energy Sold Back to the Utility (MWh)			0.000	0.000	0.000	0.000	0.000
	Net Metering Installed Capacity (MW)			58.497	42.273	18.264	0	119.034
Grand Total All States	**Net Metering Installations/customers**			7766	1035	229	0	9030
	If Available, Enter the Electric Energy Sold Back to the Utility (MWh)			0	0	0	0	0

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SCHEDULE 7. PART B. NON NET-METERED DISTRIBUTED GENERATORS

If your company owns and/or operates a distribution system, please report information on known distributed generation (grid connected/synchronized) capacity on the system. Such capacity must be utility or customer-owned

NUMBER AND CAPACITY

State	**Balancing Authority**	< 1MW

1. Number of generators
2. Total combined capacity (MW)
3. Capacity that consists of backup-only units
4. Capacity owned by respondent

Capacity by Technology and Sector (MW)

	Residential	**Commercial**	**Industrial**	**Transportation**	**Direct Connected**	**Total**
5. Internal combustion						
6. Combustion turbine(s)						
7. Steam turbine(s)						
8. Fuel Cell(s)						
9. Hydroelectric						
10, Photovoltaic						
11. Storage						
12. Wind turbine(s)						
13. Other						
14. Total						

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SCHEDULE 8. DISTRIBUTION SYSTEM INFORMATION

If your company owns a distribution system, please identify the names of the counties (parish, etc.) by State in which the electric wire/equipment are located.

LINE NO.	STATE (US Postal Abbreviation) (a)	COUNTY (Parish, Etc.) (b)	LINE NO.	STATE (US Postal Abbreviation) (a)	COUNTY (Parish, Etc.) (b)
1	MN - Anoka		21	MN - Lyon	
2	MN - Benton		22	MN - McLeod	
3	MN - Blue Earth		23	MN - Meeker	
4	MN - Brown		24	MN - Mower	
5	MN - Carver		25	MN - Murray	
6	MN - Chippewa		26	MN - Nicollet	
7	MN - Chisago		27	MN - Nobles	
8	MN - Clay		28	MN - Norman	
9	MN - Dakota		29	MN - Olmsted	
10	MN - Dodge		30	MN - Pine	
11	MN - Douglas		31	MN - Pipestone	
12	MN - Faribault		32	MN - Polk	
13	MN - Freeborn		33	MN - Pope	
14	MN - Goodhue		34	MN - Ramsey	
15	MN - Hennepin		35	MN - Redwood	
16	MN - Houston		36	MN - Renville	
17	MN - Kandiyohi		37	MN - Rice	
18	MN - Lac Qui Parle		38	MN - Rock	
19	MN - Le Sueur		39	MN - Scott	
20	MN - Lincoln		40	MN - Sherburne	

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SCHEDULE 8. DISTRIBUTION SYSTEM INFORMATION

If your company owns a distribution system, please identify the names of the counties (parish, etc.) by State in which the electric wire/equipment are located.

LINE NO.	STATE (US Postal Abbreviation) (a)	COUNTY (Parish, Etc.) (b)	LINE NO.	STATE (US Postal Abbreviation) (a)	COUNTY (Parish, Etc.) (b)
41	MN - Sibley		61	SD - Lincoln	
42	MN - Stearns		62	SD - McCook	
43	MN - Steele		63	SD - Miner	
44	MN - Todd		64	SD - Minnehaha	
45	MN - Wabasha		65	SD - Moody	
46	MN - Waseca		66	SD - Sanborn	
47	MN - Washington		67	SD - Turner	
48	MN - Watonwan				
49	MN - Wilkin				
50	MN - Winona				
51	MN - Wright				
52	MN - Yellow Medicine				
53	ND - Cass				
54	ND - Grand Forks				
55	ND - McHenry				
56	ND - Traill				
57	ND - Ward				
58	SD - Hanson				
59	SD - Hutchinson				
60	SD - Lake				

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SCHEDULE 9. COMMENTS

SCHEDULE	PART	LINE NO.	COLUMN	NOTES
(a)	(b)	(c)	(d)	(e)

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EIA861 ERROR LOG

Part	State	BA ID	Error No.	Error Description/Override Comment	Type	Override

414 Nicollet Mall
Minneapolis, MN 55401

December 1, 2020

—Via Electronic Filing—

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

RE: PETITION
2022-2024 TRIENNIAL NUCLEAR PLANT DECOMMISSIONING STUDY & ASSUMPTIONS
DOCKET NO. E002/M-20-___

Dear Mr. Seuffert:

Northern States Power Company, doing business as Xcel Energy, submits a Petition for approval of our 2022-2024 Triennial Nuclear Decommissioning Study & Assumptions, along with supporting materials.

We have electronically filed this Petition and supporting materials with the Minnesota Public Utilities Commission, and copies have been served on the parties on the attached service list. In addition, a one-page summary of the filing has been provided to persons on the attached service lists. The one-page summary provided also contains directions on how to access an electronic copy of the full filing via the Commission's website. Please contact me at (612) 330-6270 or allen.krug@xcelenergy.com or Laurie Wold at (612) 330-5510 or laurie.j.wold@xcelenergy.com if you have any questions regarding this filing.

Sincerely,

/s/

ALLEN D. KRUG
ASSOCIATE VICE PRESIDENT
STATE REGULATORY POLICY

Enclosures
c: Service Lists

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

Katie J. Sieben	Chair
Valerie Means	Commissioner
Matthew Schuerger	Commissioner
Joseph K. Sullivan	Commissioner
John A. Tuma	Commissioner

IN THE MATTER OF THE PETITION OF NORTHERN STATES POWER COMPANY FOR APPROVAL OF THE 2022 - 2024 TRIENNIAL NUCLEAR DECOMMISSIONING STUDY & ASSUMPTIONS	DOCKET NO. E002/M-20-___ **PETITION**

OVERVIEW

Pursuant to Minn. Stat. § 216B.11 and § 216B.2445 and Minn. R. 7825.0500 through 7825.0800, and prior Minnesota Public Utilities Commission (Commission) Orders, Northern States Power Company, doing business as Xcel Energy (Company), submits our Petition for approval of the 2022-2024 Nuclear Decommissioning Study and Assumptions.

The objective of a decommissioning docket is to arrive at a reasonable cost estimate for decontamination and removal of nuclear facilities at the end of their operating lives and to set an accrual to accumulate funds sufficient to pay those decommissioning costs. To meet that objective, in this Petition, we propose a change to our annual accrual designed to result in the accrual of funds necessary to decommission the Company's nuclear fleet.

This triennial filing is unique in two ways. First, it follows our June 2020 Supplemental Filing to the 2019 Integrated Resource Plan (2019 IRP Supplement) in Docket No. E002/RP-19-368, in which we discuss the Company's long-term carbon reduction goals. In particular, our Preferred Plan in the 2019 IRP Supplement includes a 10-year extension of our license to operate the Monticello plant, moving the planned retirement date from 2030 to 2040. If approved, this extension would affect our accrual calculation by extending the time for collecting an accrual during the plant's operation while allowing the Nuclear Decommissioning Trust (NDT) to earn returns during the 10 additional years of operation. Because the extension has

not yet been approved, however—and recognizing there are many regulatory hurdles both at the state and federal levels required for extending operation of the Monticello plant—we have analyzed, but do not propose, potential accruals that account for the extended operation.

Second, this filing follows the decision on our 2020 Stay Out Request. [1] In that docket, the Commission authorized the Company to defer the increase in the accrual that arose out of the 2017 Nuclear Decommissioning Trust Triennial filing (2017 Filing)[2] from January 1, 2020 to January 1, 2021. It also is being filed shortly after the Company filed its 2020 Multi-Year Rate Plan (MYRP), [3] and prior to the Commission's consideration of our 2021 Rate Case Stay Out Request.[4] If the 2021 Stay Out Request is approved (and the MYRP is withdrawn), any increase to the NDT accrual arising out of the 2017 Filing would be postponed until January 1, 2022. (As noted in our November 2, 2020 Reply Comments in Docket No. E002/M-20-743, a one-year delay in increasing the accrual from its current $14 million level would increase the accrual proposed in this Petition by only $1.28 million annually.) If the 2021 Stay Out Request is not approved and the MYRP proceeds, we would update the MYRP for the NDT changes in Rebuttal Testimony.

In compliance with the Commission's January 7, 2019 Order on our 2017 Nuclear Decommissioning Trust Triennial filing (2017 Filing) in Docket No. E002/M-17-828, we have analyzed several decommissioning scenarios and calculated a number of different accruals as part of this filing. The resulting range of possible changes to the accrual runs from an $8.6 million decrease to a $207.5 million increase. However, in general, when compared to the 2017 Filing and using the same assumptions regarding decommissioning alternatives and operating lives, calculated accruals have increased modestly. For example, if we assume that immediate decommissioning will occur following the end of each current plant license (consistent with our 2014 and 2017 Filings), the accrual for 2022 would increase from $27.4 million to approximately $31.4 million.

As discussed below—absent other material intervening events—we believe it is appropriate to increase the accrual to $31.4 million beginning in 2022. Specifically,

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[1] See Commission's March 13, 2020 ORDER in Docket No. E002/M-19-688.
[2] *See* Commission' January 7, 2019 ORDER in Docket No. E002/M-17-828.
[3] IN THE MATTER OF XCEL ENERGY'S APPLICATION FOR AUTHORITY TO INCREASE ELECTRIC RATES, Docket No. E002/GR-20-723 (November 2, 2020).
[4] PETITION FOR APPROVAL OF 2021 TRUE-UP MECHANISMS, Docket No. E002/M-20-743 (October 1, 2020). Note: The Company's 2021 Stay Out Request was initially filed on September 15, 2020, as part of the Company's Response and Petition in the COVID-19 Relief & Recovery dockets (Docket Nos. E,G999/CI-20-492; E,G002/M-20-716). On October 1, 2020 it was given its own docket – Docket No. E002/M-20-743.

the long-term real interest rates (Treasury rate in excess of average future inflation, measured by the rate on Treasury Inflation Protection Securities (TIPS)) is a fundamental building block for the forward-looking return forecast. That rate is lower today than it was in 2017 as a result of a decline in real interest rates. As a result, our current projections show lower long-term investment growth in the future than our projections in the 2017 Filing. This change in our projections is consistent with the investment industry as a whole. Given the very long duration of the NDT and decommissioning process, even modest changes in forward-looking expected return assumptions can have a substantial effect on the accrual. For these reasons, we believe increasing the accrual is appropriate and reasonable.

Based on the above, the Company respectfully requests the Commission:

- Approve our decommissioning study and assumptions as compliant with the Company's obligations under Minnesota statutes, Commission rules, and prior precedent;
- Approve an accrual of $31,368,901 effective in 2022 to meet the needs of the Company's 60-year spent fuel scenario, with no recasking of the fuel, for 2022 through 2024 while strategic decisions about the future of our nuclear units are decided in our 2019 IRP;
- Approve an annual accrual of $0.7 million for end-of-life (EOL) nuclear fuel for the calendar year 2022 through 2024; and
- Approve the current asset allocation for the NDT.

Our Petition is organized as follows:

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VI. REQUIRED DECOMMISSIONING INFORMATION
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Supporting Schedules

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B	Escalation Analysis
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L	Decommissioning Cost Analysis for the Monticello Nuclear Generating Plant with a 10-year Operating Life Extension

I. SUMMARY OF FILING

A one-paragraph summary of the filing accompanies this Petition pursuant to Minn. R. 7829.1300, subp. 1.

II. SERVICE ON OTHER PARTIES

Pursuant to Minn. Stat. § 216.17, subd.3, the Company has electronically filed this document. A summary of the filing has been served on all parties on the attached service list.

III. GENERAL FILING INFORMATION

Pursuant to Minn. R. 7825.3200, 7825.3500, and 7829.1300, subp. 3. the Company provides the following required information:

A. Name, Address, and Telephone Number of Utility

Northern States Power Company
Xcel Energy
414 Nicollet Mall
Minneapolis, MN 55401
(612) 330-5500

B. Name, Address, and Telephone Number of Utility Attorney

Matt B. Harris
Lead Assistant General Counsel
Xcel Energy
414 Nicollet Mall, 401 – 8th Floor
Minneapolis, MN 55401
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C. Date of Filing

This Petition is being filed on December 1, 2020.

D. Statute Controlling Schedule for Processing the Filing

Under Minn. R. 7829.0100, subp. 11, this request for approval of decommissioning accrual is a "miscellaneous" filing because no determination of the Company's general revenue requirements is necessary. There is no specific statute that prescribes the amount of time the Commission has to rule on this Petition.

E. Utility Employee Responsible for the Filing

Allen D. Krug
A.V.P. of Minnesota State Regulatory Policy
Xcel Energy
414 Nicollet Mall, 401 – 7th Floor
Minneapolis, MN 55401
(612) 330-6270

IV. MISCELLANEOUS INFORMATION

Pursuant to Minn. R. 7829.0700, subpt. 2, the Company requests that the following persons be placed on the Commission's official service list for this matter:

Matt B. Harris
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Any information requests in this proceeding should be submitted to Ms. Sweet at the Regulatory Records email address above.

V. COMPANY PROPOSAL

In developing the Company's proposed NDT accrual, it is important to consider the timing of this triennial filing. Most notably, we are making this filing while our 2019 IRP, in which we and our stakeholders are considering the long-term future of our nuclear fleet, is pending before the Commission.

In its January 11, 2017 Order in the Company's last IRP, the Commission specifically ordered that the Company describe in its next IRP "its plans and possible scenarios for cost-effective and orderly retirement of its aging baseload fleet, including Sherco, King, Monticello, and Prairie Island."[5] The 2019 IRP, therefore, addresses several alternatives for our nuclear fleet, including the continued operation of the units through the end of their licensed lives, possible early retirements of one or more units, and/or possible life extensions. Of these alternatives, the Company's Preferred Plan in the June 30, 2020 IRP Supplement proposes to extend the licensed life of the Monticello Plant, leaving the decision of whether to extend the life of Prairie Island (which is currently scheduled to retire several years after Monticello) for the next IRP. Consistent with that direction, we analyzed the impacts of the Monticello extension on the NDT accrual.

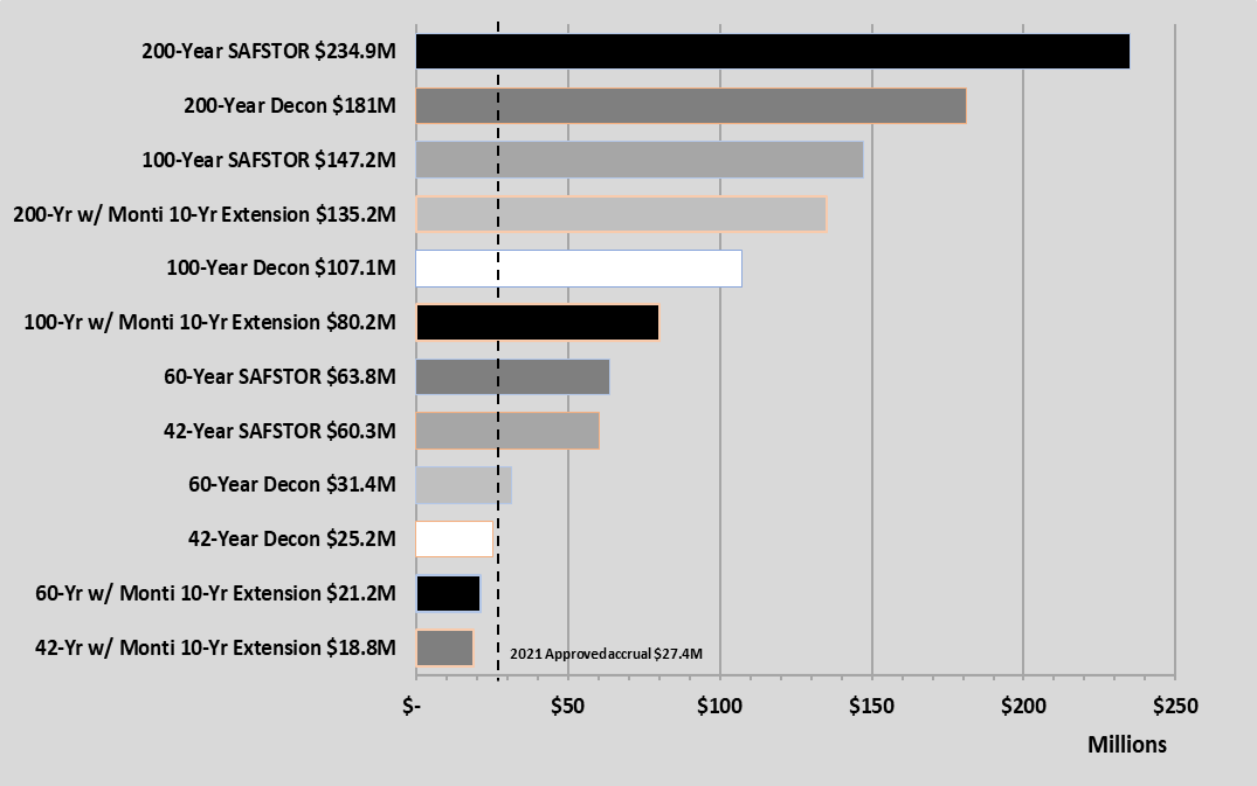
Additionally, Schedules J, K, and L thoroughly discuss alternative decommissioning scenarios, including both immediate decommissioning (DECON)[6] as well as the SAFSTOR[7] alternative. In fact, the Department raised SAFSTOR as an alternative in our 2015 IRP, noting that it would allow the decommissioning funds to accrue interest following retirement of the plants.[8] We note that the day before making this filing, we discovered additional review of our modeling of the SAFSTOR alternative scenarios is required. This additional review will not change our recommended accrual, but we expect that it may lower the SAFSTOR alternative accruals. We will

[5] Docket. No. E002/RP-15-21 (January 11, 2017 Order at 12.)
[6] DECON is defined by the NRC as, "[a] method of decommissioning in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed and safely buried in a low-level radioactive waste landfill or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations."
[7] SAFSTOR is defined by the NRC as, "[a] method of decommissioning in which a nuclear facility is placed and maintained in a condition that allows the facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use."
[8] Docket. No. E002/RP-15-21 (Department's July 8, 2016 Comments at 37-38).

file a supplement to this Petition with revised schedules based on the updated SAFSTOR calculations.

These two decision points—how long to operate the plants and how to decommission them—could have a dramatic impact on the accrual calculation for the NDT. The following table shows the potential accrual amounts under various scenarios involving the length of time Monticello runs, the method of decommissioning, and the amount of time the spent fuel is stored in Minnesota.

Table 1 – Nuclear Decommissioning Triennial Accrual Alternatives



In preparation for this Petition and setting our proposed accrual, we analyzed a variety of decommissioning scenarios and calculated a number of different accruals for the Commission. We discuss these various scenarios below. We also set forth all of the information required by the relevant statutes, Commission rules, and past Commission Orders.

Based on our review of these scenarios, we recommend increasing the annual accrual to $31.4 million—the 60-year DECON Scenario identified in Table 1 above. The overall goal of the decommissioning accrual schedule is to ensure that the customers who benefit from nuclear power pay all the costs associated with that power at the

time it is generated—including the costs to eventually decommission the plants. We believe our proposal to increase the currently approved accrual to $31.4 million is reasonable because it is consistent with past decisions setting accruals.

Although we considered accrual scenarios based on the extension of the Monticello operating license, we do not recommend adopting an accrual based on those scenarios at this time. We make this recommendation because the 2019 IRP remains pending, and the status of the Monticello extension is uncertain. Additionally, extending the license for Monticello requires obtaining additional regulatory approvals, including securing a Subsequent License Renewal from the Nuclear Regulatory Commission (NRC) and a Certificate of Need for additional spent fuel storage from the Commission. In light of these uncertainties, we believe it is most appropriate at this time to set the accrual based on a scenario that does not include a license extension. We note, however, that were we to account for the Monticello extension, the annual accrual could drop to $21.2 million. Moreover, should the extension ultimately be approved, the accrual can be adjusted accordingly at a later date.

Finally, we propose to continue the assumption that the Department of Energy will continue to provide refunds for dry cask storage during the decommissioning process, as approved by the Commission in its March 20, 2020 Order in Docket No. E002/M-17-828

We believe this proposal is reasonable and represents the best path forward, while recognizing other decisions the Commission may make would require us to update the proposed accrual in the future. The remainder of this Petition presents the information and analyses that are required by statute, Commission rules, and past Commission Orders for triennial filings.

VI. REQUIRED DECOMMISSIONING INFORMATION

A. Scenarios Evaluated

Consistent with previous filings, the Company examines the impact of assumptions in (1) the engineering cost estimate; (2) costs associated with spent fuel storage following plant shutdown; (3) inflation and escalation; (4) earnings rates; (5) fund investment structure; and (6) recovery period.

As required by Minn. Stat. § 216B.2445, the Company provides scenarios assuming spent fuel will be stored in the State for 60 years, 100 years, and 200 years following cessation of operations at the plant. We include a 60-year scenario without recasking as our base case. This scenario is supported by the NRC evaluation and conclusion

that casks can safely store spent fuel for a minimum of 60 years and assumes replacement after 100 years. We discuss this assumption further in Part B.1.b.ii below. However, pursuant to the Commission's Order in our previous Triennial Nuclear Decommissioning Accrual filing, we have also provided 100-year and 200-year scenarios that include the cost of recasking every 50 years.[9] In addition, we are including a scenario that assumes spent fuel will be stored in the state for only 42 years. The scenarios discussed above have been provided using the immediate decommissioning (*i.e.*, DECON) scenario for decommissioning, which is consistent with what was provided in the 2017 Filing. In addition to these four DECON scenarios, the Company has provided delayed removal and dismantling (*i.e.*, SAFSTOR) scenarios assuming the same durations as the DECON scenarios. These two alternatives are discussed in Schedule A, which lays out the annual cash flows, as well as the cost estimate report provided by TLG Services, Inc. (TLG) in Schedule J for Monticello, Schedule K for Prairie Island, and Schedule L for the Monticello 10-year license extension.

The decommissioning accrual is an annuity calculation based on the yearly expenditures, in nominal dollars, provided for each cost estimate scenario. The cost estimate is jurisdictionalized for Minnesota retail customers using 72.9219% as presented in the current Minnesota rate case.[10] The escalation rate is used to inflate the jurisdictional cost estimate to future years, and the earnings rate represents the expected return of the fund. Then, an annuity payment is calculated such that, when added to the current fund balance and grown at the forward-looking after-tax expected return, it will result in an estimated fund balance sufficient to satisfy the estimated dismantling costs.

In total, the Company includes twelve accrual scenarios in this Petition. Eight are based on the DECON assumption. Four are based on the SAFSTOR assumption. Within each of these assumptions, we include scenarios for a 42-year, 60-year, 100-year, and 200-year dry cask storage operational period. All scenarios assume an accrual change in 2022. The accrual scenarios are presented in Schedule E.

[9] *In the Matter of Northern States Power Company's for Approval of the 2016-2018 Triennial Nuclear Plant Decommissioning Accrual*, Docket No. E002/M-14-761, ORDER APPROVING NUCLEAR DECOMMISSIONING STUDY, ASSUMPTIONS, AND ANNUAL ACCRUAL, AND SETTING FILING REQUIREMENTS (October 5, 2015).
[10] IN THE MATTER OF XCEL ENERGY'S APPLICATION FOR AUTHORITY TO INCREASE ELECTRIC RATES, Docket No. E002/GR-20-723 (November 2, 2020).

B. Primary Factors Changed Since 2017 Filing

The decommissioning analysis includes three discrete steps. The first is to determine a decommissioning cost estimate for a specific scenario.[11] The second is to determine the forward-looking expected-return estimate and escalation rate for the NDT. The forward-looking expected return is based on the investment mix over the relevant time period and includes an analysis of the expected returns on various asset classes and changing investment strategies based on when liquidity would be needed to cover decommissioning costs. The third step is to calculate an annual accrual necessary to fully fund the costs of decommissioning for each site based on the escalation rates and earnings estimates developed for the chosen scenario.

This section of the Petition examines the three primary drivers that contribute to changes in the amounts needed for decommissioning at the expiration of the plants' current operating licenses:

- *Changes to the engineering and other cost estimates.* We revised the engineering cost estimates, to transfer spent fuel from the pool to the Independent Spent Fuel Storage Installation (ISFSI) within 4 years of shutdown, rather than the 5 years previously used. This change reflects the Company's belief that the 5-year assumption was an overly conservative estimate, as industry peers are currently transferring spent fuel in as few as 2–3 years following plant shut down.
- *Changes in assumptions about escalation/inflation of costs over time.* We utilized two escalation/inflation rates: one for the labor cash flows and one for the non-labor cash flows;
- *Revisions to the forward-looking expected returns.* We applied two earnings rates: one for the operation period and another for the post shutdown period.

A detailed discussion of each of these primary drivers is provided below.

1. Engineering and Other Cost Estimates

Our consultant, TLG Services, Inc. (TLG), performed site-specific cost estimates for the twelve scenarios noted above (eight fuel scenarios for DECON and four fuel scenarios for SAFSTOR for each of the two sites). Schedules A.1-A16 show TLG's schedules of annual expenditures for each of the scenarios individually. A more complete comparison of the cost estimates between the previous filing and this filing is provided in Schedule A.

[11] In all scenarios, it is assumed that the site is fully dismantled, radiologically decontaminated, and restored.

In addition to the cost estimates from TLG, the Company has provided a calculation of the NRC minimum funding amount applicable to the Company's facilities in Schedule A. The NRC minimum is a calculation of a generic cost to decommission based on the output of a unit and is calculated using a formula specified by the NRC. It is not intended to be a site-specific estimate of decommissioning, as it does not address site-specific issues. Instead, the NRC uses this as a gauge of the minimum level of funding a licensee must have to meet the NRC's funding assurance requirements of future decommissioning. Consistent with prior filings, the Company does not use the NRC minimum to determine the need for future decommissioning funding, but we provide it as a comparison data point for analysis. All the cost estimates from TLG are greater than the NRC minimum calculations, thus the accrual we propose is designed to fund more than the NRC minimum.

The decommissioning cost estimate is driven by two primary factors: the choice of decommissioning alternative for the radiological removal of the plant and the duration of fuel storage on site after operations. We discuss each in turn below.

a. Decommissioning Alternatives for Radiological Removal

The alternative chosen for the removal and decontamination of the radiological components of the nuclear plant can vary the timing of when the costs are incurred from early in the decommissioning timeframe for DECON to almost 50 years after operations cease for SAFSTOR. The annual costs associated with the radiological decommissioning alternative are similar across all the different spent fuel storage scenarios that are provided. For example, with the DECON method, the radiological removal costs are the same for the 42-year, the 60-year, the 100-year, and the 200-year spent fuel storage scenarios. Thus, the duration for storing spent fuel remaining on site does not affect the annual costs for the radiological decommissioning.

In addition to DECON scenarios, the Company has evaluated and provided SAFSTOR scenarios, in light of a significant number of plants using the SAFSTOR method. Of the nuclear plants in decommissioning, 10 sites are in SAFSTOR, 10 are in DECON, and 7 are complete and categorized as ISFSI-only. Many of these plants have stated, however, they do not intend to take the full 60 years but will finish decommissioning when economically viable. As noted above, we have discovered additional review of our modeling of the SAFSTOR scenarios is necessary, and we will provide updated analysis in a supplement to this Petition.

Regardless of the decommissioning option, we anticipate the plant will put all of its used fuel into dry storage containers and move it to the ISFSI within the first four years following shutdown. This could occur even faster as technology continues to

evolve. For example, Oyster Creek and Pilgrim nuclear plants, which shut down in 2018 and 2019 respectively, plan to have their used fuel moved to ISFSI less than 3 years after shutdown according to information supplied by their owner, Holtec International.

With either method, once the fuel has been moved to dry casks, the spent fuel pool and supporting systems can be dismantled, meaning that the pool can be drained and supporting equipment can be de-energized and secured. For SAFSTOR, the plant is then left intact during the dormancy period. During this time, there is a 24-hour security force, and maintenance of security systems along with lighting, building maintenance, ventilation and radiation monitoring programs. This dormancy period allows for an eventual reduction in worker dose rates during decommissioning as systems are allowed to decay before full dismantlement. It also results in a reduction in radioactive waste volumes at time of full dismantlement, which results in cost savings.

b. Period that Spent Fuel Could Potentially Remain Onsite

The second issue that influences the overall cost estimate is the duration of fuel storage after shutdown and the procedures in place for the handling of spent fuel. These include the period spent fuel remains in the pool, the period the fuel is stored onsite, and whether the fuel has to be moved to a second cask while stored onsite.[12]

As with all decommissioning cost estimates, the dismantlement and removal of contaminated structures cannot be completed until all spent fuel has been removed from the reactors and storage pools and placed in dry storage containers in the ISFSI. Final release of the site from all licenses will occur once all of the fuel is removed from the onsite storage facility and the storage facility itself has been removed. The differences between the 42-year and 60-year scenarios and the 100-year and 200-year scenarios are in part related to the storage facility operational period and whether the fuel storage scenario included costs to replace spent fuel dry storage casks every 50 years (*i.e.*, recasking). In our spent fuel scenarios, the 42-year and 60-year scenarios do not include recasking. The 100-year and 200-year scenarios include recasking every 50 years. Our recasking assumptions are discussed further in Part c below.

[12] In our last triennial nuclear decommissioning filing, the Commission ordered that the Company provide a more detailed break out of "spent fuel management" costs in future decommissioning filings. In reference to this request the Company first notes that the engineering cost estimate provided in this filing contains tables 3.1-3.7 containing the costs assigned to spent fuel management by cost category and year for all seven scenarios. The cost estimates also provide a narrative discussion regarding what these costs include in section 2.1.4.

In developing the strategy for spent fuel shipping for the 60-year, 100-year, and 200-year scenarios, a key assumption is that all fuel would be shipped from one site first (Prairie Island) followed by the second site (Monticello). Allocations of space for shipping to a federal facility are provided on a company-wide basis, and the Company has the discretion to ship spent fuel from either site first, or both sites at the same time. If spent fuel were shipped from both sites at the same time, both ISFSIs would have to operate for the entire time period following shutdown, *i.e.* 60 years, 100 years, or 200 years. By completing shipping from one site first, overall costs would be lowered because the costs of operating and securing the first site's ISFSI are eliminated approximately 13 years earlier.

However, the 42-year scenario assumes shipping from both sites simultaneously, resulting in the Prairie Island ISFSI operating until 2064 (31 years after plant shutdown) and the Monticello ISFSI operating until 2062 (32 years after plant shutdown). Table 2 below depicts the years that spent fuel shipping will begin and finish for the 42-year, 60-year, 100-year, and 200-year scenarios. The fuel shipping commencement and completion dates do not change because of the decommissioning alternative chosen or whether recasking is performed.

Table 2 – Spent Fuel Shipping Schedules

Plant	Year Shipping Begins	Year Shipping Finishes
42-year Scenario		
Prairie Island	2027	2064
Monticello	2042	2062
60-year Scenario (recasking or no recasking)		
Prairie Island	2053	2077
Monticello	2078	2090
100-year Scenario		
Prairie Island	2093	2117
Monticello	2118	2130
200-year Scenario		
Prairie Island	2193	2217
Monticello	2218	2230

These shipping schedules are informed by two sets of activities that are occurring at the national level. The first is the status of federal and private storage initiatives, permanent or temporary and the second is the NRC's Continued Storage of Spent

Nuclear Fuel rule which went into effect on October 20, 2014.[13] Each is discussed in greater detail below.

i Status of Federal and Private Storage Initiatives, Permanent or Temporary.

Licensing of Yucca Mountain. The application to license the Yucca Mountain permanent repository remains pending before the NRC, following the unsuccessful attempt by the Obama Administration to terminate the proceeding and withdraw the application. The NRC Staff's technical and environmental reviews have been essentially completed, but the adjudicatory hearings on the application before the NRC Atomic Safety and Licensing Board remain suspended pending Congressional appropriations for both DOE and NRC. Numerous contentions submitted by Nevada and other opponents remain to be litigated and must be resolved before the NRC can license the project. The Administration did not include any funding for Yucca Mountain in the FY2021 budget proposal but included $27 million to explore interim storage of waste at other sites. This bill is the first in recent years to not include any funding for Yucca Mountain, (compared with $116 million in the FY 2020 and $120 million in the FY 2019 budgets for both interim storage and Yucca Mountain). The reversal of the Administration's position is thought to be for political reasons. On July 13, 2020, the House Appropriations Committee adopted funding similar to the Administration's proposal and authorized $27.5 million for interim storage only. The full House passed the bill by a vote of 217-197 on July 31. 2020. Any differences between the House and Senate bills will need to be resolved in conference. Current FY2021 funding is ongoing but it is unlikely there will be Yucca Mountain funding.

Consolidated Interim Storage. Away-from-reactor spent fuel storage as contemplated in the Nuclear Waste Policy Act (known as "Monitored Retrievable Storage") has not been part of the DOE's program since the early 1990s, though it remains in the NWPA. Three private initiatives are discussed below.

Private Fuel Storage Initiative

The Company pursued interim spent fuel storage with an eight-utility consortium Private Fuel Storage (PFS) project in Utah. PFS proposed to build a spent fuel storage facility on the West Central Utah reservation of the Skull Valley Band of

[13] A copy of the Federal Register Notice which published the final NRC rule entitled, "Continued Storage of Spent Nuclear Fuel" dated September 19, 2014 can be found at the following web location: http://www.gpo.gov/fdsys/pkg/FR-2014-09-19/pdf/2014-22215.pdf

Goshute Indians. PFS and the Skull Valley Band entered into a lease in December 1996 that allowed for temporary storage of spent fuel for both the Prairie Island and Monticello plants.

The license application for the PFS Project was submitted to the NRC in June 1997. In February 2006, the NRC issued PFS a license for the interim storage facility. In September 2006, the U.S. Department of the Interior (DOI) disapproved the lease between PFS and the Skull Valley Band and at the same time denied PFS a right-of-way across federal land for the transport of spent fuel to the Skull Valley Reservation. In July 2010, the U.S. District Court for the District of Utah found that the DOI decisions were arbitrary and capricious for not properly considering evidence in the record and improperly relying on evidence outside of the record. The court vacated the DOI decisions and remanded the PFS's right-of-way application and lease to the DOI for further consideration, which was not initiated.

The State of Utah and a group opposed to the PFS Project appealed the NRC's license issuance for the PFS facility to the D.C. Circuit. The appeal was administratively terminated by the Court on its own motion in April 2018, without prejudice to the reopening of the case by any party. Even if the lease were approved and the right-of-way granted, the project must still overcome significant hurdles.

Because of the lengthy approval process that PFS experienced, companies who were initially interested have instead constructed onsite dry fuel storage facilities. A decision to revive the PFS project would depend on the outcome of the DOI's reconsideration, the judicial challenge at the D.C. Circuit if reinstated, continued opposition in Utah, and on sufficient interest and commitment to use the facility by companies with spent fuel, none of which is currently apparent.

Interim Storage Partners (ISP) Consolidated Interim Storage Facility

A centralized interim storage project was initiated by Waste Control Specialists (WCS) for a site in Andrews County, Texas, adjacent to WCS's existing low-level radioactive waste and hazardous waste storage and disposal facilities. The NRC license application for this project was filed in April 2016. In April 2017, WCS asked the NRC to suspend the review of this application. Subsequently, WCS and Orano USA (formerly Areva Nuclear Materials) formed a joint venture to license the facility. In response to letters to the NRC in June and July 2018 from the joint venture ISP, the NRC restarted its review of the application. In response to NRC's August 2018

notice of opportunity for hearing, a number of environmental and other organizations sought to intervene in the NRC proceeding. At about the same time, two organizations moved the Commission to reject the application (and the Holtec application described below), alleging that the NRC lacked the jurisdiction to consider the application. After the Commission denied those requests, one of the organizations appealed to the U.S. Court of Appeals for the D.C. Circuit on December 27, 2018. On June 13, 2019, in considering the NRC's motion, the Court dismissed the case as not ripe for judicial review. On August 23, 2019, the Atomic Safety and Licensing Board considered the hearing requests, admitted one contention submitted by one of the petitioners, and dismissed the remaining contentions and petitioners. A subsequent Licensing Board decision dismissed this contention as moot and rejected an attempt to amend the contention. The Board also dismissed another petitioner's late-filed contention. Appeals from the August 2019 Board decision remain pending before the Commission, and a late-filed contention submitted by one of the petitioners remains pending before the Board. The NRC's recently revised schedule for the environmental review shows a final EIS by July 2021.

Holtec HI-STORE Consolidated Interim Storage Facility

Holtec International has proposed the HI-STORE Centralized Interim Storage Facility for a site in Eddy and Lea Counties in southeastern New Mexico. Holtec filed an application with the NRC for this facility in March 2017. As noted above, a number of environmental and other organizations challenged the application, and following extensive proceedings in front of the NRC, Atomic Safety and Licensing Board, and in courts, the NRC's recently revised schedule for the environmental review shows a final EIS by July 2021.

ii. NRC Continued Storage of Spent Nuclear Fuel Rule

Historically, Waste Confidence has been the NRC's generic determination regarding the environmental impacts of storing spent nuclear fuel beyond the licensed life for operation of a nuclear power plant. This generic analysis has been incorporated into the NRC's reviews under the National Environmental Policy Act for new reactor licenses, license renewals, and ISFSI licenses through the Waste Confidence Rule. On June 8, 2012, the U.S. Court of Appeals for the DC Circuit found that some aspects of the Waste Confidence Rule did not satisfy the NRC's National Environmental Policy Act obligations and vacated the rulemaking.[14] The court indicated that, in making either a Finding of No Significant Impact based on an Environmental

[14] *New York v. NRC,* 681 F.3d 471 (D.C. Cir. 2012)

Assessment or in an Environmental Impact Statement, the NRC needed to add additional discussions concerning the impacts of failing to secure permanent disposal for spent nuclear fuel, and concerning the impacts of certain aspects of potential spent fuel pool leaks and spent fuel pool fires.

In response to the court's decision, the NRC suspended final licensing decisions on new reactors, reactor license renewals, and spent fuel storage facility renewals. The NRC subsequently directed its staff to develop a new rule within 24 months.

On Sept. 6, 2012, the NRC Commission directed NRC staff to proceed with a Generic Environmental Impact Statement (GEIS) to analyze the environmental impacts of continued storage, address the issues raised in the Court's decision, and update the rule in accordance with the analysis in the GEIS. The final rule and GEIS was renamed from "waste confidence" to "continued storage of spent nuclear fuel" in response to public comment to more accurately reflect the nature and content of the rule. The GEIS and final rule effective October 20, 2014, implemented the Commission's direction.

The rule does not authorize, license or otherwise permit nuclear power plant licensees to store spent fuel for any length of time. Rather, the continued storage rule adopts the findings of the GEIS regarding the environmental impacts of storing spent fuel at any reactor site after the reactor's licensed period of operations. As a result, those generic impacts do not need to be re-analyzed in the environmental reviews for individual licenses. The GEIS analyzes the environmental impact of storing spent fuel beyond the licensed operating life of reactors over three timeframes: for 60 years (short-term), 100 years after the short-term scenario (long-term) and indefinitely. However, availability of a deep geologic repository within 60 years is commented on by the NRC in the Federal Register Notice of the Rule where it states on page 56,254:

> *The United States national policy remains disposal of spent fuel in a geologic repository, and, as stated in the GEIS, the NRC believes that the most likely scenario is that a repository will become available by the end of the short-term timeframe (60 years beyond the licensed life for operation of a reactor).*

The possibility of even longer service times is supported by the evaluations performed in the NRCs NUREG-2157, Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel. Under the renewed ISFSI licenses, cask monitoring and maintenance activities are reviewed and approved by the NRC and provide reasonable assurance the casks will continue to store used nuclear fuel safely for a minimum of 60 years.

In NUREG- 2157, "The NRC assumes the replacement of dry casks after 100 years of service life, however, replacement times will depend on actual degradation observed during continued regulatory oversight for maintain safety during continued storage."

c. Recasking Assumptions

We believe it is reasonable and appropriate to assume that no recasking will be necessary for either the 42-year or 60-year scenarios. Recent activities by the NRC indicate that cask life is at least 100 years or longer. This is supported by the NRC's recent actions to process the renewal of the licenses of multiple ISFSIs,[15] including for Prairie Island, a total operation period of 60 years (a 20-year initial license plus a 40-year renewal) of operation. Under the renewed ISFSI licenses, cask monitoring and maintenance activities are reviewed and approved by the NRC and provide reasonable assurance that the casks will continue to store used nuclear fuel safely for a minimum of 60 years.

In addition, in the Generic Environmental Impact Statement for Continued Storage of Spent Fuel published in NUREG-2157 in September 2014, the NRC states, "The NRC assumes replacement of dry casks after 100 years of service life; however, replacement times will depend on actual degradation observed during continued regulatory oversight for maintaining safety during continued storage." Taken together, we believe these findings support our assumption that no recasking will be necessary under the 60-year scenario. We further note that the large step up in the accrual for any scenarios with recasking is primarily due to the recasking assumption that is included in the cost estimate.

The Prairie Island site specific ISFSI license (SNM-2506), which permits storage of the TN-40 casks, was issued in 1993 for a 20-year period. The associated Safety Analysis Report (SAR) described a minimum design life of 25 years. The Company subsequently applied for, and the NRC granted, a renewal of license SNM-2506 for an additional 40 years through 2053. As part of the license renewal process, a review of Time-Limited Aging Analyses (TLAA) and the Aging Management Review (AMR) of the ISFSI systems, structures, and components were conducted. TLAA reviews identified analyses that were required to be performed to demonstrate intended functions would be maintained during the period of extended operation. AMRs identified aging effects/mechanisms that could adversely affect the ability of the systems, structures, and components to perform their safety functions during the period of extended operation and the application identifies an acceptable aging

management program to be implemented prior to the period of extended operation at the site. The NRC Staff reviewed the AMRs and the Aging Management Programs proposed by the Company and added license conditions reflecting the Aging Management Programs.

The Monticello ISFSI casks are authorized by Certificate of Compliance 72-1004 which permits the use of each cask for 20 years from the date it is placed into service. The associated SAR described a service life of 50 years. The general license holder (TN Americas LLC) has subsequently applied for a renewal of Certificate of Compliance 1004 for an additional 40 years. This application is pending NRC approval. As part of the license renewal process, a review of TLAA and the AMR of the ISFSI systems, structures, and components was conducted. TLAA reviews identified analyses that were required to be performed to demonstrate intended functions would be maintained during the period of extend operation. AMRs identified aging effects/mechanisms that could adversely affect the ability of the systems, structures, and components to perform their safety functions during the period of extended operation, and the application identifies an acceptable aging management program to be implemented prior to the period of extended operation at the site. The application included SAR markups to modify the service life to 60 years.[16]

Based on TLAA and AMRs that have been performed, experience to date and continuation of approved aging management programs to ensure that monitoring and maintenance are adequately performed, the Company believes it is reasonable to assume the licenses and Certificates of Compliance may eventually be renewed for an additional 40 years, or longer.

d. Technical and Regulatory Barriers to Transporting Spent Fuel

There are no technical or regulatory barriers to transporting spent fuel. The NRC regulates the transportation of commercial spent nuclear fuel in accordance with 10 CFR Part 71 – Packaging and Transport of Radioactive Material. Over the past 30 years, the DOE, NRC and the nuclear industry have safely completed approximately 3,000 shipments of spent nuclear fuel and high-level waste. There is also extensive worldwide experience with spent nuclear fuel transportation: more than 70,000 metric tons of uranium of spent nuclear fuel has been safely shipped in the past 25 years, including all the fuel from the Company's decommissioned Pathfinder nuclear plant

[16] The manufacture warranty states the design of the casks shall conform and comply with the applicable NRC requirements for 20 years. The warranty on the material and services typically applies for 2- 5 years from the date of services or material delivery.

in South Dakota and 1,058 fuel assemblies from the Company's Monticello Nuclear Generating Plant to a storage facility in Morris, IL This is equal to the amount the DOE will ship to a permanent repository as authorized in the Nuclear Waste Policy Act. Barriers are largely political and at the state level along the proposed transportation routes. DOE continues to provide funding to work on the potential transportation barriers such as public education and emergency planning along the transportation routes.

Under contract with DOE, nuclear plant operators are required to prepare spent fuel for shipment to DOE. To ship spent fuel the nuclear plant, operators are required to place the fuel in NRC-approved containers for transportation. The casks used for storage at Monticello and Prairie Island also will be used for transportation, and there will not be a need to move spent fuel from their current storage container prior to transport. The actual transportation will be the responsibility of DOE. To accomplish this, title and liability for the spent fuel will be transferred to DOE when the spent fuel transportation container crosses the nuclear-plant site boundary and is in the possession of DOE.

In addition, as described above, two private companies are moving through the NRC licensing process to open centralized interim storage facilities and would transport fuel using a private shipment model. The Company continues to lead important initiatives to prepare the industry and work with stakeholders to move used fuel either to interim or permanent storage facilities.

e. Industry decommissioning status and use of third-party contractors

In compliance with Order Point 10 of the Commission's January 7, 2019 Order regarding the 2017 Filing, we provide this information regarding the use of third-party contractors for decommissioning the Prairie Island Nuclear Generating Plant.

The Zion plant in Illinois has been going through decommissioning under the responsibility of a third-party contractor, EnergySolutions (*i.e.*, ZionSolutions), which began decommissioning the plant in 2010. All of the above-grade plant structures at Zion have been removed. Radiological final status surveys and site restoration was completed in 2020. These results are significant because Zion's operating utility—Exelon—previously assumed that a decades-long SAFSTOR period would be required for its decommissioning trust to grow and become fully funded. Thus, the growth of third-party firms could reduce the prevalence of SAFSTOR if plants are able to decommission at a cost that is less than previously anticipated.

The NRC approved a transfer of the license of the Vermont Yankee plant from Entergy to a third-party decommissioning firm, NorthStar Group Services in July 2018. Like Exelon, Entergy had originally planned to enter a decades-long SAFSTOR period to allow its decommissioning trust funds to grow to a level sufficient to decommission the plant, but NorthStar stated that it can begin decommissioning immediately and complete it by 2030 and possibly as early as the mid-2020s. As we understand the transaction, NorthStar has taken over ownership of the plant and corresponding decommissioning trust. It will use the trust funds to decommission the plant and retain any unspent funds as profit from the transaction. In other words, NorthStar believes it can fully decommission the Vermont Yankee plant for less than Entergy anticipated when it originally planned to manage the decommissioning, and it was willing to take the risk associating with achieving these savings. The NRC approved the license transfer in October of 2018 and the Vermont Public Utility Commission issued an order approving the sale in December.

Holtec International (Holtec) has also emerged as a significant firm in the decommissioning industry. In 2019 Holtec purchased both the Oyster Creek and Pilgrim Nuclear plants for decommissioning. Holtec also announced an agreement in April 2019 to acquire Entergy's Indian Point Nuclear power plant units for expedited decommissioning. Under that agreement, Entergy will sell Units 1, 2, and 3 to a Holtec subsidiary, transferring licenses, spent fuel, decommissioning liability, and nuclear decommissioning trusts for the units.

Finally, Duke Energy Florida has finalized a contract with Accelerated Decommissioning Partners to do the decommissioning work at a cost of approximately $540 million, with Duke remaining the owner but ADP is now the operator of Crystal River. They now expect the plant to be decommissioned by 2027 with only the dry cask storage facility remaining thereafter.

2. Escalation/Inflation Rate

The second primary driver of the decommissioning estimate is an updated set of assumptions regarding escalation and inflation. Goldman Sachs Asset Management (GSAM), our investment advisor for the NDT, provided the forecast analysis for the escalation/inflation rates used in this filing's accrual calculations. A more comprehensive narrative of this analysis and accompanying graphs are included in Schedule B, which includes a discussion of the economic and inflation factors, including gross domestic product growth, labor productivity, and other considerations utilized in estimating long-term inflation rates.

The Company recommends a 3.78 percent escalation rate for the labor component of decommissioning and a 2.58 percent escalation rate for the non-labor components. The 1.2 percent difference in this escalation rate for non-labor reflects the fact that increases in labor productivity will not have an impact on escalation of non-labor costs. These two rates were factored into the calculation of the future costs of nuclear decommissioning. However, the Prairie Island Indian Community payments were not escalated as they remain constant each year until the fuel is removed from the site.

3. Forecast Earnings Rate

GSAM also provided the analysis for the forecasted earnings rate, which was reviewed internally for reasonableness. A more comprehensive narrative of this analysis and accompanying graphs are included in Schedule C, which includes a discussion of the analytical framework used by GSAM to arrive at the forward-looking expected returns. It also includes a discussion regarding our investment strategy, investment and economic assumptions, and the expected returns for the various classes of investments that are currently a part of the fund.

While there is inherent uncertainty in any forward-looking expected return and escalation/inflation forecasts, the longer it takes to complete the decommissioning, the more time the fund has to compound earnings on the amounts contributed. At the same time, however, a longer decommissioning period also subjects the fund to more risk that the estimated earnings will not be realized as expected.

Consistent with our past triennial filings, the Company recommends a stratification of the earnings rate between the operational period and the decommissioning period. We also recommend two earnings rates for each facility to better match the earnings rates with the individual cost estimates and to better replicate the separation in the Qualified Trusts within the NDT. Each unit has its own set of earnings rates due to the difference in the timing of cash flows and different decommissioning start dates. Table 3 below shows the expected after-tax returns that are representative of the analysis detailed in Schedule C.

Table 3 – Earnings Rates Forecast

	60-Year Scenario			
	2017 Rates		2020 Rates	
Nuclear Unit	Operations	Decom.	Operations	Decom.
Monticello	5.00%	4.43%	3.80%	3.10%
Prairie Island Unit 1	4.99%	4.15%	4.01%	2.80%
Prairie Island Unit 2	5.04%	4.09%	3.98%	2.72%

The decrease in the expected after-tax returns is largely the result of lower overall interest rates in the market impacting forward looking expected returns for multiple asset classes.

C. Trust Structure & Investment Strategy

The NDT investments are contained in three Qualified Trusts, which are a standard decommissioning fund that cannot be refunded to customers until all decommissioning activities are completed. The Company has established an individual Qualified Trust for each nuclear operating unit to hold the decommissioning funds required by the NRC.

Below we discuss our investment strategy for the NDT as well as our liquidity assumptions for the trust.

1. Investment Strategy

As discussed in previous triennial dockets, the Company's NDT Committee routinely evaluates both the NDT's performance and the overall investment strategy for the fund (including its asset allocation), and it revises both the strategy and allocation as necessary.

As part of this Triennial Nuclear Decommissioning Accrual filing, the Company undertook a comprehensive review of our investment allocations to evaluate portfolio changes that would be effective over the next triennial period. The process of determining the portfolio's asset mix is called asset allocation optimization. Different mixes of assets can produce hundreds, or even thousands, of alternative combinations of risk and returns. As a result, asset allocation techniques are used in practice to evaluate the various possible asset mixes and determine those combinations that are likely to deliver optimal performance in terms of risk and return.

We have used this process to perform a long-term optimization of the asset allocation for the NDT's investments. With any investment, there is always a trade-off between expected risk and the expected rate of return on that investment. Typically, strategies

with higher expected returns also come with higher expected risk and vice versa. The goal is to optimize the trade-off between risk and return over the long term. If, on one hand, too little risk is taken, increased contributions likely will be needed to make up for the lack of sufficient market returns. If, on the other hand, too much risk is taken, it also is possible that increased contributions will be needed in the event an unfavorable outcome is realized

Following the Company's full analysis of multiple investment portfolios, we recommend the following investment mix shown in Table 4 below. We note that the development of this recommendation followed a process deemed prudent by the independent investment review required by the Commission's February 27, 2017 Order in Docket No. E002/M-14-761. That review also concluded that the Company "has found an appropriate balance to achieving a reasonable risk adjusted return" and that its asset allocation is "properly diversified amongst a reasonable amount of non-correlated assets classes."

Table 4 – Recommended Investment Mix

Portfolio Line Item	2017 Target	2020 Target
Total Equity	60.0%	58.0%
Private Equity	10.0%	10.0%
US All Cap Equity	25.8%	27.9%
Non-US Developed Equity	14.1%	12.6%
Emerging Markets Equity	10.1%	7.5%
Fixed Income	30.0%	30.0%
Investment Grade Fixed Income	12.1%	19.0%
High Yield Fixed Income	10.0%	5.0%
Emerging Market Debt	7.9%	6.0%
Private Real Estate	10.0%	12.0%
Cash	0.0%	0.0%
Overall fund benchmark:	**100.0%**	**100.0%**

Consistent with prior triennial filings, we request that the Commission approve this asset allocation, which we believe results in an optimized trade-off between risk and return over the long term on a forward-looking basis. That said, the Company will continue to analyze the portfolio asset mix and make updates and changes as necessary. In other words, the portfolio mix identified in this filing is a snapshot of a point in time and could change between now and the next triennial filing.

A more detailed discussion of the recommended target asset mix for the decommissioning fund, along with an analysis of the forward-looking expected returns is included in Schedule C.

a. Liquidity Assumptions

Our analysis assumes that the funds are invested in bonds as a cash outlay is approached. For each expected annual outgoing cash flow, assets are converted to bonds ahead of time to give more certainty to the ability to make the payment. Not all funds are converted to bonds – only enough to cover each annual cash outflow. For example, if the conversion is at a five-year period, the first outflows expected in 2030 are converted to bonds in 2025; then in 2026, enough cash is converted to bonds to match the 2031 expected outflow.

D. Current Fund Balances

Annually, the Company reports the balances in the various funds in either this petition or a separate letter. The balances for both the Qualified Trust for the MN Jurisdiction are discussed below.

1. Qualified Trust

As of June 30, 2020, the Qualified Trust book value balance for all three operating units was a total of $1,306 million for the MN Jurisdiction, with a total market value of $1,765 million. The difference between the book value and the market value is the unrealized gains and losses. Table 5 below shows the book and market values by unit. A detailed presentation of each unit's balances is presented in Schedule D.

Table 5 – Qualified Trust Balance as of June 30, 2020

Unit	Book Value	Market Value
Monticello	$594,749,330	$793,777,262
Prairie Island Unit 1	335,862,951	458,345,888
Prairie Island Unit 2	375,757,525	512,577,436
Total	$1,306,369,807	$1,764,700,585

The Qualified Trust balances are maintained by retail and wholesale jurisdictions. The retail jurisdictions are Minnesota, North Dakota, South Dakota, and Wisconsin. The wholesale jurisdictions are Minnesota and Wisconsin; since 2014, there have been no wholesale customers. The wholesale balance that was previously collected from wholesale customers is applied to the estimated dismantling cost on a jurisdictional

basis and reduces the accrual calculation for which the retail customers are responsible.

In Order Point 10 of the January 7, 2019 Order in Docket No. E002/M-17-828, the Commission required that "Xcel shall also report on whether the Company should redistribute to retail customers the wholesale customer contribution." We believe that redistributing funds is not necessary, but if FERC approval to transfer the funds were sought and received, doing so would not be unreasonable. Whether we redistribute funds from the wholesale customers to retail customers, what is critical is to ensure that the amount of funds assigned to the two wholesale jurisdictions is factored into the Minnesota retail accrual calculation. The reason we believe that we have to factor a portion of the wholesale balance into the accrual calculation relates to the allocation of the cost estimate to each jurisdiction. One hundred percent of the cost estimate is allocated to the retail jurisdictions as these customers carry the burden of funding the remaining amount for decommissioning. If we did not include a portion of the wholesale balance in the accrual calculation, the accrual calculations for each retail jurisdiction will over recover the amount needed by the wholesale balance. Thus, we must account for the Minnesota jurisdictional amount of the Minnesota and Wisconsin wholesale balance when calculating the accrual.

The book value balance for the Minnesota and Wisconsin wholesale jurisdictions in total was $49.7 million, and the market value was $66.5 million at June 30, 2020. The proposed distribution of these balances using the rate case demand allocators, assigned 72.9219% of the total to the Minnesota Retail jurisdiction, or $36.2 million additional book value balance and $48.5 million in market value balance. The allocation of the wholesale jurisdiction balances is included in Schedule D. Including the Minnesota Retail portion of the wholesale jurisdiction balances to the June 30, 2020 balances, results in the adjusted balances used in this filing as follows in Table 6:

Table 6 – Adjusted Qualified Trust Balance as of June 30, 2020

Unit	Book Value	Market Value
Monticello	$610,109,002	$814,968,100
Prairie Island Unit 1	346,629,286	471,960,960
Prairie Island Unit 2	385,837,890	526,255,835
Total	$1,342,576,178	$1,813,184,895

2. Beginning Fund Balance for Annuity Calculation

The 2017 Filing was submitted using the fund's adjusted market values, per the Commission order, and the 2020 filing continues to use the adjusted market value as a basis for the accrual. Using the adjusted market value is consistent with forward looking market conditions and will provide the most justifiable and proper accrual estimate at this time. The adjusted funds currently have a $470.6 million unrealized net gain. However, not all of this unrealized gain is available to fund decommissioning costs because taxes will have to be paid on the gains when they are realized. Therefore, the June 30, 2020 adjusted market value was dampened by $131.0 million for the estimated tax that can be expected be paid when the unrealized gain is realized. The Company calculated the tax effect on the June 30, 2020 adjusted market value based on the unrealized gains and losses in the portfolio. This tax effect calculation is shown with each accrual calculation in Schedule E.

3. Escrow Fund

In the 2014 Filing, the Commission approved the discontinuance of the Escrow Fund and approved the transfer (pour-over) to the Qualified Trust. The Company completed this pour-over in 2016 and reported a zero balance in the Escrow Fund with the 2017 compliance filing to 2014 Filing.

VII. EFFECT OF CHANGE UPON THE COMPANY'S REVENUE

Subdivision 1 (b) of Minn. Stat. §216B.2445 requires the inclusion of an estimated customer impact for each of the assumed periods. For this petition we calculated the rate impact to each of the customer classes on a $/kWh increase. This was done by allocating the estimated accruals for the various scenarios presented in Schedule F to the customer classes using the most recent Class Cost of Service Study.

The class allocation process used the same stratification methodology approved by the Commission in Docket No. E002/M-11-807 to return the DOE Settlement dollars to customers. This included an approximate 19.0 percent weight to capacity and an 81.0 percent weight to energy usage from Docket No E002/GR-19-564. The accrual was then divided by the energy each class forecasted to be used over a 12-month period ending December 31, 2020, also from Docket No. E002/GR-19-564, to determine a $/kWh that would be required for that class to collect its portion of the accrual. Schedule F provides the result of this calculation for all accruals provided in Schedule E.

VIII. EOL NUCLEAR FUEL

At the time each nuclear unit is shut down, there will be nuclear fuel remaining in the reactor that has not been fully utilized. We refer to this unused fuel as end-of-life (EOL) nuclear fuel. The unused fuel cannot be transferred to another facility, and the amortization expense for said fuel would have to be taken at the end of operations at each unit. To avoid this spike in amortization at the end of the useful life of each unit, the Company estimates the expected cost of unused fuel at the end of operations and amortizes the expense over the remaining life of each unit. This is done using a sinking fund method.

The Company recommends a decrease to the annual internal accrual for EOL nuclear fuel for this triennial filing. The Company is proposing to change the 2022 accrual based on the new EOL nuclear fuel factors discussed in Schedule G. The Minnesota jurisdictional annual accrual for 2022 is requested to be $714,366. This is a decrease of $1,591,993 over the accrual based on the factors approved in the 2017 Filing.

This recommended decrease stems mainly from an update in the estimates of the cost of the final fuel at shutdown. The estimated amount to be recovered decreased approximately $38 million from the estimate used in the 2017 Filing. The decrease was primarily the result of leveling of $/MWHe through optimization of the multi-cycle core fuel designs close to EOLL, primarily at Prairie Island Unit 2, and lower projected nuclear fuel commodity prices in the future. The 2022 accrual worksheet detailing the calculation is included in Schedule G.

IX. PREMATURE RISK INVESTIGATION

In previous Orders, the Commission has directed the Company to provide an investigation of premature risk in its Triennial Nuclear Decommissioning Accrual filings.[17] Consistent with the Commission's prior orders, our investigation included the following aspects of the risks of premature decommissioning:

- The availability of commercial insurance.
- The availability of electric industry co-insurance.
- Any programs, which may be proposed, mandated, or administered by the NRC or any other United States Government agency.

[17] *In the Matter of the Petition of Northern States Power Company d/b/a Xcel Energy for Approval of the 2012-2014 Triennial Nuclear Plant Decommissioning Accrual,* Docket No. E002/M-11-939, Order Approving Decommissioning Plan and Modifying Refund Plan, (Dec. 4, 2012).

- Specific detailed information pertaining to any steps the Company has taken to minimize any possible loss, which may occur as a result of premature decommissioning.
- The Company's ability to withstand possible economic and financial trauma, which may be associated with premature decommissioning.

Schedule H contains the regular response to that request. It addresses accident and non-accident related premature decommissioning of nuclear generating facilities. Presently, insurance is unavailable for non-accident related premature decommissioning such as those caused by regulatory directives. Therefore, the insurance analysis deals with accidents.

The Company's property insurance coverage of $2.65 billion would largely offset the potential impact of an accident-related decommissioning. Although accident-related decommissioning expenses are significant, the length of time involved in a clean-up process, insurance payments, tax deductibility of expenses, and related rate relief would affect the yearly expense. Although accident related premature decommissioning would affect both the Company and its customers, it is anticipated that, with acceptable regulatory decisions, the financial integrity of the Company would be maintained.

X. ASSET RETIREMENT OBLIGATION

The implementation of the Statement of Financial Accounting Standards No. 143 (SFAS 143), *Accounting for Asset Retirement Obligations* (ARO) in January of 2003 brought some changes to the accrual accounting for decommissioning. Financial Accounting Standards Board (FASB) Interpretation No. 47 (FIN 47), *Accounting for Conditional Asset Retirement Obligations* was released in March 2005. These statements are both included within the FASB Accounting Standards Codification (ASC) 410 *Asset Retirement and Environmental Obligations*. This Interpretation of the conditionality of an ARO has resulted in some additional accounting analysis for many of the fixed assets at the Company. Nuclear decommissioning was never assumed to be conditional in nature, thus the ARO accounting for nuclear decommissioning established in 2003 is unaffected by this Interpretation. Nonetheless, a summary of the ARO accounting for nuclear decommissioning is included in Schedule I for reference. This section is provided in response to the Commission's Order Point 9. from the 2017 Filing.

CONCLUSION

Xcel Energy respectfully requests the Commission approve our Petition for Approval of the 2022-2024 Nuclear Decommissioning Accrual. As described in this filing, we specifically request Commission approval of:

- Approve our decommissioning study and assumptions as compliant with the Company's obligations under Minnesota statutes, Commission rules, and prior precedent;
- Continue allocation of DOE settlement funds to the NDT;
- Approve an accrual of $31,368,901 effective in 2022 to meet the needs of the Company's 60-year spent fuel scenario, with no recasking of the fuel, for 2022 through 2024 while strategic decisions about the future of our nuclear units are decided in our 2019 IRP;
- Approve an annual accrual of $0.7 million for EOL nuclear fuel for the calendar year 2022 through 2024; and
- Approve the proposed asset allocation for the NDT.

The next decommissioning filing would be for the calendar years 2025 through 2027 with the submittal due December 1, 2023.

Dated: December 1, 2020

Northern States Power Company

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

Katie J. Sieben	Chair
Valerie Means	Commissioner
Matthew Schuerger	Commissioner
Joseph K. Sullivan	Commissioner
John A. Tuma	Commissioner

IN THE MATTER OF THE PETITION OF NORTHERN STATES POWER COMPANY FOR APPROVAL OF THE 2022-2024 TRIENNIAL NUCLEAR DECOMMISSIONING STUDY & ASSUMPTIONS	DOCKET NO. E002/M-20-___ **SUMMARY**

SUMMARY OF FILING

Please take notice that on December 1, 2020, Northern States Power Company, doing business as Xcel Energy, filed with the Minnesota Public Utilities Commission its Petition for approval of its Triennial Nuclear Decommissioning Study and Assumptions. In this Petition the Company analyzed several decommissioning scenarios and calculated a number of different accruals. The resulting accrual calculations range from an $8.6 million reduction to an increase of $207.5 million.

The full version of this filing can be found by searching the Department of Commerce's efiling website:

https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showeDocketsSearch&showEdocket=true&userType=public.

A docket number has not yet been assigned, but the filing can be found by searching the Received Date: December 1, 2020, and On Behalf Of: Xcel Energy.

CERTIFICATE OF SERVICE

I, Paget Pengelly, hereby certify that I have this day served copies or summaries of the foregoing document on the attached list of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States Mail at Minneapolis, Minnesota

xx electronic filing

Docket No. E002/M-17-828
Xcel Energy's Miscellaneous Electric Service List

Dated this 1st day of December 2020

/s/

Paget Pengelly
Regulatory Administrator

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John	Coffman	john@johncoffman.net	AARP	871 Tuxedo Blvd. St, Louis, MO 63119-2044	Electronic Service	No	OFF_SL_17-828_M-17-828
Generic Notice	Commerce Attorneys	commerce.attorneys@ag.state.mn.us	Office of the Attorney General-DOC	445 Minnesota Street Suite 1400 St. Paul, MN 55101	Electronic Service	Yes	OFF_SL_17-828_M-17-828
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The cost estimates developed and presented in this decommissioning filing are based on numerous fundamental assumptions, including regulatory requirements, project contingencies, low-level radioactive waste disposal practices, high-level radioactive waste management options, and site restoration requirements. There are four fuel storage options and two dismantling options presented for each facility. Additionally, new to this filing, we have received cost estimates assuming a 10 year life extension at the Monticello facility. Thus, there are twelve cost estimates for Monticello and eight cost estimates for Prairie Island provided with this filing.

As required by Minnesota statutes, a variety of cost studies were created, in order to address the possibility of delays in the DOE acceptance of spent fuel. The Company is required by statute to submit at least three cost scenarios, 60-year, 100-year, and 200-year scenarios. The length of these scenarios is the longest period of time measured from the start of shutdown until all spent fuel is removed from the locations. The 100-year and the 200-year dry cask operational period scenarios assume that the fuel will be re-casked every 50-years.

In the 2017 Filing, the Company provided scenarios using the DECON and SAFSTOR decommissioning alternative. This filing is consistent with the 2017 Filing in that it provides scenarios for both decommissioning alternatives. This filing provides four DECON scenarios and four SAFSTOR scenarios.
For this filing, the Company assumed approximately four years of wet storage based on a conservative estimate of the capabilities of casks currently on the market. For the remainder of this period, the fuel will be stored in dry storage and the pool will no longer be required. This results in a significant decrease in the amount of security staff required at the site.

As a basis for these cost estimates, TLG uses a systems and structural inventory database, which in 1999, was revised for both nuclear facilities. The Company has reviewed and made minor changes to this inventory in the current filing. Other items provided as input are property and sales tax assumptions, insurance levels, burial rates, recycling practices, license termination dates, department budgets, purchased power and oil costs, incidental costs and meteorological data. These are all input to a process that will estimate the total dollar amount for decontaminating, removing, packaging, shipping, and disposing of the two nuclear sites. These cost estimates include labor rates for both salaried staff and union craft people. All labor is provided with loadings such as pension, unemployment, workers compensation, and medical where applicable. An estimate for employee retention costs also was included in the estimate to account for the additional expense the Company expects to incur in order to insure it retains the staffing

required for the plant in the early post shutdown stage while fuel remains in the pool. Xcel Energy also reviewed the organizational structure and numbers of employees for the salaried staff input.

Briefly, the decommissioning process is broken down into several main categories of work that are performed in various periods throughout the decommissioning depending on the dismantling method and the fuel storage assumptions, as follows:

> Preparation – Site preparation, engineering and planning of detailed procedures, performing various surveys, implementing the staffing transition plan, organizing the staff required to manage the intended decommissioning activities from available plant staff and outside resources, and submitting filings to regulatory entities.
>
> Fuel Storage – Packaging the fuel in dry cask canisters, loading the canisters to the storage pad, building a fuel transfer facility, re-casking every 50 years for some cost estimates.
>
> Dormancy – For SAFSTOR only, this is the period following unit shutdown where structures and systems not necessary for the operation or support of spent fuel pool and site security and surveillance are drained, de-energized, and secured. Minimal maintenance, sanitation, and sealing is performed to allow the facility to be maintained in an inactive state until delayed decommissioning activities commence. Only inspection, maintenance and security/surveillance activities are occurring during this period.
>
> Decommissioning operations – a constructing additional facilities for cask storage, transferring all spent fuel to dry casks, modifications to site structures and facilities, decontamination, removal, packaging, shipping, and burial of all contaminated and activated components and structures. By the end of this work all radioactive or contaminated material from the plant has been removed, but the fuel may still be onsite.
>
> Site Restoration – The demolition of remaining structures, site restoration, and license termination.

All cost estimate numbers are provided in instant dollars, which means that costs for the same activity from one year to the next do not increase due to inflation.

For example, the salary for an engineer is the same in the first year and all subsequent years. The time value impact of inflation is brought into the equation in the accrual calculation worksheet.

In Summary, the Company has computed various decommissioning accruals using the DECON and SAFSTOR scenarios assuming a 42-year (no re-casking), 60-year (no re-casking), 100-year (with re-casking), and 200-year (with re-casking) dry cask storage operational period.

SAFSTOR Method of Decommissioning

SAFSTOR is defined in the U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70, and 72, as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use." Under this cost estimate decommissioning activities will commence about 50 years after the cessation of operations and will be completed within 60 years. Many plants entering SAFSTOR have stated they do not intend to take the full 60 years but will finish decommissioning when economically viable.

SAFSTOR has begun to be pursued by a number of plant operators as they have entered shutdown. The primary reason for this shift is the increased earnings in the fund when a large majority of the expenditures are pushed further out into the future, which allows for smaller annual accruals during operation. To the extent that the after-tax return of the fund out paces the sum of the annual escalation and costs to tend the facility during dormancy, the required contributions by rate payers will be decreased over a DECON method. Over a 50 year dormancy period, this impact becomes substantial based upon current estimates.

The salaried staff presented in the cost estimate is not necessarily assumed to be the staff of Xcel Energy. This assumption is due to the length of the wait period, now being 50 years, and the fact that the employees with nuclear experience currently employed within Xcel Energy will be enjoying retirement and not available for decommissioning work. Thus, the cost estimate assumes a Decommissioning Operations Contractor (DOC), which is an independent entity that oversees the decommissioning work and provides the required salaried employees.

A more detailed description of the cost estimation process is included in the accompanying two volumes. TLG has provided a written outline of the procedures as well as worksheets that delineate the costs per activity, per period.

DECON Method of Decommissioning

DECON is defined in the U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70, and 72, as "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations."

Under this cost estimate decommissioning activities will commence as soon as possible after the cessation of operations. The last fuel assemblies will be sufficiently cooled and can be removed from the spent fuel pool and placed in dry casks after about five years.

DECON has been the preferred method of decommissioning for most situations. It is generally favorable because it eliminates the costs for caretaking, other than those related to the ISFSI. The cost estimate places most of the major expenditures more towards the front end of the decommissioning schedule. This is a major advantage because the individuals familiar with the operation of the facility are available to support the dismantling effort, plant systems and services are fully functional, structural integrity is intact, and licensee has a comprehensive management organization available to oversee and conduct the orderly decommissioning and decontamination.

Comparison to 2017 Filing

An extended time period of spent fuel management has multiple impacts including a significant increase in labor costs and extends the period of cost escalation, which creates a higher risk over time. The Company has escalated the 60-year DECON cost estimate from the 2017 Filing in the Table 1 below and compared it to the 2020 cost estimate simply to show that the cost estimates were similar and in line with the changes expected from inflation. The comparison table inflates the 2017 Filing cost estimate using the last approved escalation rate for labor and non-labor activities of 4.03 percent and 2.83%, respectively.

Table 1
Comparison of Current No-Recasking Cost Estimate to Previous Filing
60-Year Scenario (DECON)

	2017 Study in 2020 Dollars	2020 Cost Estimate
Monticello	$1,680,978,400	$1,612,762,003
Prairie Island Unit 1	1,097,692,104	1,017,864,701
Prairie Island Unit 2	1,099,367,680	1,029,940,789
	$3,878,038,184	$3,660,567,493

One of the largest changes from the 2017 cost estimate to the 2020 cost estimate was the amount of time the Company anticipates needing to operate the spent fuel pool after shutdown from 5 years to 4 years. The company asked for this change and feels it is still a conservative estimate, as industry peers are transferring spent fuel in as few as 2 years. Given the above driver, the current estimate is decreased, which aligns with the inflated 2017 Filing cost estimate.

Table 2 shows the attachments that provide the yearly cost estimate detail for the seven cost estimates for each facility. Theses summaries show the costs for the radiological decommissioning, the spent fuel management costs, site restoration, and the ISFSI decommissioning. The entire TLG cost estimate documentation is provided in Schedule L for Monticello, Schedule M for Prairie Island, and Schedule N for the Monticello 10 year license extension.

Table 2
Cost Estimate Cash Flow Summary Schedules

A.1	Monticello Schedule of Annual Expenditures – DECON 42-Year (No-Recasking)
A.2	Monticello Schedule of Annual Expenditures – DECON 60-Year (No-Recasking)
A.3	Monticello Schedule of Annual Expenditures – DECON 100-Year (Re-casking)

A.4	Monticello Schedule of Annual Expenditures – DECON 200-Year (Re-casking)
A.5	Monticello Schedule of Annual Expenditures – SAFSTOR 42-Year (No-Recasking)
A.6	Monticello Schedule of Annual Expenditures – SAFSTOR 60-Year (No-Recasking)
A.7	Monticello Schedule of Annual Expenditures – SAFSTOR 100-Year (Re-casking)
A.8	Monticello Schedule of Annual Expenditures – SAFSTOR 200-Year (Re-casking)
A.9	Prairie Island Schedule of Annual Expenditures – DECON 42-Year (No-Recasking)
A.10	Prairie Island Schedule of Annual Expenditures – DECON 60-Year (No-Recasking)
A.11	Prairie Island Schedule of Annual Expenditures – DECON 100-Year (Re-casking)
A.12	Prairie Island Schedule of Annual Expenditures – DECON 200-Year (Re-casking)
A.13	Prairie Island Schedule of Annual Expenditures – SAFSTOR 42-Year (No-Recasking)
A.14	Prairie Island Schedule of Annual Expenditures – SAFSTOR 60-Year (No-Recasking)
A.15	Prairie Island Schedule of Annual Expenditures – SAFSTOR 100-Year (Re-casking)
A.16	Prairie Island Schedule of Annual Expenditures – SAFSTOR 200-Year (Re-casking)

A.17	Monticello 10 Year Extension Schedule of Annual Expenditures – DECON 42-Year (No-Recasking)
A.18	Monticello 10 Year Extension Schedule of Annual Expenditures – DECON 60-Year (No-Recasking)
A.19	Monticello 10 Year Extension Schedule of Annual Expenditures – DECON 100-Year (Re-casking)
A.20	Monticello 10 Year Extension Schedule of Annual Expenditures – DECON 200-Year (Re-casking)

NRC Minimum

The NRC minimum required funding amounts, based upon the new information from NUREG-1307, Revision 16, and the most recent statistics for comparison to the new cost estimates have been calculated. Under the NRC minimum calculation requirements, the Company must show that it will meet the minimum cost calculated under at least one of the two burial options allowed: Direct Burial and Blended Burial. The Blended Burial NRC minimum calculations are less than all scenarios of our 2020 cost estimates in total. Table 3 shows lists the support schedules for the information for the calculation of the NRC minimum.

Table 3
NRC Minimum Calculation Supporting Schedules

A.21	NRC Minimum Historical Escalation
A.22	NRC Minimum Calculation

Property Taxes Included in Cost Estimates

Taxation of utility property is fundamentally different than taxation of the property owned by any other business. Like other businesses, we pay property taxes on the value of the land we own, the buildings attached thereto, and rights-of-way. This property is all assessed at the local level. Unlike other businesses, however, we are also assessed property taxes on personal property. Specifically, we are required to pay property taxes on Operating Property, which is defined as "any tangible property that is owned or leased, except land, which is directly

associated with the generation, transmission, or distribution of electricity [or] natural gas…." Minn. R. 8100.0100, subp. 11.

In Minnesota, the Department of Revenue (DOR) values all of the Company's operating property in Minnesota, as well as its gas and electric operating property that extends into North Dakota and South Dakota. Each type of property is valued as one integrated system, or unit. When the system value for each type (electric or natural gas) is determined, an allocation is then made to reflect how much of the system value is attributable to Minnesota. Allocation is based on a combination of original cost of the property in Minnesota to total system cost, as well as gross revenue in Minnesota to total system revenue.

Deductions are then made to subtract property locally assessed (land and some buildings) and exemptions (e.g., sliding scale exemption for generation efficiency, pollution control, etc.). The resulting value is then apportioned to the various taxing districts based on the original cost of the property located in those districts.

Local taxing districts then combine the market value apportioned to them with the value of the Company's locally assessed property to arrive at our tax base within the taxing district's jurisdiction. Finally, each jurisdiction then applies its own individual property tax rate to our tax base to determine our property tax liability in that jurisdiction.

As we make new investments in personal property throughout our integrated system, the market value upon which property taxes are assessed increases. This increased market value is then apportioned to the local jurisdictions that host our Monticello and Prairie Island plants. In 2017, the Company paid $17.9 million in real and personal property taxes related to Monticello and $24.7 million for Prairie Island. In 2018, the Company paid $18.7 million in property taxes related to Monticello and $26.8 million for Prairie Island. When operations at these nuclear plants cease, the operating property will be removed from the sites and will no longer be included in the DOR's market valuation. This will result in a reduction in property taxes paid when operations cease, but the property for the ISFSI will continue to be locally assessed. For the decommissioning cost estimates, the land, structures, and the dry cask portion of the operating property taxes were assumed to continue with the structures component lasting until the structures are decommissioned and removed.

The property tax amounts for Monticello and Prairie Island provided in the decommissioning cost estimate were based on the actual liabilities paid in 2019. The Company's consultant developed the future property tax estimates for after

plant shut down based on the actual property taxes paid for the Prairie Island ($23.2 million) and Monticello ($18.4 million). Table 4 shows the change in property taxes from operations to decommissioning.

Table 4
Property Tax Estimates

	During Operations	Plant Shutdown	Plant Structures Removed
Prairie Island			
Land	$216,242	$216,242	$216,242
Structure	5,765,693	5,765,693	0
Substation	397,824	0	0
ISFSI	2,598,788	2,598,788	2,598,788
Generation Machinery	14,205,814	0	0
Total	$23,184,361	$8,580,723	$2,815,030
Monticello			
Land	$517,757	$517,757	$517,757
Structure	3,675,271	3,675,271	0
Substation	284,764	0	0
ISFSI	533,686	533,686	533,686
Generation Machinery	13,385,394	0	0
Total	$18,396,873	$4,726,715	$1,051,443

The process used in the current property tax cost estimates is the same as the method used in our 2017 Filing. In addition, we note that there is no double recovery of property taxes between the decommissioning accrual and those included in current rates. The collection of funds from customers today for the payment of future tax obligations does not relate to the current year property tax expense.

Spent Fuel Management Costs

The cost estimates include the operating and maintenance of the ISFSI from shutdown through when all the fuel has been removed from the site. Schedules A.1 through A.20 show the annual costs in total spent fuel management costs by unit. Schedule A.23 breaks the spent fuel management costs down into its cost components such as utility staff, property taxes, and operating costs.

Table 5
Cost Breakdown Schedule

A.23	Spent Fuel Management Cost Breakdown – 60-year DECON

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Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2030	$ 29,863	$ 2,014	$ 173	$ -	$ 32,050
2031	117,581	5,993	669	-	124,243
2032	202,647	13,280	205	-	216,132
2033	189,691	58,336	31	-	248,058
2034	135,978	92,491	7	-	228,476
2035	69,137	6,894	-	-	76,030
2036	10,568	11,845	32,564	-	54,977
2037	1,198	12,926	37,074	-	51,199
2038	-	9,678	-	-	9,678
2039	-	13,278	-	-	13,278
2040	-	14,742	-	-	14,742
2041	-	8,887	-	-	8,887
2042	-	8,887	-	-	8,887
2043	-	8,887	-	-	8,887
2044	-	8,911	-	-	8,911
2045	-	8,887	-	-	8,887
2046	-	8,887	-	-	8,887
2047	-	8,887	-	-	8,887
2048	-	11,789	-	-	11,789
2049	-	8,887	-	-	8,887
2050	-	8,887	-	-	8,887
2051	-	8,887	-	-	8,887
2052	-	9,326	-	-	9,326
2053	-	10,132	-	-	10,132
2054	-	9,717	-	-	9,717
2055	-	9,717	-	-	9,717
2056	-	11,402	-	-	11,402
2057	-	10,962	-	-	10,962
2058	-	10,962	-	-	10,962
2059	-	10,962	-	-	10,962
2060	-	10,156	-	-	10,156
2061	-	9,717	-	-	9,717
2062	-	10,132	-	-	10,132
2063	-	9,717	-	-	9,717
2064	-	9,741	-	-	9,741
2065	-	10,132	-	-	10,132
2066	-	9,717	-	-	9,717
2067	-	9,717	-	-	9,717
2068	-	10,156	-	-	10,156
2069	-	10,547	-	-	10,547
2070	-	9,717	-	-	9,717
2071	-	10,547	-	-	10,547

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2072	6,632	10,246	-	-	16,877
2073	-	-	2,663	12,844	15,507
	$ 763,295	$ 555,579	$ 73,386	$ 12,844	$ 1,405,104

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2030	$ 29,863	$ 2,014	$ 173	$ -	$ 32,050
2031	117,581	5,993	669	-	124,243
2032	202,647	13,280	205	-	216,132
2033	189,691	58,336	31	-	248,058
2034	135,978	92,491	7	-	228,476
2035	69,137	6,483	-	-	75,620
2036	10,568	8,751	32,564	-	51,882
2037	1,198	9,229	37,074	-	47,501
2038	-	8,912	-	-	8,912
2039	-	8,912	-	-	8,912
2040	-	8,936	-	-	8,936
2041	-	8,912	-	-	8,912
2042	-	8,912	-	-	8,912
2043	-	8,912	-	-	8,912
2044	-	8,936	-	-	8,936
2045	-	8,912	-	-	8,912
2046	-	8,912	-	-	8,912
2047	-	8,912	-	-	8,912
2048	-	11,814	-	-	11,814
2049	-	8,912	-	-	8,912
2050	-	15,387	-	-	15,387
2051	-	15,387	-	-	15,387
2052	-	18,291	-	-	18,291
2053	-	20,427	-	-	20,427
2054	-	16,107	-	-	16,107
2055	-	19,707	-	-	19,707
2056	-	21,171	-	-	21,171
2057	-	8,840	-	-	8,840
2058	-	8,840	-	-	8,840
2059	-	8,840	-	-	8,840
2060	-	8,864	-	-	8,864
2061	-	8,840	-	-	8,840
2062	-	8,840	-	-	8,840
2063	-	8,840	-	-	8,840
2064	-	8,864	-	-	8,864
2065	-	8,840	-	-	8,840
2066	-	8,840	-	-	8,840
2067	-	8,840	-	-	8,840
2068	-	8,864	-	-	8,864
2069	-	8,840	-	-	8,840
2070	-	8,840	-	-	8,840
2071	-	8,840	-	-	8,840

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Monticello Nuclear Generating Plant
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Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2072	-	8,864	-	-	8,864
2073	-	8,840	-	-	8,840
2074	-	8,840	-	-	8,840
2075	-	8,840	-	-	8,840
2076	-	8,864	-	-	8,864
2077	-	8,840	-	-	8,840
2078	-	10,916	-	-	10,916
2079	-	11,331	-	-	11,331
2080	-	10,940	-	-	10,940
2081	-	10,916	-	-	10,916
2082	-	10,916	-	-	10,916
2083	-	11,331	-	-	11,331
2084	-	10,940	-	-	10,940
2085	-	10,916	-	-	10,916
2086	-	10,916	-	-	10,916
2087	-	11,331	-	-	11,331
2088	-	13,818	-	-	13,818
2089	-	10,916	-	-	10,916
2090	6,632	9,346	-	-	15,978
2091	-	-	2,663	12,844	15,507
	$ 763,295	$ 763,237	$ 73,386	$ 12,844	$ 1,612,762

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2030	$ 29,863	$ 2,014	$ 173	$ -	$ 32,050
2031	117,581	7,696	669	-	125,946
2032	202,647	21,070	205	-	223,922
2033	189,691	63,565	31	-	253,288
2034	135,978	92,491	7	-	228,476
2035	69,137	6,483	-	-	75,620
2036	10,568	8,789	32,673	-	52,031
2037	1,198	9,371	37,199	-	47,768
2038	-	10,267	-	-	10,267
2039	-	10,267	-	-	10,267
2040	-	10,295	-	-	10,295
2041	-	10,267	-	-	10,267
2042	-	10,267	-	-	10,267
2043	-	10,267	-	-	10,267
2044	-	10,295	-	-	10,295
2045	-	10,267	-	-	10,267
2046	-	10,267	-	-	10,267
2047	-	10,267	-	-	10,267
2048	-	13,173	-	-	13,173
2049	-	10,267	-	-	10,267
2050	-	16,742	-	-	16,742
2051	-	16,742	-	-	16,742
2052	-	16,770	-	-	16,770
2053	-	16,742	-	-	16,742
2054	-	16,742	-	-	16,742
2055	-	16,742	-	-	16,742
2056	-	16,770	-	-	16,770
2057	-	16,742	-	-	16,742
2058	-	45,494	-	-	45,494
2059	-	16,742	-	-	16,742
2060	-	16,770	-	-	16,770
2061	-	16,742	-	-	16,742
2062	-	16,742	-	-	16,742
2063	-	31,118	-	-	31,118
2064	-	16,770	-	-	16,770
2065	-	16,742	-	-	16,742
2066	-	19,617	-	-	19,617
2067	-	16,742	-	-	16,742
2068	-	57,022	-	-	57,022
2069	-	16,742	-	-	16,742
2070	-	16,742	-	-	16,742
2071	-	16,742	-	-	16,742

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Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2072	-	16,770	-	-	16,770
2073	-	16,742	-	-	16,742
2074	-	16,742	-	-	16,742
2075	-	16,742	-	-	16,742
2076	-	16,770	-	-	16,770
2077	-	16,742	-	-	16,742
2078	-	16,742	-	-	16,742
2079	-	16,742	-	-	16,742
2080	-	16,770	-	-	16,770
2081	-	16,742	-	-	16,742
2082	-	16,742	-	-	16,742
2083	-	16,742	-	-	16,742
2084	-	117,400	-	-	117,400
2085	-	16,742	-	-	16,742
2086	-	16,742	-	-	16,742
2087	-	16,742	-	-	16,742
2088	-	19,648	-	-	19,648
2089	-	16,742	-	-	16,742
2090	-	16,742	-	-	16,742
2091	-	16,742	-	-	16,742
2092	-	19,650	-	-	19,650
2093	-	21,782	-	-	21,782
2094	-	17,462	-	-	17,462
2095	8,544	21,062	-	-	29,606
2096	-	22,529	-	-	22,529
2097	-	10,195	-	-	10,195
2098	-	10,195	-	-	10,195
2099	-	10,195	-	-	10,195
2100	-	10,195	-	-	10,195
2101	-	10,195	-	-	10,195
2102	-	10,195	-	-	10,195
2103	-	10,195	-	-	10,195
2104	-	10,223	-	-	10,223
2105	-	10,195	-	-	10,195
2106	-	10,195	-	-	10,195
2107	-	10,195	-	-	10,195
2108	-	38,974	-	-	38,974
2109	-	10,195	-	-	10,195
2110	-	10,195	-	-	10,195
2111	-	10,195	-	-	10,195
2112	-	10,223	-	-	10,223
2113	-	24,571	-	-	24,571

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Monticello Nuclear Generating Plant
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Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2114	-	10,195	-	-	10,195
2115	-	10,195	-	-	10,195
2116	-	13,098	-	-	13,098
2117	-	10,195	-	-	10,195
2118	-	52,523	-	-	52,523
2119	-	12,686	-	-	12,686
2120	-	12,299	-	-	12,299
2121	-	12,271	-	-	12,271
2122	-	12,271	-	-	12,271
2123	-	12,686	-	-	12,686
2124	-	12,299	-	-	12,299
2125	-	12,271	-	-	12,271
2126	-	12,271	-	-	12,271
2127	-	12,686	-	-	12,686
2128	-	15,177	-	-	15,177
2129	-	12,271	-	-	12,271
2130	6,632	10,649	-	-	17,281
2131	-	-	2,779	4,389	7,168
	$ 771,839	$ 1,795,906	$ 73,737	$ 4,389	$ 2,645,871

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Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2030	$ 29,863	$ 2,014	$ 173	$ -	$ 32,050
2031	117,581	7,696	669	-	125,946
2032	202,781	21,070	205	-	224,056
2033	189,711	63,565	31	-	253,308
2034	135,824	92,491	7	-	228,322
2035	69,137	6,483	-	-	75,620
2036	10,568	8,789	32,673	-	52,031
2037	1,198	9,370	37,199	-	47,767
2038	-	10,258	-	-	10,258
2039	-	10,258	-	-	10,258
2040	-	10,286	-	-	10,286
2041	-	10,258	-	-	10,258
2042	-	10,258	-	-	10,258
2043	-	10,258	-	-	10,258
2044	-	10,286	-	-	10,286
2045	-	10,258	-	-	10,258
2046	-	10,258	-	-	10,258
2047	-	10,258	-	-	10,258
2048	-	13,163	-	-	13,163
2049	-	10,258	-	-	10,258
2050	-	16,733	-	-	16,733
2051	-	16,733	-	-	16,733
2052	-	16,761	-	-	16,761
2053	-	16,733	-	-	16,733
2054	-	16,733	-	-	16,733
2055	-	16,733	-	-	16,733
2056	-	16,761	-	-	16,761
2057	-	16,733	-	-	16,733
2058	-	45,484	-	-	45,484
2059	-	16,733	-	-	16,733
2060	-	16,761	-	-	16,761
2061	-	16,733	-	-	16,733
2062	-	16,733	-	-	16,733
2063	-	31,109	-	-	31,109
2064	-	16,761	-	-	16,761
2065	-	16,733	-	-	16,733
2066	-	19,608	-	-	19,608
2067	-	16,733	-	-	16,733
2068	-	57,013	-	-	57,013
2069	-	16,733	-	-	16,733
2070	-	16,733	-	-	16,733
2071	-	16,733	-	-	16,733

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Monticello Nuclear Generating Plant
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Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2072	-	16,761	-	-	16,761
2073	-	16,733	-	-	16,733
2074	-	16,733	-	-	16,733
2075	-	16,733	-	-	16,733
2076	-	16,761	-	-	16,761
2077	-	16,733	-	-	16,733
2078	-	16,733	-	-	16,733
2079	-	16,733	-	-	16,733
2080	-	16,761	-	-	16,761
2081	-	16,733	-	-	16,733
2082	-	16,733	-	-	16,733
2083	-	16,733	-	-	16,733
2084	-	117,391	-	-	117,391
2085	-	16,733	-	-	16,733
2086	-	16,733	-	-	16,733
2087	-	16,733	-	-	16,733
2088	-	19,639	-	-	19,639
2089	-	16,733	-	-	16,733
2090	-	16,733	-	-	16,733
2091	-	16,733	-	-	16,733
2092	-	16,761	-	-	16,761
2093	-	16,733	-	-	16,733
2094	-	16,733	-	-	16,733
2095	8,544	16,733	-	-	25,277
2096	-	16,761	-	-	16,761
2097	-	16,733	-	-	16,733
2098	-	16,733	-	-	16,733
2099	-	16,733	-	-	16,733
2100	-	16,733	-	-	16,733
2101	-	16,733	-	-	16,733
2102	-	16,733	-	-	16,733
2103	-	16,733	-	-	16,733
2104	-	16,761	-	-	16,761
2105	-	16,733	-	-	16,733
2106	-	16,733	-	-	16,733
2107	-	16,733	-	-	16,733
2108	-	45,512	-	-	45,512
2109	-	16,733	-	-	16,733
2110	-	16,733	-	-	16,733
2111	-	16,733	-	-	16,733
2112	-	16,761	-	-	16,761
2113	-	31,109	-	-	31,109

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Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2114	-	16,733	-	-	16,733
2115	-	16,733	-	-	16,733
2116	-	19,636	-	-	19,636
2117	-	16,733	-	-	16,733
2118	-	56,985	-	-	56,985
2119	-	16,733	-	-	16,733
2120	-	16,761	-	-	16,761
2121	-	16,733	-	-	16,733
2122	-	16,733	-	-	16,733
2123	-	16,733	-	-	16,733
2124	-	16,761	-	-	16,761
2125	-	16,733	-	-	16,733
2126	-	16,733	-	-	16,733
2127	-	16,733	-	-	16,733
2128	-	19,639	-	-	19,639
2129	-	16,733	-	-	16,733
2130	-	16,733	-	-	16,733
2131	-	16,733	-	-	16,733
2132	-	16,761	-	-	16,761
2133	-	16,733	-	-	16,733
2134	-	117,363	-	-	117,363
2135	-	16,733	-	-	16,733
2136	-	16,761	-	-	16,761
2137	-	16,733	-	-	16,733
2138	-	16,733	-	-	16,733
2139	-	16,733	-	-	16,733
2140	-	16,761	-	-	16,761
2141	-	16,733	-	-	16,733
2142	-	16,733	-	-	16,733
2143	-	16,733	-	-	16,733
2144	-	16,761	-	-	16,761
2145	-	16,733	-	-	16,733
2146	-	16,733	-	-	16,733
2147	-	16,733	-	-	16,733
2148	-	16,761	-	-	16,761
2149	-	16,733	-	-	16,733
2150	-	16,733	-	-	16,733
2151	-	16,733	-	-	16,733
2152	-	16,761	-	-	16,761
2153	-	16,733	-	-	16,733
2154	-	16,733	-	-	16,733
2155	-	16,733	-	-	16,733

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2156	-	16,761	-	-	16,761
2157	-	16,733	-	-	16,733
2158	-	45,484	-	-	45,484
2159	-	16,733	-	-	16,733
2160	-	16,761	-	-	16,761
2161	-	16,733	-	-	16,733
2162	-	16,733	-	-	16,733
2163	-	31,109	-	-	31,109
2164	-	16,761	-	-	16,761
2165	-	16,733	-	-	16,733
2166	-	19,608	-	-	19,608
2167	-	16,733	-	-	16,733
2168	-	59,891	-	-	59,891
2169	-	16,733	-	-	16,733
2170	-	16,733	-	-	16,733
2171	-	16,733	-	-	16,733
2172	-	16,761	-	-	16,761
2173	-	16,733	-	-	16,733
2174	-	16,733	-	-	16,733
2175	-	16,733	-	-	16,733
2176	-	16,761	-	-	16,761
2177	-	16,733	-	-	16,733
2178	-	16,733	-	-	16,733
2179	-	16,733	-	-	16,733
2180	-	16,761	-	-	16,761
2181	-	16,733	-	-	16,733
2182	-	16,733	-	-	16,733
2183	-	16,733	-	-	16,733
2184	-	117,391	-	-	117,391
2185	-	16,733	-	-	16,733
2186	-	16,733	-	-	16,733
2187	-	16,733	-	-	16,733
2188	-	16,761	-	-	16,761
2189	-	16,733	-	-	16,733
2190	-	16,733	-	-	16,733
2191	-	16,733	-	-	16,733
2192	-	19,641	-	-	19,641
2193	-	21,772	-	-	21,772
2194	-	17,453	-	-	17,453
2195	-	21,052	-	-	21,052
2196	-	22,520	-	-	22,520
2197	-	10,186	-	-	10,186

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2198	-	10,186	-	-	10,186
2199	-	10,186	-	-	10,186
2200	-	10,186	-	-	10,186
2201	-	10,186	-	-	10,186
2202	-	10,186	-	-	10,186
2203	-	10,186	-	-	10,186
2204	-	10,214	-	-	10,214
2205	-	10,186	-	-	10,186
2206	-	10,186	-	-	10,186
2207	-	10,186	-	-	10,186
2208	-	41,843	-	-	41,843
2209	-	10,186	-	-	10,186
2210	-	10,186	-	-	10,186
2211	-	10,186	-	-	10,186
2212	-	10,214	-	-	10,214
2213	-	24,561	-	-	24,561
2214	-	10,186	-	-	10,186
2215	-	10,186	-	-	10,186
2216	-	13,089	-	-	13,089
2217	-	10,186	-	-	10,186
2218	-	52,513	-	-	52,513
2219	-	12,677	-	-	12,677
2220	-	12,289	-	-	12,289
2221	-	12,261	-	-	12,261
2222	-	12,261	-	-	12,261
2223	-	12,677	-	-	12,677
2224	-	12,289	-	-	12,289
2225	-	12,261	-	-	12,261
2226	-	12,261	-	-	12,261
2227	-	12,677	-	-	12,677
2228	-	12,289	-	-	12,289
2229	-	12,261	-	-	12,261
2230	6,632	10,640	-	-	17,272
2231	-	-	2,779	4,389	7,168
	$ 771,839	$ 3,848,543	$ 73,737	$ 4,389	$ 4,698,508

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2030	$ 25,789	$ 2,014	$ -	$ -	$ 27,803
2031	113,712	5,993	-	-	119,705
2032	48,302	58,673	-	-	106,975
2033	39,065	70,475	-	-	109,540
2034	29,534	50,293	-	-	79,827
2035	8,815	6,489	-	-	15,303
2036	8,839	9,386	-	-	18,224
2037	8,815	10,808	-	-	19,623
2038	8,815	7,209	-	-	16,023
2039	8,815	10,808	-	-	19,623
2040	8,839	12,265	-	-	21,104
2041	8,815	6,417	-	-	15,231
2042	8,815	6,417	-	-	15,231
2043	8,815	6,417	-	-	15,231
2044	8,839	6,434	-	-	15,273
2045	8,815	6,417	-	-	15,231
2046	8,815	6,417	-	-	15,231
2047	8,815	6,417	-	-	15,231
2048	8,839	9,312	-	-	18,151
2049	8,815	6,417	-	-	15,231
2050	8,815	6,417	-	-	15,231
2051	8,815	6,417	-	-	15,231
2052	8,839	6,849	-	-	15,688
2053	8,815	7,662	-	-	16,477
2054	8,815	7,247	-	-	16,062
2055	8,815	7,247	-	-	16,062
2056	8,839	8,925	-	-	17,764
2057	8,815	8,492	-	-	17,307
2058	8,815	8,492	-	-	17,307
2059	8,815	8,492	-	-	17,307
2060	8,839	7,680	-	-	16,518
2061	8,815	7,247	-	-	16,062
2062	8,815	7,662	-	-	16,477
2063	8,815	7,247	-	-	16,062
2064	8,839	7,265	-	-	16,103
2065	8,815	7,662	-	-	16,477
2066	8,815	7,247	-	-	16,062
2067	8,815	7,247	-	-	16,062
2068	8,839	7,680	-	-	16,518
2069	8,815	8,077	-	-	16,892
2070	8,815	7,247	-	-	16,062
2071	8,815	8,077	-	-	16,892

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2072	8,839	8,095	-	-	16,934
2073	9,136	-	-	-	9,136
2074	9,136	-	-	-	9,136
2075	9,136	-	-	-	9,136
2076	9,161	-	-	-	9,161
2077	9,136	-	-	-	9,136
2078	9,136	-	-	-	9,136
2079	9,136	-	-	-	9,136
2080	9,161	-	-	-	9,161
2081	9,136	-	-	-	9,136
2082	9,136	-	-	-	9,136
2083	9,136	-	-	-	9,136
2084	9,161	-	-	-	9,161
2085	46,929	-	425	-	47,355
2086	93,666	-	634	-	94,300
2087	186,255	-	44	656	186,956
2088	97,113	-	6	6,318	103,436
2089	92,953	-	5	5,869	98,827
2090	27,431	-	11,169	-	38,600
2091	133	-	35,449	-	35,582
2092	56	-	14,860	-	14,915
	$ 1,245,842	$ 479,749	$ 62,593	$ 12,844	$ 1,801,028

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2030	$ 25,789	$ 2,014	$ -	$ -	$ 27,803
2031	113,712	5,993	-	-	119,705
2032	48,302	58,673	-	-	106,975
2033	39,065	70,475	-	-	109,540
2034	29,534	50,293	-	-	79,827
2035	8,815	6,489	-	-	15,303
2036	8,839	6,506	-	-	15,345
2037	8,815	6,489	-	-	15,303
2038	8,815	6,489	-	-	15,303
2039	8,815	6,489	-	-	15,303
2040	8,839	6,506	-	-	15,345
2041	8,815	6,489	-	-	15,303
2042	8,815	6,489	-	-	15,303
2043	8,815	6,489	-	-	15,303
2044	8,839	6,506	-	-	15,345
2045	8,815	6,489	-	-	15,303
2046	8,815	6,489	-	-	15,303
2047	8,815	6,489	-	-	15,303
2048	8,839	9,384	-	-	18,223
2049	8,815	6,489	-	-	15,303
2050	8,815	12,964	-	-	21,779
2051	8,815	12,964	-	-	21,779
2052	8,839	15,861	-	-	24,700
2053	8,815	18,003	-	-	26,818
2054	8,815	13,684	-	-	22,498
2055	8,815	17,283	-	-	26,098
2056	8,839	18,741	-	-	27,580
2057	8,815	6,417	-	-	15,231
2058	8,815	6,417	-	-	15,231
2059	8,815	6,417	-	-	15,231
2060	8,839	6,434	-	-	15,273
2061	8,815	6,417	-	-	15,231
2062	8,815	6,417	-	-	15,231
2063	8,815	6,417	-	-	15,231
2064	8,839	6,434	-	-	15,273
2065	8,815	6,417	-	-	15,231
2066	8,815	6,417	-	-	15,231
2067	8,815	6,417	-	-	15,231
2068	8,839	6,434	-	-	15,273
2069	8,815	6,417	-	-	15,231
2070	8,815	6,417	-	-	15,231
2071	8,815	6,417	-	-	15,231

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2072	8,839	6,434	-	-	15,273
2073	8,815	6,417	-	-	15,231
2074	8,815	6,417	-	-	15,231
2075	8,815	6,417	-	-	15,231
2076	8,839	6,434	-	-	15,273
2077	8,815	6,417	-	-	15,231
2078	8,815	8,492	-	-	17,307
2079	8,815	8,908	-	-	17,722
2080	8,839	8,510	-	-	17,349
2081	8,815	8,492	-	-	17,307
2082	8,815	8,492	-	-	17,307
2083	8,815	8,908	-	-	17,722
2084	8,839	8,510	-	-	17,349
2085	46,173	5,776	425	-	52,374
2086	92,744	4,912	634	-	98,290
2087	185,330	6,298	44	-	191,672
2088	96,142	7,312	6	-	103,459
2089	92,028	7,294	5	1,168	100,495
2090	27,204	5,030	11,203	11,676	55,113
2091	133	30	35,556	-	35,719
2092	56	12	14,904	-	14,972
	$ 1,237,254	$ 629,040	$ 62,778	$ 12,844	$ 1,941,915

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2030	$ 26,185	$ 2,438	$ -	$ -	$ 28,622
2031	114,172	5,569	-	-	119,742
2032	48,302	24,882	-	-	73,184
2033	39,065	34,114	-	-	73,179
2034	29,534	135,167	-	-	164,701
2035	8,815	6,489	-	-	15,303
2036	8,839	6,506	-	-	15,345
2037	8,815	6,489	-	-	15,303
2038	8,815	6,489	-	-	15,303
2039	8,815	6,489	-	-	15,303
2040	8,839	6,506	-	-	15,345
2041	8,815	6,489	-	-	15,303
2042	8,815	6,489	-	-	15,303
2043	8,815	6,489	-	-	15,303
2044	8,839	6,506	-	-	15,345
2045	8,815	6,489	-	-	15,303
2046	8,815	6,489	-	-	15,303
2047	8,815	6,489	-	-	15,303
2048	8,839	9,384	-	-	18,223
2049	8,815	6,489	-	-	15,303
2050	8,815	12,964	-	-	21,779
2051	8,815	12,964	-	-	21,779
2052	8,839	12,982	-	-	21,820
2053	8,815	12,964	-	-	21,779
2054	8,815	12,964	-	-	21,779
2055	8,815	12,964	-	-	21,779
2056	8,839	12,982	-	-	21,820
2057	8,815	12,964	-	-	21,779
2058	8,815	41,715	-	-	50,530
2059	8,815	12,964	-	-	21,779
2060	8,839	12,982	-	-	21,820
2061	8,815	12,964	-	-	21,779
2062	8,815	12,964	-	-	21,779
2063	8,815	27,340	-	-	36,154
2064	8,839	12,982	-	-	21,820
2065	8,815	12,964	-	-	21,779
2066	8,815	15,839	-	-	24,654
2067	8,815	12,964	-	-	21,779
2068	8,839	53,233	-	-	62,072
2069	8,815	12,964	-	-	21,779
2070	8,815	12,964	-	-	21,779
2071	8,815	12,964	-	-	21,779

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2072	8,839	12,982	-	-	21,820
2073	8,815	12,964	-	-	21,779
2074	8,815	12,964	-	-	21,779
2075	8,815	12,964	-	-	21,779
2076	8,839	12,982	-	-	21,820
2077	8,815	12,964	-	-	21,779
2078	8,815	12,964	-	-	21,779
2079	8,815	12,964	-	-	21,779
2080	8,839	12,982	-	-	21,820
2081	8,815	12,964	-	-	21,779
2082	8,815	12,964	-	-	21,779
2083	8,815	12,964	-	-	21,779
2084	8,839	113,611	-	-	122,450
2085	45,261	10,288	425	-	55,974
2086	92,179	9,364	634	-	102,177
2087	184,121	10,716	44	-	194,882
2088	92,904	16,515	6	-	109,425
2089	89,014	13,551	5	-	102,570
2090	27,137	13,336	10,074	-	50,547
2091	133	14,842	31,973	-	46,948
2092	56	18,616	13,402	-	32,074
2093	-	21,375	-	-	21,375
2094	-	17,056	-	-	17,056
2095	8,544	20,655	-	-	29,199
2096	-	22,122	-	-	22,122
2097	-	9,789	-	-	9,789
2098	-	9,789	-	-	9,789
2099	-	9,789	-	-	9,789
2100	-	9,789	-	-	9,789
2101	-	9,789	-	-	9,789
2102	-	9,789	-	-	9,789
2103	-	9,789	-	-	9,789
2104	-	9,816	-	-	9,816
2105	-	9,789	-	-	9,789
2106	-	9,789	-	-	9,789
2107	-	9,789	-	-	9,789
2108	-	38,567	-	-	38,567
2109	-	9,789	-	-	9,789
2110	-	9,789	-	-	9,789
2111	-	9,789	-	-	9,789
2112	-	9,816	-	-	9,816
2113	-	24,164	-	-	24,164

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2114	-	9,789	-	-	9,789
2115	-	9,789	-	-	9,789
2116	-	12,691	-	-	12,691
2117	-	9,789	-	-	9,789
2118	-	52,116	-	-	52,116
2119	-	12,280	-	-	12,280
2120	-	11,891	-	-	11,891
2121	-	11,864	-	-	11,864
2122	-	11,864	-	-	11,864
2123	-	12,280	-	-	12,280
2124	-	11,891	-	-	11,891
2125	-	11,864	-	-	11,864
2126	-	11,864	-	-	11,864
2127	-	12,280	-	-	12,280
2128	-	14,769	-	-	14,769
2129	-	11,864	-	-	11,864
2130	6,615	10,258	-	-	16,873
2131	-	-	2,790	4,387	7,177
	$ 1,244,264	$ 1,580,426	$ 59,354	$ 4,387	$ 2,888,431

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2030	$ 26,185	$ 2,438	$ -	$ -	$ 28,622
2031	114,172	5,569	-	-	119,742
2032	48,302	24,882	-	-	73,184
2033	39,065	34,114	-	-	73,179
2034	29,534	135,167	-	-	164,701
2035	8,815	6,489	-	-	15,303
2036	8,839	6,506	-	-	15,345
2037	8,815	6,489	-	-	15,303
2038	8,815	6,489	-	-	15,303
2039	8,815	6,489	-	-	15,303
2040	8,839	6,506	-	-	15,345
2041	8,815	6,489	-	-	15,303
2042	8,815	6,489	-	-	15,303
2043	8,815	6,489	-	-	15,303
2044	8,839	6,506	-	-	15,345
2045	8,815	6,489	-	-	15,303
2046	8,815	6,489	-	-	15,303
2047	8,815	6,489	-	-	15,303
2048	8,839	9,384	-	-	18,223
2049	8,815	6,489	-	-	15,303
2050	8,815	12,964	-	-	21,779
2051	8,815	12,964	-	-	21,779
2052	8,839	12,982	-	-	21,820
2053	8,815	12,964	-	-	21,779
2054	8,815	12,964	-	-	21,779
2055	8,815	12,964	-	-	21,779
2056	8,839	12,982	-	-	21,820
2057	8,815	12,964	-	-	21,779
2058	8,815	41,715	-	-	50,530
2059	8,815	12,964	-	-	21,779
2060	8,839	12,982	-	-	21,820
2061	8,815	12,964	-	-	21,779
2062	8,815	12,964	-	-	21,779
2063	8,815	27,340	-	-	36,154
2064	8,839	12,982	-	-	21,820
2065	8,815	12,964	-	-	21,779
2066	8,815	15,839	-	-	24,654
2067	8,815	12,964	-	-	21,779

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2068	8,839	53,233	-	-	62,072
2069	8,815	12,964	-	-	21,779
2070	8,815	12,964	-	-	21,779
2071	8,815	12,964	-	-	21,779
2072	8,839	12,982	-	-	21,820
2073	8,815	12,964	-	-	21,779
2074	8,815	12,964	-	-	21,779
2075	8,815	12,964	-	-	21,779
2076	8,839	12,982	-	-	21,820
2077	8,815	12,964	-	-	21,779
2078	8,815	12,964	-	-	21,779
2079	8,815	12,964	-	-	21,779
2080	8,839	12,982	-	-	21,820
2081	8,815	12,964	-	-	21,779
2082	8,815	12,964	-	-	21,779
2083	8,815	12,964	-	-	21,779
2084	8,839	113,611	-	-	122,450
2085	45,261	10,270	425	-	55,956
2086	92,179	9,339	634	-	102,152
2087	184,121	10,691	44	-	194,856
2088	92,904	16,489	6	-	109,399
2089	89,014	13,525	5	-	102,545
2090	27,152	13,296	10,074	-	50,521
2091	180	14,769	31,973	-	46,923
2092	76	15,682	13,402	-	29,160
2093	-	16,295	-	-	16,295
2094	-	16,295	-	-	16,295
2095	8,544	16,295	-	-	24,839
2096	-	16,321	-	-	16,321
2097	-	16,295	-	-	16,295
2098	-	16,295	-	-	16,295
2099	-	16,295	-	-	16,295
2100	-	16,295	-	-	16,295
2101	-	16,295	-	-	16,295
2102	-	16,295	-	-	16,295
2103	-	16,295	-	-	16,295
2104	-	16,321	-	-	16,321
2105	-	16,295	-	-	16,295

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2106	-	16,295	-	-	16,295
2107	-	16,295	-	-	16,295
2108	-	45,073	-	-	45,073
2109	-	16,295	-	-	16,295
2110	-	16,295	-	-	16,295
2111	-	16,295	-	-	16,295
2112	-	16,321	-	-	16,321
2113	-	30,670	-	-	30,670
2114	-	16,295	-	-	16,295
2115	-	16,295	-	-	16,295
2116	-	19,197	-	-	19,197
2117	-	16,295	-	-	16,295
2118	-	56,547	-	-	56,547
2119	-	16,295	-	-	16,295
2120	-	16,321	-	-	16,321
2121	-	16,295	-	-	16,295
2122	-	16,295	-	-	16,295
2123	-	16,295	-	-	16,295
2124	-	16,321	-	-	16,321
2125	-	16,295	-	-	16,295
2126	-	16,295	-	-	16,295
2127	-	16,295	-	-	16,295
2128	-	19,199	-	-	19,199
2129	-	16,295	-	-	16,295
2130	-	16,295	-	-	16,295
2131	-	16,295	-	-	16,295
2132	-	16,321	-	-	16,321
2133	-	16,295	-	-	16,295
2134	-	116,925	-	-	116,925
2135	-	16,295	-	-	16,295
2136	-	16,321	-	-	16,321
2137	-	16,295	-	-	16,295
2138	-	16,295	-	-	16,295
2139	-	16,295	-	-	16,295
2140	-	16,321	-	-	16,321
2141	-	16,295	-	-	16,295
2142	-	16,295	-	-	16,295
2143	-	16,295	-	-	16,295
2144	-	16,321	-	-	16,321

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
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Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2145	-	16,295	-	-	16,295
2146	-	16,295	-	-	16,295
2147	-	16,295	-	-	16,295
2148	-	16,321	-	-	16,321
2149	-	16,295	-	-	16,295
2150	-	16,295	-	-	16,295
2151	-	16,295	-	-	16,295
2152	-	16,321	-	-	16,321
2153	-	16,295	-	-	16,295
2154	-	16,295	-	-	16,295
2155	-	16,295	-	-	16,295
2156	-	16,321	-	-	16,321
2157	-	16,295	-	-	16,295
2158	-	45,046	-	-	45,046
2159	-	16,295	-	-	16,295
2160	-	16,321	-	-	16,321
2161	-	16,295	-	-	16,295
2162	-	16,295	-	-	16,295
2163	-	30,670	-	-	30,670
2164	-	16,321	-	-	16,321
2165	-	16,295	-	-	16,295
2166	-	19,170	-	-	19,170
2167	-	16,295	-	-	16,295
2168	-	59,451	-	-	59,451
2169	-	16,295	-	-	16,295
2170	-	16,295	-	-	16,295
2171	-	16,295	-	-	16,295
2172	-	16,321	-	-	16,321
2173	-	16,295	-	-	16,295
2174	-	16,295	-	-	16,295
2175	-	16,295	-	-	16,295
2176	-	16,321	-	-	16,321
2177	-	16,295	-	-	16,295
2178	-	16,295	-	-	16,295
2179	-	16,295	-	-	16,295
2180	-	16,321	-	-	16,321
2181	-	16,295	-	-	16,295
2182	-	16,295	-	-	16,295
2183	-	16,295	-	-	16,295
2184	-	116,951	-	-	116,951
2185	-	16,295	-	-	16,295
2186	-	16,295	-	-	16,295

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2187	-	16,295	-	-	16,295
2188	-	16,321	-	-	16,321
2189	-	16,295	-	-	16,295
2190	-	16,295	-	-	16,295
2191	-	16,295	-	-	16,295
2192	-	19,201	-	-	19,201
2193	-	21,334	-	-	21,334
2194	-	17,015	-	-	17,015
2195	-	20,614	-	-	20,614
2196	-	22,081	-	-	22,081
2197	-	9,747	-	-	9,747
2198	-	9,747	-	-	9,747
2199	-	9,747	-	-	9,747
2200	-	9,747	-	-	9,747
2201	-	9,747	-	-	9,747
2202	-	9,747	-	-	9,747
2203	-	9,747	-	-	9,747
2204	-	9,774	-	-	9,774
2205	-	9,747	-	-	9,747
2206	-	9,747	-	-	9,747
2207	-	9,747	-	-	9,747
2208	-	41,403	-	-	41,403
2209	-	9,747	-	-	9,747
2210	-	9,747	-	-	9,747
2211	-	9,747	-	-	9,747
2212	-	9,774	-	-	9,774
2213	-	24,123	-	-	24,123
2214	-	9,747	-	-	9,747
2215	-	9,747	-	-	9,747
2216	-	12,649	-	-	12,649
2217	-	9,747	-	-	9,747
2218	-	52,075	-	-	52,075
2219	-	12,238	-	-	12,238
2220	-	11,850	-	-	11,850
2221	-	11,823	-	-	11,823
2222	-	11,823	-	-	11,823
2223	-	12,238	-	-	12,238
2224	-	11,850	-	-	11,850
2225	-	11,823	-	-	11,823
2226	-	11,823	-	-	11,823
2227	-	12,238	-	-	12,238
2228	-	11,850	-	-	11,850

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2229	-	11,823	-	-	11,823
2230	6,615	10,219	-	-	16,833
2231	-	-	2,790	4,387	7,177
	$ 1,244,346	$ 3,588,215	$ 59,354	$ 4,387	$ 4,896,302

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 1
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2033	$ 33,832	$ 1,665	$ 265	$ -	$ 35,762
2034	100,979	4,340	1,139	-	106,458
2035	140,817	5,105	1,755	-	147,677
2036	134,833	8,177	2,282	-	145,292
2037	83,954	27,653	1,726	-	113,333
2038	26,517	44,161	-	-	70,678
2039	44,699	5,883	-	-	50,583
2040	11,853	7,316	13,118	-	32,287
2041	634	8,322	20,203	-	29,160
2042	299	8,126	9,520	-	17,945
2043	-	7,328	-	-	7,328
2044	-	7,139	-	-	7,139
2045	-	7,536	-	-	7,536
2046	-	7,536	-	-	7,536
2047	-	7,328	-	-	7,328
2048	-	7,554	-	-	7,554
2049	-	7,536	-	-	7,536
2050	-	7,328	-	-	7,328
2051	-	7,536	-	-	7,536
2052	-	7,346	-	-	7,346
2053	-	7,120	-	-	7,120
2054	-	7,120	-	-	7,120
2055	-	7,120	-	-	7,120
2056	-	6,724	-	-	6,724
2057	-	6,705	-	-	6,705
2058	-	6,705	-	-	6,705
2059	-	6,705	-	-	6,705
2060	-	7,139	-	-	7,139
2061	-	7,120	-	-	7,120
2062	-	7,120	-	-	7,120
2063	-	7,120	-	-	7,120
2064	-	7,139	-	-	7,139
2065	-	7,120	-	-	7,120
2066	-	7,120	-	-	7,120
2067	-	7,120	-	-	7,120
2068	-	7,139	-	-	7,139
2069	-	7,120	-	-	7,120
2070	-	7,120	-	-	7,120
2071	-	7,120	-	-	7,120
2072	-	7,139	-	-	7,139
2073	-	7,120	-	-	7,120
2074	11,984	6,919	-	-	18,902
2075	-	-	989	5,560	6,549
	$ 590,402	$ 349,793	$ 50,998	$ 5,560	$ 996,753

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 2
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2034	$ 13,517	$ 1,003	$ 50	$ -	$ 14,570
2035	83,108	5,613	374	-	89,096
2036	131,256	9,124	1,670	-	142,050
2037	143,197	22,684	2,364	-	168,245
2038	135,828	47,980	2,631	-	186,439
2039	51,456	5,883	-	-	57,340
2040	14,213	7,316	19,809	-	41,339
2041	572	8,322	30,507	-	39,401
2042	270	8,126	14,376	-	22,771
2043	-	7,328	-	-	7,328
2044	-	7,139	-	-	7,139
2045	-	7,536	-	-	7,536
2046	-	7,536	-	-	7,536
2047	-	7,328	-	-	7,328
2048	-	7,554	-	-	7,554
2049	-	7,536	-	-	7,536
2050	-	7,328	-	-	7,328
2051	-	7,536	-	-	7,536
2052	-	7,346	-	-	7,346
2053	-	7,120	-	-	7,120
2054	-	7,120	-	-	7,120
2055	-	7,120	-	-	7,120
2056	-	6,724	-	-	6,724
2057	-	6,705	-	-	6,705
2058	-	6,705	-	-	6,705
2059	-	6,705	-	-	6,705
2060	-	7,139	-	-	7,139
2061	-	7,120	-	-	7,120
2062	-	7,120	-	-	7,120
2063	-	7,120	-	-	7,120
2064	-	7,139	-	-	7,139
2065	-	7,120	-	-	7,120
2066	-	7,120	-	-	7,120
2067	-	7,120	-	-	7,120
2068	-	7,139	-	-	7,139
2069	-	7,120	-	-	7,120
2070	-	7,120	-	-	7,120
2071	-	7,120	-	-	7,120
2072	-	7,139	-	-	7,139
2073	-	7,120	-	-	7,120
2074	11,984	6,919	-	-	18,902
2075	-	-	989	5,560	6,549
	$ 585,402	$ 345,097	$ 72,770	$ 5,560	$ 1,008,829

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 1
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2033	$ 33,832	$ 1,665	$ 265	$ -	$ 35,762
2034	100,979	4,340	1,139	-	106,458
2035	140,817	5,105	1,755	-	147,678
2036	134,833	8,066	2,282	-	145,182
2037	83,954	27,460	1,726	-	113,139
2038	26,517	43,750	-	-	70,267
2039	44,699	4,484	-	-	49,183
2040	11,853	6,412	13,118	-	31,384
2041	634	7,435	20,203	-	28,272
2042	299	7,042	9,520	-	16,862
2043	-	6,692	-	-	6,692
2044	-	6,711	-	-	6,711
2045	-	6,692	-	-	6,692
2046	-	6,692	-	-	6,692
2047	-	6,692	-	-	6,692
2048	-	6,711	-	-	6,711
2049	-	6,692	-	-	6,692
2050	-	6,692	-	-	6,692
2051	-	6,692	-	-	6,692
2052	-	6,711	-	-	6,711
2053	-	7,107	-	-	7,107
2054	-	7,523	-	-	7,523
2055	-	7,523	-	-	7,523
2056	-	7,749	-	-	7,749
2057	-	7,315	-	-	7,315
2058	-	7,938	-	-	7,938
2059	-	7,315	-	-	7,315
2060	-	7,126	-	-	7,126
2061	-	7,523	-	-	7,523
2062	-	7,523	-	-	7,523
2063	-	7,315	-	-	7,315
2064	-	7,541	-	-	7,541
2065	-	7,523	-	-	7,523
2066	-	7,315	-	-	7,315
2067	-	7,523	-	-	7,523
2068	-	7,541	-	-	7,541
2069	-	7,315	-	-	7,315
2070	-	7,523	-	-	7,523
2071	-	7,523	-	-	7,523
2072	-	7,541	-	-	7,541
2073	-	7,523	-	-	7,523
2074	-	7,523	-	-	7,523
2075	-	8,962	-	-	8,962
2076	-	7,541	-	-	7,541
2077	11,984	7,321	-	-	19,305
2078	-	-	989	5,560	6,549
	$ 590,401	$ 370,904	$ 50,998	$ 5,560	$ 1,017,864

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 2
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2034	$ 13,517	$ 1,003	$ 50	$ -	$ 14,570
2035	83,108	5,613	374	-	89,096
2036	131,256	8,977	1,670	-	141,903
2037	143,197	22,497	2,364	-	168,058
2038	135,828	47,600	2,631	-	186,059
2039	51,456	4,484	-	-	55,940
2040	14,213	6,412	19,809	-	40,435
2041	572	7,435	30,507	-	38,514
2042	270	7,042	14,376	-	21,688
2043	-	6,692	-	-	6,692
2044	-	6,711	-	-	6,711
2045	-	6,692	-	-	6,692
2046	-	6,692	-	-	6,692
2047	-	6,692	-	-	6,692
2048	-	6,711	-	-	6,711
2049	-	6,692	-	-	6,692
2050	-	6,692	-	-	6,692
2051	-	6,692	-	-	6,692
2052	-	6,711	-	-	6,711
2053	-	7,107	-	-	7,107
2054	-	7,523	-	-	7,523
2055	-	7,523	-	-	7,523
2056	-	7,749	-	-	7,749
2057	-	7,315	-	-	7,315
2058	-	7,938	-	-	7,938
2059	-	7,315	-	-	7,315
2060	-	7,126	-	-	7,126
2061	-	7,523	-	-	7,523
2062	-	7,523	-	-	7,523
2063	-	7,315	-	-	7,315
2064	-	7,541	-	-	7,541
2065	-	7,523	-	-	7,523
2066	-	7,315	-	-	7,315
2067	-	7,523	-	-	7,523
2068	-	7,541	-	-	7,541
2069	-	7,315	-	-	7,315
2070	-	7,523	-	-	7,523
2071	-	7,523	-	-	7,523
2072	-	7,541	-	-	7,541
2073	-	7,523	-	-	7,523
2074	-	7,523	-	-	7,523
2075	-	8,962	-	-	8,962
2076	-	7,541	-	-	7,541
2077	11,984	7,321	-	-	19,305
2078	-	-	989	5,560	6,549
	$ 585,402	$ 366,208	$ 72,770	$ 5,560	$ 1,029,941

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 1
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2033	$ 33,832	$ 1,665	$ 265	$ -	$ 35,762
2034	100,979	4,340	1,139	-	106,458
2035	140,817	5,105	1,755	-	147,677
2036	134,833	10,026	2,282	-	147,141
2037	83,954	30,888	1,726	-	116,568
2038	26,517	45,723	-	-	72,241
2039	44,699	4,484	-	-	49,183
2040	11,853	6,425	13,164	-	31,442
2041	634	7,454	20,274	-	28,362
2042	299	7,396	9,554	-	17,249
2043	-	7,344	-	-	7,344
2044	-	7,364	-	-	7,364
2045	-	13,400	-	-	13,400
2046	-	11,382	-	-	11,382
2047	-	11,382	-	-	11,382
2048	-	7,364	-	-	7,364
2049	-	11,382	-	-	11,382
2050	-	13,400	-	-	13,400
2051	-	13,181	-	-	13,181
2052	-	13,421	-	-	13,421
2053	-	7,344	-	-	7,344
2054	-	7,344	-	-	7,344
2055	-	13,400	-	-	13,400
2056	-	11,402	-	-	11,402
2057	-	11,382	-	-	11,382
2058	-	7,344	-	-	7,344
2059	-	11,162	-	-	11,162
2060	-	11,402	-	-	11,402
2061	-	11,382	-	-	11,382
2062	-	7,344	-	-	7,344
2063	-	19,457	-	-	19,457
2064	-	15,220	-	-	15,220
2065	-	11,382	-	-	11,382
2066	-	7,344	-	-	7,344
2067	-	7,344	-	-	7,344
2068	-	15,439	-	-	15,439
2069	-	13,400	-	-	13,400
2070	-	7,344	-	-	7,344
2071	-	7,344	-	-	7,344
2072	-	17,239	-	-	17,239
2073	-	7,344	-	-	7,344
2074	-	7,344	-	-	7,344

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2075	-	18,877	-	-	18,877
2076	-	7,364	-	-	7,364
2077	-	7,344	-	-	7,344
2078	-	17,438	-	-	17,438
2079	-	7,344	-	-	7,344
2080	-	7,364	-	-	7,364
2081	-	7,344	-	-	7,344
2082	-	17,000	-	-	17,000
2083	-	7,344	-	-	7,344
2084	-	7,364	-	-	7,364
2085	-	7,344	-	-	7,344
2086	-	7,344	-	-	7,344
2087	-	7,344	-	-	7,344
2088	3,640	68,050	-	-	71,690
2089	-	7,344	-	-	7,344
2090	-	7,344	-	-	7,344
2091	-	7,344	-	-	7,344
2092	-	7,364	-	-	7,364
2093	-	7,759	-	-	7,759
2094	-	8,382	-	-	8,382
2095	-	14,457	-	-	14,457
2096	-	12,659	-	-	12,659
2097	-	12,017	-	-	12,017
2098	-	8,797	-	-	8,797
2099	-	12,017	-	-	12,017
2100	-	13,834	-	-	13,834
2101	-	14,457	-	-	14,457
2102	-	14,457	-	-	14,457
2103	-	7,967	-	-	7,967
2104	-	8,194	-	-	8,194
2105	-	14,249	-	-	14,249
2106	-	12,017	-	-	12,017
2107	-	12,224	-	-	12,224
2108	-	8,194	-	-	8,194
2109	-	12,017	-	-	12,017
2110	-	12,224	-	-	12,224
2111	-	12,224	-	-	12,224
2112	-	8,194	-	-	8,194
2113	-	20,324	-	-	20,324
2114	-	16,274	-	-	16,274
2115	-	13,663	-	-	13,663
2116	-	8,194	-	-	8,194
2117	11,984	7,948	-	-	19,932
2118	-	-	1,798	2,367	4,164
	$ 594,042	$ 985,833	$ 51,958	$ 2,367	$ 1,634,199

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 2
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2034	$ 13,517	$ 1,003	$ 50	$ -	$ 14,570
2035	83,108	5,613	374	-	89,096
2036	131,256	11,593	1,670	-	144,519
2037	143,197	25,809	2,364	-	171,370
2038	135,828	49,033	2,631	-	187,492
2039	51,456	4,484	-	-	55,940
2040	14,213	6,425	19,855	-	40,493
2041	572	7,454	30,578	-	38,604
2042	270	7,396	14,410	-	22,075
2043	-	7,344	-	-	7,344
2044	-	7,364	-	-	7,364
2045	-	13,400	-	-	13,400
2046	-	11,382	-	-	11,382
2047	-	11,382	-	-	11,382
2048	-	7,364	-	-	7,364
2049	-	11,382	-	-	11,382
2050	-	13,400	-	-	13,400
2051	-	13,181	-	-	13,181
2052	-	13,421	-	-	13,421
2053	-	7,344	-	-	7,344
2054	-	7,344	-	-	7,344
2055	-	13,400	-	-	13,400
2056	-	11,402	-	-	11,402
2057	-	11,382	-	-	11,382
2058	-	7,344	-	-	7,344
2059	-	11,162	-	-	11,162
2060	-	11,402	-	-	11,402
2061	-	11,382	-	-	11,382
2062	-	7,344	-	-	7,344
2063	-	19,457	-	-	19,457
2064	-	15,220	-	-	15,220
2065	-	11,382	-	-	11,382
2066	-	7,344	-	-	7,344
2067	-	7,344	-	-	7,344
2068	-	15,439	-	-	15,439
2069	-	13,400	-	-	13,400
2070	-	7,344	-	-	7,344
2071	-	7,344	-	-	7,344
2072	-	17,239	-	-	17,239
2073	-	7,344	-	-	7,344
2074	-	7,344	-	-	7,344
2075	-	18,877	-	-	18,877

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2076	-	7,364	-	-	7,364
2077	-	7,344	-	-	7,344
2078	-	17,438	-	-	17,438
2079	-	7,344	-	-	7,344
2080	-	7,364	-	-	7,364
2081	-	7,344	-	-	7,344
2082	-	17,000	-	-	17,000
2083	-	7,344	-	-	7,344
2084	-	7,364	-	-	7,364
2085	-	7,344	-	-	7,344
2086	-	7,344	-	-	7,344
2087	-	7,344	-	-	7,344
2088	3,640	68,050	-	-	71,690
2089	-	7,344	-	-	7,344
2090	-	7,344	-	-	7,344
2091	-	7,344	-	-	7,344
2092	-	7,364	-	-	7,364
2093	-	7,759	-	-	7,759
2094	-	8,382	-	-	8,382
2095	-	14,457	-	-	14,457
2096	-	12,659	-	-	12,659
2097	-	12,017	-	-	12,017
2098	-	8,797	-	-	8,797
2099	-	12,017	-	-	12,017
2100	-	13,834	-	-	13,834
2101	-	14,457	-	-	14,457
2102	-	14,457	-	-	14,457
2103	-	7,967	-	-	7,967
2104	-	8,194	-	-	8,194
2105	-	14,249	-	-	14,249
2106	-	12,017	-	-	12,017
2107	-	12,224	-	-	12,224
2108	-	8,194	-	-	8,194
2109	-	12,017	-	-	12,017
2110	-	12,224	-	-	12,224
2111	-	12,224	-	-	12,224
2112	-	8,194	-	-	8,194
2113	-	20,324	-	-	20,324
2114	-	16,274	-	-	16,274
2115	-	13,663	-	-	13,663
2116	-	8,194	-	-	8,194
2117	11,984	7,948	-	-	19,932
2118	-	-	1,798	2,367	4,164
	$ 589,042	$ 981,137	$ 73,730	$ 2,367	$ 1,646,275

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 1
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2033	$ 33,832	$ 1,665	$ 265	$ -	$ 35,762
2034	100,979	4,340	1,139	-	106,458
2035	140,817	5,105	1,755	-	147,677
2036	134,833	10,026	2,282	-	147,141
2037	83,954	30,888	1,726	-	116,568
2038	26,517	45,723	-	-	72,241
2039	44,699	4,484	-	-	49,183
2040	11,853	6,425	13,164	-	31,442
2041	634	7,454	20,274	-	28,362
2042	299	7,388	9,554	-	17,241
2043	-	7,330	-	-	7,330
2044	-	7,350	-	-	7,350
2045	-	13,386	-	-	13,386
2046	-	11,367	-	-	11,367
2047	-	11,367	-	-	11,367
2048	-	7,350	-	-	7,350
2049	-	11,367	-	-	11,367
2050	-	13,386	-	-	13,386
2051	-	13,167	-	-	13,167
2052	-	13,406	-	-	13,406
2053	-	7,330	-	-	7,330
2054	-	7,330	-	-	7,330
2055	-	13,386	-	-	13,386
2056	-	11,388	-	-	11,388
2057	-	11,367	-	-	11,367
2058	-	7,330	-	-	7,330
2059	-	11,148	-	-	11,148
2060	-	11,388	-	-	11,388
2061	-	11,367	-	-	11,367
2062	-	7,330	-	-	7,330
2063	-	19,443	-	-	19,443
2064	-	15,206	-	-	15,206
2065	-	11,367	-	-	11,367
2066	-	7,330	-	-	7,330
2067	-	7,330	-	-	7,330
2068	-	15,425	-	-	15,425

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2069	-	13,386	-	-	13,386
2070	-	7,330	-	-	7,330
2071	-	7,330	-	-	7,330
2072	-	17,225	-	-	17,225
2073	-	7,330	-	-	7,330
2074	-	7,330	-	-	7,330
2075	-	18,863	-	-	18,863
2076	-	7,350	-	-	7,350
2077	-	7,330	-	-	7,330
2078	-	17,424	-	-	17,424
2079	-	7,330	-	-	7,330
2080	-	7,350	-	-	7,350
2081	-	7,330	-	-	7,330
2082	-	16,986	-	-	16,986
2083	-	7,330	-	-	7,330
2084	-	7,350	-	-	7,350
2085	-	7,330	-	-	7,330
2086	-	7,330	-	-	7,330
2087	-	7,330	-	-	7,330
2088	3,640	68,035	-	-	71,675
2089	-	7,330	-	-	7,330
2090	-	7,330	-	-	7,330
2091	-	7,330	-	-	7,330
2092	-	7,350	-	-	7,350
2093	-	7,330	-	-	7,330
2094	-	7,330	-	-	7,330
2095	-	13,405	-	-	13,405
2096	-	11,400	-	-	11,400
2097	-	11,380	-	-	11,380
2098	-	7,330	-	-	7,330
2099	-	11,380	-	-	11,380
2100	-	13,405	-	-	13,405
2101	-	13,405	-	-	13,405
2102	-	13,405	-	-	13,405
2103	-	7,330	-	-	7,330
2104	-	7,350	-	-	7,350
2105	-	13,405	-	-	13,405
2106	-	11,380	-	-	11,380
2107	-	11,380	-	-	11,380
2108	-	7,350	-	-	7,350
2109	-	11,380	-	-	11,380

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2110	-	11,380	-	-	11,380
2111	-	11,380	-	-	11,380
2112	-	7,350	-	-	7,350
2113	-	19,480	-	-	19,480
2114	-	15,430	-	-	15,430
2115	-	12,819	-	-	12,819
2116	-	7,350	-	-	7,350
2117	-	7,330	-	-	7,330
2118	-	15,430	-	-	15,430
2119	-	13,405	-	-	13,405
2120	-	7,350	-	-	7,350
2121	-	7,330	-	-	7,330
2122	-	17,455	-	-	17,455
2123	-	7,330	-	-	7,330
2124	-	7,350	-	-	7,350
2125	-	17,455	-	-	17,455
2126	-	7,330	-	-	7,330
2127	-	7,330	-	-	7,330
2128	-	17,475	-	-	17,475
2129	-	7,330	-	-	7,330
2130	-	7,330	-	-	7,330
2131	-	7,330	-	-	7,330
2132	-	17,475	-	-	17,475
2133	-	7,330	-	-	7,330
2134	-	7,330	-	-	7,330
2135	-	7,330	-	-	7,330
2136	-	7,350	-	-	7,350
2137	-	7,330	-	-	7,330
2138	-	68,079	-	-	68,079
2139	-	7,330	-	-	7,330
2140	-	7,350	-	-	7,350
2141	-	7,330	-	-	7,330
2142	-	7,330	-	-	7,330
2143	-	7,330	-	-	7,330
2144	-	7,350	-	-	7,350
2145	-	13,405	-	-	13,405
2146	-	11,380	-	-	11,380
2147	-	11,380	-	-	11,380
2148	-	7,350	-	-	7,350
2149	-	11,380	-	-	11,380
2150	-	13,405	-	-	13,405
2151	-	13,405	-	-	13,405
2152	-	13,425	-	-	13,425
2153	-	7,330	-	-	7,330
2154	-	7,330	-	-	7,330

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2155	-	14,844	-	-	14,844
2156	-	11,400	-	-	11,400
2157	-	11,380	-	-	11,380
2158	-	7,330	-	-	7,330
2159	-	11,380	-	-	11,380
2160	-	11,400	-	-	11,400
2161	-	11,380	-	-	11,380
2162	-	7,330	-	-	7,330
2163	-	19,480	-	-	19,480
2164	-	15,450	-	-	15,450
2165	-	11,380	-	-	11,380
2166	-	7,330	-	-	7,330
2167	-	7,330	-	-	7,330
2168	-	15,450	-	-	15,450
2169	-	13,405	-	-	13,405
2170	-	7,330	-	-	7,330
2171	-	7,330	-	-	7,330
2172	-	17,475	-	-	17,475
2173	-	7,330	-	-	7,330
2174	-	7,330	-	-	7,330
2175	-	17,455	-	-	17,455
2176	-	7,350	-	-	7,350
2177	-	7,330	-	-	7,330
2178	-	17,455	-	-	17,455
2179	-	7,330	-	-	7,330
2180	-	7,350	-	-	7,350
2181	-	7,330	-	-	7,330
2182	-	17,455	-	-	17,455
2183	-	7,330	-	-	7,330
2184	-	7,350	-	-	7,350
2185	-	7,330	-	-	7,330
2186	-	7,330	-	-	7,330
2187	-	7,330	-	-	7,330
2188	-	68,099	-	-	68,099
2189	-	7,330	-	-	7,330
2190	-	7,330	-	-	7,330
2191	-	7,330	-	-	7,330
2192	-	7,350	-	-	7,350
2193	-	7,745	-	-	7,745
2194	-	8,368	-	-	8,368
2195	-	15,881	-	-	15,881
2196	-	12,645	-	-	12,645
2197	-	12,002	-	-	12,002
2198	-	8,783	-	-	8,783
2199	-	12,002	-	-	12,002
2200	-	13,820	-	-	13,820
2201	-	14,443	-	-	14,443

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2202	-	14,443	-	-	14,443
2203	-	7,952	-	-	7,952
2204	-	8,180	-	-	8,180
2205	-	14,235	-	-	14,235
2206	-	12,002	-	-	12,002
2207	-	12,210	-	-	12,210
2208	-	8,180	-	-	8,180
2209	-	12,002	-	-	12,002
2210	-	12,210	-	-	12,210
2211	-	12,210	-	-	12,210
2212	-	8,180	-	-	8,180
2213	-	20,310	-	-	20,310
2214	-	16,260	-	-	16,260
2215	-	12,210	-	-	12,210
2216	-	8,180	-	-	8,180
2217	11,984	7,934	-	-	19,918
2218	-	-	1,798	2,367	4,164
	$594,042	$2,126,090	$51,958	$2,367	$2,774,456

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 2
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2034	$ 13,517	$ 1,003	$ 50	$ -	$ 14,570
2035	83,108	5,613	374	-	89,096
2036	131,256	11,593	1,670	-	144,519
2037	143,197	25,809	2,364	-	171,370
2038	135,828	49,033	2,631	-	187,492
2039	51,456	4,484	-	-	55,940
2040	14,213	6,425	19,855	-	40,493
2041	572	7,454	30,578	-	38,604
2042	270	7,388	14,410	-	22,067
2043	-	7,330	-	-	7,330
2044	-	7,350	-	-	7,350
2045	-	13,386	-	-	13,386
2046	-	11,367	-	-	11,367
2047	-	11,367	-	-	11,367
2048	-	7,350	-	-	7,350
2049	-	11,367	-	-	11,367
2050	-	13,386	-	-	13,386
2051	-	13,167	-	-	13,167
2052	-	13,406	-	-	13,406
2053	-	7,330	-	-	7,330
2054	-	7,330	-	-	7,330
2055	-	13,386	-	-	13,386
2056	-	11,388	-	-	11,388
2057	-	11,367	-	-	11,367
2058	-	7,330	-	-	7,330
2059	-	11,148	-	-	11,148
2060	-	11,388	-	-	11,388
2061	-	11,367	-	-	11,367
2062	-	7,330	-	-	7,330
2063	-	19,443	-	-	19,443
2064	-	15,206	-	-	15,206
2065	-	11,367	-	-	11,367
2066	-	7,330	-	-	7,330
2067	-	7,330	-	-	7,330
2068	-	15,425	-	-	15,425
2069	-	13,386	-	-	13,386
2070	-	7,330	-	-	7,330
2071	-	7,330	-	-	7,330
2072	-	17,225	-	-	17,225
2073	-	7,330	-	-	7,330
2074	-	7,330	-	-	7,330
2075	-	18,863	-	-	18,863

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2076	-	7,350	-	-	7,350
2077	-	7,330	-	-	7,330
2078	-	17,424	-	-	17,424
2079	-	7,330	-	-	7,330
2080	-	7,350	-	-	7,350
2081	-	7,330	-	-	7,330
2082	-	16,986	-	-	16,986
2083	-	7,330	-	-	7,330
2084	-	7,350	-	-	7,350
2085	-	7,330	-	-	7,330
2086	-	7,330	-	-	7,330
2087	-	7,330	-	-	7,330
2088	3,640	68,035	-	-	71,675
2089	-	7,330	-	-	7,330
2090	-	7,330	-	-	7,330
2091	-	7,330	-	-	7,330
2092	-	7,350	-	-	7,350
2093	-	7,330	-	-	7,330
2094	-	7,330	-	-	7,330
2095	-	13,405	-	-	13,405
2096	-	11,400	-	-	11,400
2097	-	11,380	-	-	11,380
2098	-	7,330	-	-	7,330
2099	-	11,380	-	-	11,380
2100	-	13,405	-	-	13,405
2101	-	13,405	-	-	13,405
2102	-	13,405	-	-	13,405
2103	-	7,330	-	-	7,330
2104	-	7,350	-	-	7,350
2105	-	13,405	-	-	13,405
2106	-	11,380	-	-	11,380
2107	-	11,380	-	-	11,380
2108	-	7,350	-	-	7,350
2109	-	11,380	-	-	11,380
2110	-	11,380	-	-	11,380
2111	-	11,380	-	-	11,380
2112	-	7,350	-	-	7,350
2113	-	19,480	-	-	19,480
2114	-	15,430	-	-	15,430
2115	-	12,819	-	-	12,819
2116	-	7,350	-	-	7,350
2117	-	7,330	-	-	7,330
2118	-	15,430	-	-	15,430
2119	-	13,405	-	-	13,405

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2120	-	7,350	-	-	7,350
2121	-	7,330	-	-	7,330
2122	-	17,455	-	-	17,455
2123	-	7,330	-	-	7,330
2124	-	7,350	-	-	7,350
2125	-	17,455	-	-	17,455
2126	-	7,330	-	-	7,330
2127	-	7,330	-	-	7,330
2128	-	17,475	-	-	17,475
2129	-	7,330	-	-	7,330
2130	-	7,330	-	-	7,330
2131	-	7,330	-	-	7,330
2132	-	17,475	-	-	17,475
2133	-	7,330	-	-	7,330
2134	-	7,330	-	-	7,330
2135	-	7,330	-	-	7,330
2136	-	7,350	-	-	7,350
2137	-	7,330	-	-	7,330
2138	-	68,079	-	-	68,079
2139	-	7,330	-	-	7,330
2140	-	7,350	-	-	7,350
2141	-	7,330	-	-	7,330
2142	-	7,330	-	-	7,330
2143	-	7,330	-	-	7,330
2144	-	7,350	-	-	7,350
2145	-	13,405	-	-	13,405
2146	-	11,380	-	-	11,380
2147	-	11,380	-	-	11,380
2148	-	7,350	-	-	7,350
2149	-	11,380	-	-	11,380
2150	-	13,405	-	-	13,405
2151	-	13,405	-	-	13,405
2152	-	13,425	-	-	13,425
2153	-	7,330	-	-	7,330
2154	-	7,330	-	-	7,330
2155	-	14,844	-	-	14,844
2156	-	11,400	-	-	11,400
2157	-	11,380	-	-	11,380
2158	-	7,330	-	-	7,330
2159	-	11,380	-	-	11,380
2160	-	11,400	-	-	11,400
2161	-	11,380	-	-	11,380
2162	-	7,330	-	-	7,330
2163	-	19,480	-	-	19,480
2164	-	15,450	-	-	15,450

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2165	-	11,380	-	-	11,380
2166	-	7,330	-	-	7,330
2167	-	7,330	-	-	7,330
2168	-	15,450	-	-	15,450
2169	-	13,405	-	-	13,405
2170	-	7,330	-	-	7,330
2171	-	7,330	-	-	7,330
2172	-	17,475	-	-	17,475
2173	-	7,330	-	-	7,330
2174	-	7,330	-	-	7,330
2175	-	17,455	-	-	17,455
2176	-	7,350	-	-	7,350
2177	-	7,330	-	-	7,330
2178	-	17,455	-	-	17,455
2179	-	7,330	-	-	7,330
2180	-	7,350	-	-	7,350
2181	-	7,330	-	-	7,330
2182	-	17,455	-	-	17,455
2183	-	7,330	-	-	7,330
2184	-	7,350	-	-	7,350
2185	-	7,330	-	-	7,330
2186	-	7,330	-	-	7,330
2187	-	7,330	-	-	7,330
2188	-	68,099	-	-	68,099
2189	-	7,330	-	-	7,330
2190	-	7,330	-	-	7,330
2191	-	7,330	-	-	7,330
2192	-	7,350	-	-	7,350
2193	-	7,745	-	-	7,745
2194	-	8,368	-	-	8,368
2195	-	15,881	-	-	15,881
2196	-	12,645	-	-	12,645
2197	-	12,002	-	-	12,002
2198	-	8,783	-	-	8,783
2199	-	12,002	-	-	12,002
2200	-	13,820	-	-	13,820
2201	-	14,443	-	-	14,443
2202	-	14,443	-	-	14,443
2203	-	7,952	-	-	7,952
2204	-	8,180	-	-	8,180
2205	-	14,235	-	-	14,235
2206	-	12,002	-	-	12,002
2207	-	12,210	-	-	12,210
2208	-	8,180	-	-	8,180
2209	-	12,002	-	-	12,002
2210	-	12,210	-	-	12,210

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2211	-	12,210	-	-	12,210
2212	-	8,180	-	-	8,180
2213	-	20,310	-	-	20,310
2214	-	16,260	-	-	16,260
2215	-	12,210	-	-	12,210
2216	-	8,180	-	-	8,180
2217	11,984	7,934	-	-	19,918
2218	-	-	1,798	2,367	4,164
	$ 589,042	$ 2,121,393	$ 73,730	$ 2,367	$ 2,786,532

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 1
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2033	$ 23,236	$ 1,665	$ -	$ -	$ 24,901
2034	77,095	4,302	-	-	81,398
2035	27,355	23,292	-	-	50,647
2036	22,943	25,431	-	-	48,374
2037	22,880	25,362	-	-	48,242
2038	20,139	21,701	-	-	41,840
2039	7,250	5,313	-	-	12,563
2040	7,270	5,533	-	-	12,803
2041	7,250	5,106	-	-	12,356
2042	7,250	5,728	-	-	12,979
2043	7,250	5,106	-	-	12,356
2044	7,270	4,910	-	-	12,180
2045	7,250	5,313	-	-	12,563
2046	7,250	5,313	-	-	12,563
2047	7,250	5,106	-	-	12,356
2048	7,270	5,325	-	-	12,596
2049	7,250	5,313	-	-	12,563
2050	7,250	5,106	-	-	12,356
2051	7,250	5,313	-	-	12,563
2052	7,270	5,118	-	-	12,388
2053	7,250	4,898	-	-	12,148
2054	7,250	4,898	-	-	12,148
2055	7,250	4,898	-	-	12,148
2056	7,270	4,495	-	-	11,765
2057	7,250	4,483	-	-	11,733
2058	7,250	4,483	-	-	11,733
2059	7,250	4,483	-	-	11,733
2060	7,270	4,910	-	-	12,180
2061	7,250	4,898	-	-	12,148
2062	7,250	4,898	-	-	12,148
2063	7,250	4,898	-	-	12,148
2064	7,270	4,910	-	-	12,180
2065	7,250	4,898	-	-	12,148
2066	7,250	4,898	-	-	12,148
2067	7,250	4,898	-	-	12,148
2068	7,270	4,910	-	-	12,180
2069	7,250	4,898	-	-	12,148
2070	7,250	4,898	-	-	12,148
2071	7,250	4,898	-	-	12,148
2072	7,270	4,910	-	-	12,180
2073	7,250	4,898	-	-	12,148
2074	7,250	4,898	-	-	12,148

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2075	7,961	-	-	-	7,961
2076	7,983	-	-	-	7,983
2077	7,961	-	-	-	7,961
2078	7,961	-	-	-	7,961
2079	7,961	-	-	-	7,961
2080	7,983	-	-	-	7,983
2081	7,961	-	-	-	7,961
2082	7,961	-	-	-	7,961
2083	7,961	-	-	-	7,961
2084	7,983	-	-	-	7,983
2085	7,961	-	-	-	7,961
2086	7,961	-	-	-	7,961
2087	36,071	-	378	-	36,449
2088	63,457	-	1,327	-	64,784
2089	126,412	-	1,868	-	128,280
2090	87,615	-	1,774	2,224	91,613
2091	71,947	-	1,735	3,122	76,805
2092	12,654	-	119	214	12,986
2093	16,099	-	9,643	-	25,743
2094	109	-	24,275	-	24,384
2095	79	-	17,558	-	17,636
	$ 964,882	$ 281,510	$ 58,677	$ 5,560	$ 1,310,629

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 2
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	Site Restoration	Yearly Total
2034	$ 11,048	$ 1,003	$ -	$ -	$ 12,051
2035	76,551	5,702	-	-	82,253
2036	45,315	25,041	-	-	70,355
2037	25,843	34,553	-	-	60,397
2038	22,594	29,281	-	-	51,875
2039	7,312	5,313	-	-	12,626
2040	7,333	5,533	-	-	12,865
2041	7,312	5,106	-	-	12,418
2042	7,312	5,728	-	-	13,041
2043	7,312	5,106	-	-	12,418
2044	7,333	4,910	-	-	12,243
2045	7,312	5,313	-	-	12,626
2046	7,312	5,313	-	-	12,626
2047	7,312	5,106	-	-	12,418
2048	7,333	5,325	-	-	12,658
2049	7,312	5,313	-	-	12,626
2050	7,312	5,106	-	-	12,418
2051	7,312	5,313	-	-	12,626
2052	7,333	5,118	-	-	12,450
2053	7,312	4,898	-	-	12,210
2054	7,312	4,898	-	-	12,210
2055	7,312	4,898	-	-	12,210
2056	7,333	4,495	-	-	11,828
2057	7,312	4,483	-	-	11,795
2058	7,312	4,483	-	-	11,795
2059	7,312	4,483	-	-	11,795
2060	7,333	4,910	-	-	12,243
2061	7,312	4,898	-	-	12,210
2062	7,312	4,898	-	-	12,210
2063	7,312	4,898	-	-	12,210
2064	7,333	4,910	-	-	12,243
2065	7,312	4,898	-	-	12,210
2066	7,312	4,898	-	-	12,210
2067	7,312	4,898	-	-	12,210
2068	7,333	4,910	-	-	12,243
2069	7,312	4,898	-	-	12,210
2070	7,312	4,898	-	-	12,210
2071	7,312	4,898	-	-	12,210
2072	7,333	4,910	-	-	12,243
2073	7,312	4,898	-	-	12,210
2074	7,312	4,898	-	-	12,210
2075	4,519	-	-	-	4,519

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2076	4,531	-	-	-	4,531
2077	4,519	-	-	-	4,519
2078	4,519	-	-	-	4,519
2079	4,519	-	-	-	4,519
2080	4,531	-	-	-	4,531
2081	4,519	-	-	-	4,519
2082	4,519	-	-	-	4,519
2083	4,519	-	-	-	4,519
2084	4,531	-	-	-	4,531
2085	4,519	-	-	-	4,519
2086	4,519	-	-	-	4,519
2087	4,519	-	-	-	4,519
2088	32,501	-	226	-	32,727
2089	63,639	-	1,032	-	64,671
2090	126,745	-	2,228	-	128,973
2091	101,675	-	1,957	2,883	106,515
2092	90,258	-	1,658	2,677	94,594
2093	20,170	-	13,749	-	33,918
2094	46	-	34,608	-	34,655
2095	34	-	25,032	-	25,065
	$ 938,627	$ 275,338	$ 80,490	$ 5,560	$ 1,300,015

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 1
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2033	$ 23,236	$ 1,665	$ -	$ -	$ 24,901
2034	77,095	4,302	-	-	81,398
2035	27,355	22,992	-	-	50,346
2036	22,943	25,096	-	-	48,039
2037	22,880	25,027	-	-	47,907
2038	20,139	21,425	-	-	41,564
2039	7,250	4,483	-	-	11,733
2040	7,270	4,495	-	-	11,765
2041	7,250	4,483	-	-	11,733
2042	7,250	4,483	-	-	11,733
2043	7,250	4,483	-	-	11,733
2044	7,270	4,495	-	-	11,765
2045	7,250	4,483	-	-	11,733
2046	7,250	4,483	-	-	11,733
2047	7,250	4,483	-	-	11,733
2048	7,270	4,495	-	-	11,765
2049	7,250	4,483	-	-	11,733
2050	7,250	4,483	-	-	11,733
2051	7,250	4,483	-	-	11,733
2052	7,270	4,910	-	-	12,180
2053	7,250	5,313	-	-	12,563
2054	7,250	5,313	-	-	12,563
2055	7,250	5,521	-	-	12,771
2056	7,270	5,118	-	-	12,388
2057	7,250	5,728	-	-	12,978
2058	7,250	5,106	-	-	12,356
2059	7,250	4,898	-	-	12,148
2060	7,270	5,325	-	-	12,595
2061	7,250	5,313	-	-	12,563
2062	7,250	5,106	-	-	12,356
2063	7,250	5,313	-	-	12,563
2064	7,270	5,325	-	-	12,595
2065	7,250	5,106	-	-	12,356
2066	7,250	5,313	-	-	12,563
2067	7,250	5,313	-	-	12,563
2068	7,270	5,118	-	-	12,388
2069	7,250	5,313	-	-	12,563
2070	7,250	5,313	-	-	12,563
2071	7,250	5,313	-	-	12,563
2072	7,270	5,325	-	-	12,595
2073	7,250	5,313	-	-	12,563
2074	7,250	6,752	-	-	14,002

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2075	7,250	5,313	-	-	12,563
2076	7,270	5,325	-	-	12,595
2077	7,250	4,483	-	-	11,733
2078	7,962	-	-	-	7,962
2079	7,962	-	-	-	7,962
2080	7,983	-	-	-	7,983
2081	7,962	-	-	-	7,962
2082	7,962	-	-	-	7,962
2083	7,962	-	-	-	7,962
2084	7,983	-	-	-	7,983
2085	7,962	-	-	-	7,962
2086	7,962	-	-	-	7,962
2087	36,071	-	378	-	36,449
2088	63,457	-	1,327	-	64,784
2089	126,412	-	1,868	-	128,280
2090	87,615	-	1,774	2,224	91,613
2091	71,947	-	1,735	3,122	76,805
2092	12,654	-	119	214	12,986
2093	16,099	-	9,643	-	25,743
2094	109	-	24,275	-	24,384
2095	79	-	17,558	-	17,636
	$ 962,746	$ 296,410	$ 58,677	$ 5,560	$ 1,323,393

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 2
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2034	$ 11,048	$ 1,003	$ -	$ -	$ 12,051
2035	76,551	5,702	-	-	82,253
2036	45,315	24,703	-	-	70,018
2037	25,843	34,056	-	-	59,899
2038	22,594	28,870	-	-	51,465
2039	7,312	4,483	-	-	11,795
2040	7,332	4,495	-	-	11,828
2041	7,312	4,483	-	-	11,795
2042	7,312	4,483	-	-	11,795
2043	7,312	4,483	-	-	11,795
2044	7,332	4,495	-	-	11,828
2045	7,312	4,483	-	-	11,795
2046	7,312	4,483	-	-	11,795
2047	7,312	4,483	-	-	11,795
2048	7,332	4,495	-	-	11,828
2049	7,312	4,483	-	-	11,795
2050	7,312	4,483	-	-	11,795
2051	7,312	4,483	-	-	11,795
2052	7,332	4,495	-	-	11,828
2053	7,312	4,898	-	-	12,210
2054	7,312	5,313	-	-	12,626
2055	7,312	5,313	-	-	12,626
2056	7,332	5,533	-	-	12,865
2057	7,312	5,106	-	-	12,418
2058	7,312	5,728	-	-	13,041
2059	7,312	5,106	-	-	12,418
2060	7,332	4,910	-	-	12,243
2061	7,312	5,313	-	-	12,626
2062	7,312	5,313	-	-	12,626
2063	7,312	5,106	-	-	12,418
2064	7,332	5,325	-	-	12,658
2065	7,312	5,313	-	-	12,626
2066	7,312	5,106	-	-	12,418
2067	7,312	5,313	-	-	12,626
2068	7,332	5,325	-	-	12,658
2069	7,312	5,106	-	-	12,418
2070	7,312	5,313	-	-	12,626
2071	7,312	5,313	-	-	12,626
2072	7,332	5,325	-	-	12,658
2073	7,312	5,313	-	-	12,626
2074	7,312	5,313	-	-	12,626
2075	7,312	6,752	-	-	14,064

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2076	7,332	5,325	-	-	12,658
2077	7,312	5,313	-	-	12,626
2078	4,519	-	-	-	4,519
2079	4,519	-	-	-	4,519
2080	4,531	-	-	-	4,531
2081	4,519	-	-	-	4,519
2082	4,519	-	-	-	4,519
2083	4,519	-	-	-	4,519
2084	4,531	-	-	-	4,531
2085	4,519	-	-	-	4,519
2086	4,519	-	-	-	4,519
2087	4,519	-	-	-	4,519
2088	32,501	-	226	-	32,727
2089	63,639	-	1,032	-	64,671
2090	126,745	-	2,228	-	128,973
2091	101,675	-	1,957	2,883	106,515
2092	90,258	-	1,658	2,677	94,594
2093	20,170	-	13,749	-	33,918
2094	46	-	34,608	-	34,655
2095	34	-	25,032	-	25,065
	$ 947,015	$ 290,238	$ 80,490	$ 5,560	$ 1,323,303

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 1
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2033	$ 23,736	$ 1,665	$ -	$ -	$ 25,400
2034	77,853	4,191	-	-	82,043
2035	27,355	8,174	-	-	35,529
2036	22,943	6,993	-	-	29,936
2037	22,880	26,804	-	-	49,684
2038	20,139	60,042	-	-	80,181
2039	7,250	4,483	-	-	11,733
2040	7,270	4,495	-	-	11,765
2041	7,250	4,483	-	-	11,733
2042	7,250	4,483	-	-	11,733
2043	7,250	4,483	-	-	11,733
2044	7,270	4,495	-	-	11,765
2045	7,250	10,539	-	-	17,790
2046	7,250	8,521	-	-	15,771
2047	7,250	8,521	-	-	15,771
2048	7,270	4,495	-	-	11,765
2049	7,250	8,521	-	-	15,771
2050	7,250	10,539	-	-	17,790
2051	7,250	10,320	-	-	17,571
2052	7,270	10,552	-	-	17,822
2053	7,250	4,483	-	-	11,733
2054	7,250	4,483	-	-	11,733
2055	7,250	10,539	-	-	17,790
2056	7,270	8,533	-	-	15,803
2057	7,250	8,521	-	-	15,771
2058	7,250	4,483	-	-	11,733
2059	7,250	8,301	-	-	15,552
2060	7,270	8,533	-	-	15,803
2061	7,250	8,521	-	-	15,771
2062	7,250	4,483	-	-	11,733
2063	7,250	16,596	-	-	23,846
2064	7,270	12,351	-	-	19,622
2065	7,250	8,521	-	-	15,771
2066	7,250	4,483	-	-	11,733
2067	7,250	4,483	-	-	11,733
2068	7,270	12,570	-	-	19,841
2069	7,250	10,539	-	-	17,790
2070	7,250	4,483	-	-	11,733
2071	7,250	4,483	-	-	11,733
2072	7,270	14,370	-	-	21,640
2073	7,250	4,483	-	-	11,733
2074	7,250	4,483	-	-	11,733

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2075	7,250	16,016	-	-	23,266
2076	7,270	4,495	-	-	11,765
2077	7,250	4,483	-	-	11,733
2078	7,250	14,577	-	-	21,827
2079	7,250	4,483	-	-	11,733
2080	7,270	4,495	-	-	11,765
2081	7,250	4,483	-	-	11,733
2082	7,250	14,139	-	-	21,389
2083	7,250	4,483	-	-	11,733
2084	7,270	4,495	-	-	11,765
2085	7,250	4,483	-	-	11,733
2086	7,250	4,483	-	-	11,733
2087	34,845	4,294	378	-	39,517
2088	65,871	64,751	1,327	-	131,949
2089	120,417	5,011	1,868	-	127,296
2090	85,182	4,245	1,774	-	91,201
2091	70,952	3,936	1,735	-	76,624
2092	12,497	3,898	119	-	16,514
2093	15,970	6,523	8,963	-	31,456
2094	109	7,831	22,562	-	30,502
2095	79	13,994	16,319	-	30,391
2096	-	12,424	-	-	12,424
2097	-	11,782	-	-	11,782
2098	-	8,563	-	-	8,563
2099	-	11,782	-	-	11,782
2100	-	13,600	-	-	13,600
2101	-	14,222	-	-	14,222
2102	-	14,222	-	-	14,222
2103	-	7,732	-	-	7,732
2104	-	7,959	-	-	7,959
2105	-	14,015	-	-	14,015
2106	-	11,782	-	-	11,782
2107	-	11,990	-	-	11,990
2108	-	7,959	-	-	7,959
2109	-	11,782	-	-	11,782
2110	-	11,990	-	-	11,990
2111	-	11,990	-	-	11,990
2112	-	7,959	-	-	7,959
2113	-	20,090	-	-	20,090
2114	-	16,040	-	-	16,040
2115	-	13,429	-	-	13,429
2116	-	7,959	-	-	7,959
2117	11,973	7,723	-	-	19,696
2118	-	-	1,798	2,367	4,164
	$ 961,053	$ 836,113	$ 56,842	$ 2,367	$ 1,856,374

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 2
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2034	$ 11,142	$ 735	$ -	$ -	$ 11,877
2035	76,854	6,045	-	-	82,899
2036	45,255	6,727	-	-	51,983
2037	25,843	27,540	-	-	53,383
2038	22,594	60,649	-	-	83,243
2039	7,312	4,483	-	-	11,795
2040	7,333	4,495	-	-	11,828
2041	7,312	4,483	-	-	11,795
2042	7,312	4,483	-	-	11,795
2043	7,312	4,483	-	-	11,795
2044	7,333	4,495	-	-	11,828
2045	7,312	10,539	-	-	17,852
2046	7,312	8,521	-	-	15,833
2047	7,312	8,521	-	-	15,833
2048	7,333	4,495	-	-	11,828
2049	7,312	8,521	-	-	15,833
2050	7,312	10,539	-	-	17,852
2051	7,312	10,320	-	-	17,633
2052	7,333	10,552	-	-	17,884
2053	7,312	4,483	-	-	11,795
2054	7,312	4,483	-	-	11,795
2055	7,312	10,539	-	-	17,852
2056	7,333	8,533	-	-	15,865
2057	7,312	8,521	-	-	15,833
2058	7,312	4,483	-	-	11,795
2059	7,312	8,301	-	-	15,614
2060	7,333	8,533	-	-	15,865
2061	7,312	8,521	-	-	15,833
2062	7,312	4,483	-	-	11,795
2063	7,312	16,596	-	-	23,908
2064	7,333	12,351	-	-	19,684
2065	7,312	8,521	-	-	15,833
2066	7,312	4,483	-	-	11,795
2067	7,312	4,483	-	-	11,795
2068	7,333	12,570	-	-	19,903
2069	7,312	10,539	-	-	17,852
2070	7,312	4,483	-	-	11,795
2071	7,312	4,483	-	-	11,795
2072	7,333	14,370	-	-	21,703
2073	7,312	4,483	-	-	11,795
2074	7,312	4,483	-	-	11,795

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2075	7,312	16,016	-	-	23,329
2076	7,333	4,495	-	-	11,828
2077	7,312	4,483	-	-	11,795
2078	7,312	14,577	-	-	21,890
2079	7,312	4,483	-	-	11,795
2080	7,333	4,495	-	-	11,828
2081	7,312	4,483	-	-	11,795
2082	7,312	14,139	-	-	21,451
2083	7,312	4,483	-	-	11,795
2084	7,333	4,495	-	-	11,828
2085	7,312	4,483	-	-	11,795
2086	7,312	4,483	-	-	11,795
2087	7,312	4,483	-	-	11,795
2088	36,097	64,546	226	-	100,869
2089	61,690	3,765	1,032	-	66,488
2090	120,743	4,749	2,228	-	127,720
2091	100,818	5,275	1,957	-	108,049
2092	89,858	5,382	1,658	-	96,899
2093	20,041	6,523	13,068	-	39,632
2094	46	7,831	32,895	-	40,773
2095	34	13,994	23,793	-	37,820
2096	-	12,424	-	-	12,424
2097	-	11,782	-	-	11,782
2098	-	8,563	-	-	8,563
2099	-	11,782	-	-	11,782
2100	-	13,600	-	-	13,600
2101	-	14,222	-	-	14,222
2102	-	14,222	-	-	14,222
2103	-	7,732	-	-	7,732
2104	-	7,959	-	-	7,959
2105	-	14,015	-	-	14,015
2106	-	11,782	-	-	11,782
2107	-	11,990	-	-	11,990
2108	-	7,959	-	-	7,959
2109	-	11,782	-	-	11,782
2110	-	11,990	-	-	11,990
2111	-	11,990	-	-	11,990
2112	-	7,959	-	-	7,959
2113	-	20,090	-	-	20,090
2114	-	16,040	-	-	16,040
2115	-	13,429	-	-	13,429
2116	-	7,959	-	-	7,959
2117	11,973	7,723	-	-	19,696
2118	-	-	1,798	2,367	4,164
	$ 981,541	$ 832,007	$ 78,655	$ 2,367	$ 1,894,569

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 1
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2033	$ 23,736	$ 1,665	$ -	$ -	$ 25,400
2034	77,853	4,191	-	-	82,043
2035	27,355	8,174	-	-	35,529
2036	22,943	6,993	-	-	29,936
2037	22,880	26,804	-	-	49,684
2038	20,139	60,042	-	-	80,181
2039	7,250	4,483	-	-	11,733
2040	7,270	4,495	-	-	11,765
2041	7,250	4,483	-	-	11,733
2042	7,250	4,483	-	-	11,733
2043	7,250	4,483	-	-	11,733
2044	7,270	4,495	-	-	11,765
2045	7,250	10,539	-	-	17,790
2046	7,250	8,521	-	-	15,771
2047	7,250	8,521	-	-	15,771
2048	7,270	4,495	-	-	11,765
2049	7,250	8,521	-	-	15,771
2050	7,250	10,539	-	-	17,790
2051	7,250	10,320	-	-	17,571
2052	7,270	10,552	-	-	17,822
2053	7,250	4,483	-	-	11,733
2054	7,250	4,483	-	-	11,733
2055	7,250	10,539	-	-	17,790
2056	7,270	8,533	-	-	15,803
2057	7,250	8,521	-	-	15,771
2058	7,250	4,483	-	-	11,733
2059	7,250	8,301	-	-	15,552
2060	7,270	8,533	-	-	15,803
2061	7,250	8,521	-	-	15,771
2062	7,250	4,483	-	-	11,733
2063	7,250	16,596	-	-	23,846
2064	7,270	12,351	-	-	19,622
2065	7,250	8,521	-	-	15,771
2066	7,250	4,483	-	-	11,733
2067	7,250	4,483	-	-	11,733
2068	7,270	12,570	-	-	19,841
2069	7,250	10,539	-	-	17,790
2070	7,250	4,483	-	-	11,733
2071	7,250	4,483	-	-	11,733
2072	7,270	14,370	-	-	21,640
2073	7,250	4,483	-	-	11,733
2074	7,250	4,483	-	-	11,733
2075	7,250	16,016	-	-	23,266
2076	7,270	4,495	-	-	11,765

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2077	7,250	4,483	-	-	11,733
2078	7,250	14,577	-	-	21,827
2079	7,250	4,483	-	-	11,733
2080	7,270	4,495	-	-	11,765
2081	7,250	4,483	-	-	11,733
2082	7,250	14,139	-	-	21,389
2083	7,250	4,483	-	-	11,733
2084	7,270	4,495	-	-	11,765
2085	7,250	4,483	-	-	11,733
2086	7,250	4,483	-	-	11,733
2087	34,845	4,248	378	-	39,471
2088	65,871	64,665	1,327	-	131,862
2089	120,417	4,925	1,868	-	127,210
2090	85,182	4,159	1,774	-	91,115
2091	70,952	3,850	1,735	-	76,538
2092	12,497	3,812	119	-	16,428
2093	15,970	6,039	8,963	-	30,972
2094	109	6,750	22,562	-	29,421
2095	79	12,909	16,319	-	29,307
2096	-	11,123	-	-	11,123
2097	-	11,104	-	-	11,104
2098	-	7,054	-	-	7,054
2099	-	11,104	-	-	11,104
2100	-	13,129	-	-	13,129
2101	-	13,129	-	-	13,129
2102	-	13,129	-	-	13,129
2103	-	7,054	-	-	7,054
2104	-	7,073	-	-	7,073
2105	-	13,129	-	-	13,129
2106	-	11,104	-	-	11,104
2107	-	11,104	-	-	11,104
2108	-	7,073	-	-	7,073
2109	-	11,104	-	-	11,104
2110	-	11,104	-	-	11,104
2111	-	11,104	-	-	11,104
2112	-	7,073	-	-	7,073
2113	-	19,204	-	-	19,204
2114	-	15,154	-	-	15,154
2115	-	12,543	-	-	12,543
2116	-	7,073	-	-	7,073
2117	-	7,054	-	-	7,054
2118	-	15,154	-	-	15,154
2119	-	13,129	-	-	13,129
2120	-	7,073	-	-	7,073
2121	-	7,054	-	-	7,054
2122	-	17,179	-	-	17,179
2123	-	7,054	-	-	7,054
2124	-	7,073	-	-	7,073
2125	-	17,179	-	-	17,179

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2126	-	7,054	-	-	7,054
2127	-	7,054	-	-	7,054
2128	-	17,198	-	-	17,198
2129	-	7,054	-	-	7,054
2130	-	7,054	-	-	7,054
2131	-	7,054	-	-	7,054
2132	-	17,198	-	-	17,198
2133	-	7,054	-	-	7,054
2134	-	7,054	-	-	7,054
2135	-	7,054	-	-	7,054
2136	-	7,073	-	-	7,073
2137	-	7,054	-	-	7,054
2138	-	67,803	-	-	67,803
2139	-	7,054	-	-	7,054
2140	-	7,073	-	-	7,073
2141	-	7,054	-	-	7,054
2142	-	7,054	-	-	7,054
2143	-	7,054	-	-	7,054
2144	-	7,073	-	-	7,073
2145	-	13,129	-	-	13,129
2146	-	11,104	-	-	11,104
2147	-	11,104	-	-	11,104
2148	-	7,073	-	-	7,073
2149	-	11,104	-	-	11,104
2150	-	13,129	-	-	13,129
2151	-	13,129	-	-	13,129
2152	-	13,148	-	-	13,148
2153	-	7,054	-	-	7,054
2154	-	7,054	-	-	7,054
2155	-	14,568	-	-	14,568
2156	-	11,123	-	-	11,123
2157	-	11,104	-	-	11,104
2158	-	7,054	-	-	7,054
2159	-	11,104	-	-	11,104
2160	-	11,123	-	-	11,123
2161	-	11,104	-	-	11,104
2162	-	7,054	-	-	7,054
2163	-	19,204	-	-	19,204
2164	-	15,173	-	-	15,173
2165	-	11,104	-	-	11,104
2166	-	7,054	-	-	7,054
2167	-	7,054	-	-	7,054
2168	-	15,173	-	-	15,173
2169	-	13,129	-	-	13,129
2170	-	7,054	-	-	7,054
2171	-	7,054	-	-	7,054
2172	-	17,198	-	-	17,198
2173	-	7,054	-	-	7,054
2174	-	7,054	-	-	7,054

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2175	-	17,179	-	-	17,179
2176	-	7,073	-	-	7,073
2177	-	7,054	-	-	7,054
2178	-	17,179	-	-	17,179
2179	-	7,054	-	-	7,054
2180	-	7,073	-	-	7,073
2181	-	7,054	-	-	7,054
2182	-	17,179	-	-	17,179
2183	-	7,054	-	-	7,054
2184	-	7,073	-	-	7,073
2185	-	7,054	-	-	7,054
2186	-	7,054	-	-	7,054
2187	-	7,054	-	-	7,054
2188	-	67,822	-	-	67,822
2189	-	7,054	-	-	7,054
2190	-	7,054	-	-	7,054
2191	-	7,054	-	-	7,054
2192	-	7,073	-	-	7,073
2193	-	7,469	-	-	7,469
2194	-	8,092	-	-	8,092
2195	-	15,606	-	-	15,606
2196	-	12,369	-	-	12,369
2197	-	11,727	-	-	11,727
2198	-	8,507	-	-	8,507
2199	-	11,727	-	-	11,727
2200	-	13,544	-	-	13,544
2201	-	14,167	-	-	14,167
2202	-	14,167	-	-	14,167
2203	-	7,677	-	-	7,677
2204	-	7,904	-	-	7,904
2205	-	13,959	-	-	13,959
2206	-	11,727	-	-	11,727
2207	-	11,934	-	-	11,934
2208	-	7,904	-	-	7,904
2209	-	11,727	-	-	11,727
2210	-	11,934	-	-	11,934
2211	-	11,934	-	-	11,934
2212	-	7,904	-	-	7,904
2213	-	20,034	-	-	20,034
2214	-	15,984	-	-	15,984
2215	-	11,934	-	-	11,934
2216	-	7,904	-	-	7,904
2217	11,973	7,669	-	-	19,642
2218	-	-	1,798	2,367	4,164
	$ 961,053	$ 1,947,994	$ 56,842	$ 2,367	$ 2,968,256

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Prairie Island Nuclear Generating Plant Unit 2
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2034	$ 11,142	$ 735	$ -	$ -	$ 11,877
2035	76,854	6,045	-	-	82,899
2036	45,255	6,727	-	-	51,983
2037	25,843	27,540	-	-	53,383
2038	22,594	60,649	-	-	83,243
2039	7,312	4,483	-	-	11,795
2040	7,333	4,495	-	-	11,828
2041	7,312	4,483	-	-	11,795
2042	7,312	4,483	-	-	11,795
2043	7,312	4,483	-	-	11,795
2044	7,333	4,495	-	-	11,828
2045	7,312	10,539	-	-	17,852
2046	7,312	8,521	-	-	15,833
2047	7,312	8,521	-	-	15,833
2048	7,333	4,495	-	-	11,828
2049	7,312	8,521	-	-	15,833
2050	7,312	10,539	-	-	17,852
2051	7,312	10,320	-	-	17,633
2052	7,333	10,552	-	-	17,884
2053	7,312	4,483	-	-	11,795
2054	7,312	4,483	-	-	11,795
2055	7,312	10,539	-	-	17,852
2056	7,333	8,533	-	-	15,865
2057	7,312	8,521	-	-	15,833
2058	7,312	4,483	-	-	11,795
2059	7,312	8,301	-	-	15,614
2060	7,333	8,533	-	-	15,865
2061	7,312	8,521	-	-	15,833
2062	7,312	4,483	-	-	11,795
2063	7,312	16,596	-	-	23,908
2064	7,333	12,351	-	-	19,684
2065	7,312	8,521	-	-	15,833
2066	7,312	4,483	-	-	11,795
2067	7,312	4,483	-	-	11,795
2068	7,333	12,570	-	-	19,903
2069	7,312	10,539	-	-	17,852
2070	7,312	4,483	-	-	11,795
2071	7,312	4,483	-	-	11,795
2072	7,333	14,370	-	-	21,703
2073	7,312	4,483	-	-	11,795
2074	7,312	4,483	-	-	11,795
2075	7,312	16,016	-	-	23,329

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2076	7,333	4,495	-	-	11,828
2077	7,312	4,483	-	-	11,795
2078	7,312	14,577	-	-	21,890
2079	7,312	4,483	-	-	11,795
2080	7,333	4,495	-	-	11,828
2081	7,312	4,483	-	-	11,795
2082	7,312	14,139	-	-	21,451
2083	7,312	4,483	-	-	11,795
2084	7,333	4,495	-	-	11,828
2085	7,312	4,483	-	-	11,795
2086	7,312	4,483	-	-	11,795
2087	7,312	4,483	-	-	11,795
2088	36,097	64,482	226	-	100,805
2089	61,690	3,679	1,032	-	66,402
2090	120,743	4,663	2,228	-	127,634
2091	100,818	5,189	1,957	-	107,963
2092	89,858	5,296	1,658	-	96,813
2093	20,041	6,039	13,068	-	39,148
2094	46	6,750	32,895	-	39,692
2095	34	12,909	23,793	-	36,736
2096	-	11,123	-	-	11,123
2097	-	11,104	-	-	11,104
2098	-	7,054	-	-	7,054
2099	-	11,104	-	-	11,104
2100	-	13,129	-	-	13,129
2101	-	13,129	-	-	13,129
2102	-	13,129	-	-	13,129
2103	-	7,054	-	-	7,054
2104	-	7,073	-	-	7,073
2105	-	13,129	-	-	13,129
2106	-	11,104	-	-	11,104
2107	-	11,104	-	-	11,104
2108	-	7,073	-	-	7,073
2109	-	11,104	-	-	11,104
2110	-	11,104	-	-	11,104
2111	-	11,104	-	-	11,104
2112	-	7,073	-	-	7,073
2113	-	19,204	-	-	19,204
2114	-	15,154	-	-	15,154
2115	-	12,543	-	-	12,543
2116	-	7,073	-	-	7,073
2117	-	7,054	-	-	7,054
2118	-	15,154	-	-	15,154
2119	-	13,129	-	-	13,129
2120	-	7,073	-	-	7,073
2121	-	7,054	-	-	7,054
2122	-	17,179	-	-	17,179
2123	-	7,054	-	-	7,054
2124	-	7,073	-	-	7,073

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2125	-	17,179	-	-	17,179
2126	-	7,054	-	-	7,054
2127	-	7,054	-	-	7,054
2128	-	17,198	-	-	17,198
2129	-	7,054	-	-	7,054
2130	-	7,054	-	-	7,054
2131	-	7,054	-	-	7,054
2132	-	17,198	-	-	17,198
2133	-	7,054	-	-	7,054
2134	-	7,054	-	-	7,054
2135	-	7,054	-	-	7,054
2136	-	7,073	-	-	7,073
2137	-	7,054	-	-	7,054
2138	-	67,803	-	-	67,803
2139	-	7,054	-	-	7,054
2140	-	7,073	-	-	7,073
2141	-	7,054	-	-	7,054
2142	-	7,054	-	-	7,054
2143	-	7,054	-	-	7,054
2144	-	7,073	-	-	7,073
2145	-	13,129	-	-	13,129
2146	-	11,104	-	-	11,104
2147	-	11,104	-	-	11,104
2148	-	7,073	-	-	7,073
2149	-	11,104	-	-	11,104
2150	-	13,129	-	-	13,129
2151	-	13,129	-	-	13,129
2152	-	13,148	-	-	13,148
2153	-	7,054	-	-	7,054
2154	-	7,054	-	-	7,054
2155	-	14,568	-	-	14,568
2156	-	11,123	-	-	11,123
2157	-	11,104	-	-	11,104
2158	-	7,054	-	-	7,054
2159	-	11,104	-	-	11,104
2160	-	11,123	-	-	11,123
2161	-	11,104	-	-	11,104
2162	-	7,054	-	-	7,054
2163	-	19,204	-	-	19,204
2164	-	15,173	-	-	15,173
2165	-	11,104	-	-	11,104
2166	-	7,054	-	-	7,054
2167	-	7,054	-	-	7,054
2168	-	15,173	-	-	15,173
2169	-	13,129	-	-	13,129
2170	-	7,054	-	-	7,054
2171	-	7,054	-	-	7,054
2172	-	17,198	-	-	17,198
2173	-	7,054	-	-	7,054

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2174	-	7,054	-	-	7,054
2175	-	17,179	-	-	17,179
2176	-	7,073	-	-	7,073
2177	-	7,054	-	-	7,054
2178	-	17,179	-	-	17,179
2179	-	7,054	-	-	7,054
2180	-	7,073	-	-	7,073
2181	-	7,054	-	-	7,054
2182	-	17,179	-	-	17,179
2183	-	7,054	-	-	7,054
2184	-	7,073	-	-	7,073
2185	-	7,054	-	-	7,054
2186	-	7,054	-	-	7,054
2187	-	7,054	-	-	7,054
2188	-	67,822	-	-	67,822
2189	-	7,054	-	-	7,054
2190	-	7,054	-	-	7,054
2191	-	7,054	-	-	7,054
2192	-	7,073	-	-	7,073
2193	-	7,469	-	-	7,469
2194	-	8,092	-	-	8,092
2195	-	15,606	-	-	15,606
2196	-	12,369	-	-	12,369
2197	-	11,727	-	-	11,727
2198	-	8,507	-	-	8,507
2199	-	11,727	-	-	11,727
2200	-	13,544	-	-	13,544
2201	-	14,167	-	-	14,167
2202	-	14,167	-	-	14,167
2203	-	7,677	-	-	7,677
2204	-	7,904	-	-	7,904
2205	-	13,959	-	-	13,959
2206	-	11,727	-	-	11,727
2207	-	11,934	-	-	11,934
2208	-	7,904	-	-	7,904
2209	-	11,727	-	-	11,727
2210	-	11,934	-	-	11,934
2211	-	11,934	-	-	11,934
2212	-	7,904	-	-	7,904
2213	-	20,034	-	-	20,034
2214	-	15,984	-	-	15,984
2215	-	11,934	-	-	11,934
2216	-	7,904	-	-	7,904
2217	11,973	7,669	-	-	19,642
2218	-	-	1,798	2,367	4,164
	$ 981,541	$ 1,943,956	$ 78,655	$ 2,367	$ 3,006,518

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2040	$ 29,863	$ 3,813	$ 173	$ -	$ 33,849
2041	117,586	9,881	669	-	128,136
2042	202,089	13,203	205	-	215,497
2043	189,842	57,941	31	-	247,814
2044	136,382	92,733	7	-	229,122
2045	69,136	6,424	-	-	75,560
2046	10,565	8,655	32,454	-	51,674
2047	1,202	9,165	37,184	-	47,551
2048	-	11,827	-	-	11,827
2049	-	8,925	-	-	8,925
2050	-	8,925	-	-	8,925
2051	-	8,925	-	-	8,925
2052	-	9,364	-	-	9,364
2053	-	10,170	-	-	10,170
2054	-	9,755	-	-	9,755
2055	-	9,755	-	-	9,755
2056	-	11,440	-	-	11,440
2057	-	11,001	-	-	11,001
2058	-	11,001	-	-	11,001
2059	-	11,001	-	-	11,001
2060	-	10,195	-	-	10,195
2061	-	9,755	-	-	9,755
2062	-	10,170	-	-	10,170
2063	-	9,755	-	-	9,755
2064	-	9,780	-	-	9,780
2065	-	10,170	-	-	10,170
2066	-	9,755	-	-	9,755
2067	-	9,755	-	-	9,755
2068	-	10,195	-	-	10,195
2069	-	10,585	-	-	10,585
2070	-	9,755	-	-	9,755
2071	-	10,585	-	-	10,585
2072	-	10,195	-	-	10,195
2073	-	9,340	-	-	9,340
2074	-	9,340	-	-	9,340
2075	-	9,755	-	-	9,755
2076	-	9,364	-	-	9,364
2077	-	9,340	-	-	9,340
2078	-	9,755	-	-	9,755
2079	-	9,340	-	-	9,340
2080	-	9,364	-	-	9,364
2081	-	9,755	-	-	9,755

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2082	6,632	9,428	-	-	16,060
2083	-	-	3,053	13,059	16,112
	$ 763,297	$ 549,339	$ 73,776	$ 13,059	$ 1,399,471

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2040	$ 29,863	$ 2,014	$ 173	$ -	$ 32,050
2041	117,586	5,993	669	-	124,248
2042	202,089	13,275	205	-	215,570
2043	189,842	58,021	31	-	247,894
2044	136,382	92,810	7	-	229,199
2045	69,136	6,483	-	-	75,619
2046	10,565	8,727	32,454	-	51,745
2047	1,202	9,231	37,184	-	47,617
2048	-	11,814	-	-	11,814
2049	-	8,912	-	-	8,912
2050	-	15,387	-	-	15,387
2051	-	15,387	-	-	15,387
2052	-	18,291	-	-	18,291
2053	-	20,427	-	-	20,427
2054	-	16,107	-	-	16,107
2055	-	19,707	-	-	19,707
2056	-	21,171	-	-	21,171
2057	-	8,840	-	-	8,840
2058	-	8,840	-	-	8,840
2059	-	8,840	-	-	8,840
2060	-	8,864	-	-	8,864
2061	-	8,840	-	-	8,840
2062	-	8,840	-	-	8,840
2063	-	8,840	-	-	8,840
2064	-	8,864	-	-	8,864
2065	-	8,840	-	-	8,840
2066	-	8,840	-	-	8,840
2067	-	8,840	-	-	8,840
2068	-	8,864	-	-	8,864
2069	-	8,840	-	-	8,840
2070	-	8,840	-	-	8,840
2071	-	8,840	-	-	8,840
2072	-	8,864	-	-	8,864
2073	-	8,840	-	-	8,840
2074	-	8,840	-	-	8,840
2075	-	8,840	-	-	8,840
2076	-	8,864	-	-	8,864
2077	-	8,840	-	-	8,840
2078	-	10,916	-	-	10,916
2079	-	11,331	-	-	11,331
2080	-	10,940	-	-	10,940
2081	-	10,916	-	-	10,916

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2082	-	10,916	-	-	10,916
2083	-	11,331	-	-	11,331
2084	-	10,940	-	-	10,940
2085	-	10,916	-	-	10,916
2086	-	10,916	-	-	10,916
2087	-	11,331	-	-	11,331
2088	-	13,818	-	-	13,818
2089	-	10,916	-	-	10,916
2090	-	9,255	-	-	9,255
2091	-	9,255	-	-	9,255
2092	-	9,279	-	-	9,279
2093	-	9,670	-	-	9,670
2094	-	9,255	-	-	9,255
2095	-	9,255	-	-	9,255
2096	-	9,694	-	-	9,694
2097	-	9,255	-	-	9,255
2098	-	9,255	-	-	9,255
2099	-	9,670	-	-	9,670
2100	6,632	9,346	-	-	15,978
2101	-	-	3,053	13,059	16,112
	$ 763,296	$ 767,892	$ 73,776	$ 13,059	$ 1,618,023

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2040	$ 29,863	$ 2,014	$ 173	$ -	$ 32,050
2041	117,586	7,701	669	-	125,955
2042	202,089	21,041	205	-	223,336
2043	189,842	63,270	31	-	253,143
2044	136,382	92,810	7	-	229,199
2045	69,136	6,483	-	-	75,619
2046	10,565	8,765	32,563	-	51,893
2047	1,202	9,370	37,310	-	47,881
2048	-	13,173	-	-	13,173
2049	-	10,267	-	-	10,267
2050	-	16,742	-	-	16,742
2051	-	16,742	-	-	16,742
2052	-	16,770	-	-	16,770
2053	-	16,742	-	-	16,742
2054	-	16,742	-	-	16,742
2055	-	16,742	-	-	16,742
2056	-	16,770	-	-	16,770
2057	-	16,742	-	-	16,742
2058	-	45,455	-	-	45,455
2059	-	16,742	-	-	16,742
2060	-	16,770	-	-	16,770
2061	-	16,742	-	-	16,742
2062	-	16,742	-	-	16,742
2063	-	31,098	-	-	31,098
2064	-	16,770	-	-	16,770
2065	-	16,742	-	-	16,742
2066	-	19,613	-	-	19,613
2067	-	16,742	-	-	16,742
2068	-	56,968	-	-	56,968
2069	-	16,742	-	-	16,742
2070	-	16,742	-	-	16,742
2071	-	16,742	-	-	16,742
2072	-	16,770	-	-	16,770
2073	-	16,742	-	-	16,742
2074	-	16,742	-	-	16,742
2075	-	16,742	-	-	16,742
2076	-	16,770	-	-	16,770
2077	-	16,742	-	-	16,742
2078	-	16,742	-	-	16,742
2079	-	16,742	-	-	16,742
2080	-	31,126	-	-	31,126
2081	-	16,742	-	-	16,742

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2082	-	16,742	-	-	16,742
2083	-	16,742	-	-	16,742
2084	-	16,770	-	-	16,770
2085	-	31,098	-	-	31,098
2086	-	16,742	-	-	16,742
2087	-	25,356	-	-	25,356
2088	-	19,648	-	-	19,648
2089	-	16,742	-	-	16,742
2090	-	16,742	-	-	16,742
2091	-	16,742	-	-	16,742
2092	-	19,650	-	-	19,650
2093	-	21,781	-	-	21,781
2094	-	117,956	-	-	117,956
2095	8,544	21,062	-	-	29,606
2096	-	22,529	-	-	22,529
2097	-	10,195	-	-	10,195
2098	-	10,195	-	-	10,195
2099	-	10,195	-	-	10,195
2100	-	10,195	-	-	10,195
2101	-	10,195	-	-	10,195
2102	-	10,195	-	-	10,195
2103	-	10,195	-	-	10,195
2104	-	10,223	-	-	10,223
2105	-	10,195	-	-	10,195
2106	-	10,195	-	-	10,195
2107	-	10,195	-	-	10,195
2108	-	38,935	-	-	38,935
2109	-	10,195	-	-	10,195
2110	-	10,195	-	-	10,195
2111	-	10,195	-	-	10,195
2112	-	10,223	-	-	10,223
2113	-	24,551	-	-	24,551
2114	-	10,195	-	-	10,195
2115	-	10,195	-	-	10,195
2116	-	13,094	-	-	13,094
2117	-	10,195	-	-	10,195
2118	-	52,468	-	-	52,468
2119	-	12,686	-	-	12,686
2120	-	12,299	-	-	12,299
2121	-	12,271	-	-	12,271
2122	-	12,271	-	-	12,271
2123	-	12,686	-	-	12,686

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100-Year Decommissioning Period **Page 3 of 3**

SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2124	-	12,299	-	-	12,299
2125	-	12,271	-	-	12,271
2126	-	12,271	-	-	12,271
2127	-	12,686	-	-	12,686
2128	-	15,176	-	-	15,176
2129	-	12,271	-	-	12,271
2130	-	24,966	-	-	24,966
2131	-	10,610	-	-	10,610
2132	-	10,638	-	-	10,638
2133	-	11,025	-	-	11,025
2134	-	10,610	-	-	10,610
2135	-	24,966	-	-	24,966
2136	-	11,053	-	-	11,053
2137	-	19,224	-	-	19,224
2138	-	10,610	-	-	10,610
2139	-	11,025	-	-	11,025
2140	6,632	10,677	-	-	17,309
2141	-	-	3,169	4,559	7,729
	$ 771,840	$ 1,874,865	$ 74,127	$ 4,559	$ 2,725,392

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2040	$ 29,863	$ 2,014	$ 173	$ -	$ 32,050
2041	117,586	7,701	669	-	125,955
2042	202,089	21,041	205	-	223,336
2043	189,842	63,270	31	-	253,143
2044	136,382	92,810	7	-	229,199
2045	69,136	6,483	-	-	75,619
2046	10,565	8,765	32,563	-	51,893
2047	1,202	9,369	37,310	-	47,880
2048	-	13,163	-	-	13,163
2049	-	10,258	-	-	10,258
2050	-	16,733	-	-	16,733
2051	-	16,733	-	-	16,733
2052	-	16,761	-	-	16,761
2053	-	16,733	-	-	16,733
2054	-	16,733	-	-	16,733
2055	-	16,733	-	-	16,733
2056	-	16,761	-	-	16,761
2057	-	16,733	-	-	16,733
2058	-	45,445	-	-	45,445
2059	-	16,733	-	-	16,733
2060	-	16,761	-	-	16,761
2061	-	16,733	-	-	16,733
2062	-	16,733	-	-	16,733
2063	-	31,089	-	-	31,089
2064	-	16,761	-	-	16,761
2065	-	16,733	-	-	16,733
2066	-	19,604	-	-	19,604
2067	-	16,733	-	-	16,733
2068	-	56,958	-	-	56,958
2069	-	16,733	-	-	16,733
2070	-	16,733	-	-	16,733
2071	-	16,733	-	-	16,733
2072	-	16,761	-	-	16,761
2073	-	16,733	-	-	16,733
2074	-	16,733	-	-	16,733
2075	-	16,733	-	-	16,733
2076	-	16,761	-	-	16,761
2077	-	16,733	-	-	16,733
2078	-	16,733	-	-	16,733
2079	-	16,733	-	-	16,733
2080	-	31,117	-	-	31,117
2081	-	16,733	-	-	16,733

Xcel Energy
Schedule of Annual Expenditures
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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2082	-	16,733	-	-	16,733
2083	-	16,733	-	-	16,733
2084	-	16,761	-	-	16,761
2085	-	31,089	-	-	31,089
2086	-	16,733	-	-	16,733
2087	-	25,347	-	-	25,347
2088	-	19,639	-	-	19,639
2089	-	16,733	-	-	16,733
2090	-	16,733	-	-	16,733
2091	-	16,733	-	-	16,733
2092	-	16,761	-	-	16,761
2093	-	16,733	-	-	16,733
2094	-	117,226	-	-	117,226
2095	8,544	16,733	-	-	25,277
2096	-	16,761	-	-	16,761
2097	-	16,733	-	-	16,733
2098	-	16,733	-	-	16,733
2099	-	16,733	-	-	16,733
2100	-	16,733	-	-	16,733
2101	-	16,733	-	-	16,733
2102	-	16,733	-	-	16,733
2103	-	16,733	-	-	16,733
2104	-	16,761	-	-	16,761
2105	-	16,733	-	-	16,733
2106	-	16,733	-	-	16,733
2107	-	16,733	-	-	16,733
2108	-	45,473	-	-	45,473
2109	-	16,733	-	-	16,733
2110	-	16,733	-	-	16,733
2111	-	16,733	-	-	16,733
2112	-	16,761	-	-	16,761
2113	-	31,089	-	-	31,089
2114	-	16,733	-	-	16,733
2115	-	16,733	-	-	16,733
2116	-	19,632	-	-	19,632
2117	-	16,733	-	-	16,733
2118	-	56,930	-	-	56,930
2119	-	16,733	-	-	16,733
2120	-	16,761	-	-	16,761
2121	-	16,733	-	-	16,733
2122	-	16,733	-	-	16,733
2123	-	16,733	-	-	16,733

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2124	-	16,761	-	-	16,761
2125	-	16,733	-	-	16,733
2126	-	16,733	-	-	16,733
2127	-	16,733	-	-	16,733
2128	-	19,639	-	-	19,639
2129	-	16,733	-	-	16,733
2130	-	31,089	-	-	31,089
2131	-	16,733	-	-	16,733
2132	-	16,761	-	-	16,761
2133	-	16,733	-	-	16,733
2134	-	16,733	-	-	16,733
2135	-	31,089	-	-	31,089
2136	-	16,761	-	-	16,761
2137	-	25,347	-	-	25,347
2138	-	16,733	-	-	16,733
2139	-	16,733	-	-	16,733
2140	-	16,761	-	-	16,761
2141	-	16,733	-	-	16,733
2142	-	16,733	-	-	16,733
2143	-	16,733	-	-	16,733
2144	-	117,254	-	-	117,254
2145	-	16,733	-	-	16,733
2146	-	16,733	-	-	16,733
2147	-	16,733	-	-	16,733
2148	-	16,761	-	-	16,761
2149	-	16,733	-	-	16,733
2150	-	16,733	-	-	16,733
2151	-	16,733	-	-	16,733
2152	-	16,761	-	-	16,761
2153	-	16,733	-	-	16,733
2154	-	16,733	-	-	16,733
2155	-	16,733	-	-	16,733
2156	-	16,761	-	-	16,761
2157	-	16,733	-	-	16,733
2158	-	45,445	-	-	45,445
2159	-	16,733	-	-	16,733
2160	-	16,761	-	-	16,761
2161	-	16,733	-	-	16,733
2162	-	16,733	-	-	16,733
2163	-	31,089	-	-	31,089
2164	-	16,761	-	-	16,761
2165	-	16,733	-	-	16,733

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2166	-	19,604	-	-	19,604
2167	-	16,733	-	-	16,733
2168	-	59,836	-	-	59,836
2169	-	16,733	-	-	16,733
2170	-	16,733	-	-	16,733
2171	-	16,733	-	-	16,733
2172	-	16,761	-	-	16,761
2173	-	16,733	-	-	16,733
2174	-	16,733	-	-	16,733
2175	-	16,733	-	-	16,733
2176	-	16,761	-	-	16,761
2177	-	16,733	-	-	16,733
2178	-	16,733	-	-	16,733
2179	-	16,733	-	-	16,733
2180	-	31,117	-	-	31,117
2181	-	16,733	-	-	16,733
2182	-	16,733	-	-	16,733
2183	-	16,733	-	-	16,733
2184	-	16,761	-	-	16,761
2185	-	31,089	-	-	31,089
2186	-	16,733	-	-	16,733
2187	-	25,347	-	-	25,347
2188	-	16,761	-	-	16,761
2189	-	16,733	-	-	16,733
2190	-	16,733	-	-	16,733
2191	-	16,733	-	-	16,733
2192	-	19,641	-	-	19,641
2193	-	21,772	-	-	21,772
2194	-	117,946	-	-	117,946
2195	-	21,052	-	-	21,052
2196	-	22,520	-	-	22,520
2197	-	10,186	-	-	10,186
2198	-	10,186	-	-	10,186
2199	-	10,186	-	-	10,186
2200	-	10,186	-	-	10,186
2201	-	10,186	-	-	10,186
2202	-	10,186	-	-	10,186
2203	-	10,186	-	-	10,186
2204	-	10,214	-	-	10,214
2205	-	10,186	-	-	10,186
2206	-	10,186	-	-	10,186
2207	-	10,186	-	-	10,186

Xcel Energy
Schedule of Annual Expenditures
200-Year Decommissioning Period

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SCHEDULE OF TOTAL ANNUAL EXPENDITURES
Monticello Nuclear Generating Plant
(Thousands of 2020 Dollars)

Year	Radiological	Spent Fuel	Site Restoration	ISFSI Radiological	Yearly Total
2208	-	41,804	-	-	41,804
2209	-	10,186	-	-	10,186
2210	-	10,186	-	-	10,186
2211	-	10,186	-	-	10,186
2212	-	10,214	-	-	10,214
2213	-	24,542	-	-	24,542
2214	-	10,186	-	-	10,186
2215	-	10,186	-	-	10,186
2216	-	13,085	-	-	13,085
2217	-	10,186	-	-	10,186
2218	-	52,459	-	-	52,459
2219	-	12,677	-	-	12,677
2220	-	12,289	-	-	12,289
2221	-	12,261	-	-	12,261
2222	-	12,261	-	-	12,261
2223	-	12,677	-	-	12,677
2224	-	12,289	-	-	12,289
2225	-	12,261	-	-	12,261
2226	-	12,261	-	-	12,261
2227	-	12,677	-	-	12,677
2228	-	12,289	-	-	12,289
2229	-	12,261	-	-	12,261
2230	-	24,957	-	-	24,957
2231	-	10,601	-	-	10,601
2232	-	10,629	-	-	10,629
2233	-	11,016	-	-	11,016
2234	-	10,601	-	-	10,601
2235	-	24,957	-	-	24,957
2236	-	11,044	-	-	11,044
2237	-	19,215	-	-	19,215
2238	-	10,601	-	-	10,601
2239	-	11,016	-	-	11,016
2240	6,632	10,668	-	-	17,300
2241	-	-	3,169	4,559	7,729
	$ 771,840	$ 4,001,649	$ 74,127	$ 4,559	$ 4,852,176

Xcel Energy
NRC Minimum Historical Escalation

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January 1986 to January 2020

1. Determine Most Recent Escalation Component

	Base Conversion 1986	Value (2005 base)	4Q - 19 (Dec '05 Base)	Base Labor Adjustment Factor	Current Labor Adjustment Factor
	(1)	(2)	(3)	(4)	(5)
Labor (L)	48.1	100.00	135.7	2.08	2.82

Dept of Labor, Bureau of Labor Statistics, Employment Cost Index (NAICS), 4th Qtr 2019 (Retrieved May 2020), Private industry, Midwest region

Industrial Power (P)	114.2			232.5	2.036
Light Fuel Oil (F)	82.0			219.5	2.677

Department of Labor, Bureau of Labor Statistics, Producer Price Index Data for December 2019 (Retrieved May 2020); Industrial Power from Commodity code 0543, 500 kw demand, Midwest Region; Light Fuel Oils from Commodity code 0573

Burial (B)	
PWR - Combination of Compact-Affiliated and Non-Compact Facility	12.853
BWR - Combination of Compact-Affiliated and Non-Compact Facility	13.422

NUREG 1307, Report on Waste Burial, Revision 17 (Table 2.1 in February 2019)

2. Calculate Energy Component (E)

	Equation	Industrial Power	Light	Fuel Oil	Energy Component
Energy (PWR)	= .58(P) + .42(F)	2.036		2.677	2.305
Energy (BWR)	= .54(P) + .46(F)	2.036		2.677	2.331

3. Calculate NRC Escalation Factor as of June 2017

	Labor	Energy	Burial	NRC Escalation Factor
	(L)	(E)	(B)	(6)
PWR - Blended	2.821	2.305	12.853	4.9611
BWR - Blended	2.821	2.331	13.422	5.0896

Notes:

(1) = Base values from NRC Proposed Guidelines
(2) = Conversion factor to convert from 1986 base to 2005 base.
(3) = The most recent published value:
(4) = (2) / (1), Labor only
(5) = (4) * (3) for Labor, Industrial Power, and Light Fuel Oil
(6) = (.65 x L) + (.13 x E) + (.22 x B)

Xcel Energy
NRC Minimum Calculation

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January 1986 to January 2020

1. NRC Minimum Calculation in 1986 Dollars

	Equation	MWt	1986 Minimum Calculation
Monticello (BWR)	= $104 million + (0.009 * MWt)	2004	122,036,000
Prairie Island (PWR), Unit 1	= $75 million + (0.0088 * MWt)	1677	89,757,600
Prairie Island (PWR), Unit 2	= $75 million + (0.0088 * MWt)	1677	89,757,600

2. NRC Minimum Calculation in 2019 Dollars - Combination of Facilities

	1986 Minimum Calculation	Escalation Rate	2019 Minimum Calculation (Blended)
Monticello (BWR)	122,036,000	5.0896	621,116,682
Prairie Island (PWR), Unit 1	89,757,600	4.9611	445,296,938
Prairie Island (PWR), Unit 2	89,757,600	4.9611	445,296,938

Xcel Energy
Spent Fuel Management Costs
60-year Decommissioning Period
DECON Method ($s in 000's)

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	Monticello												
	Emergency Planning Fees	Spent Fuel Capital and Transfer	Spent Fuel Pool O&M	ISFSI Operating Costs	Security Staff Cost	Utility Staff Cost	Insurance	Property taxes	NRC ISFSI Fees	Plant energy budget	Fixed Overhead	Railroad Track Maintenance	Total
2030	1,178	493	303	40	-	-	-	-	-	-	-	-	2,014
2031	3,568	1,325	971	129	-	-	-	-	-	-	-	-	5,993
2032	3,132	9,045	974	129	-	-	-	-	-	-	-	-	13,280
2033	3,123	54,113	971	129	-	-	-	-	-	-	-	-	58,336
2034	2,199	87,579	668	129	1,547	369	-	-	-	-	-	-	92,491
2035	163	59	-	129	4,953	1,180	-	-	-	-	-	-	6,483
2036	164	80	-	129	4,966	1,183	-	1,302	182	169	401	175	8,751
2037	163	71	-	129	4,952	1,180	57	1,566	228	193	478	211	9,229
2038	163	72	-	129	4,946	1,181	774	999	256	-	248	144	8,912
2039	163	72	-	129	4,946	1,181	774	999	256	-	248	144	8,912
2040	164	72	-	129	4,959	1,185	776	1,002	257	-	248	144	8,936
2041	163	72	-	129	4,946	1,181	774	999	256	-	248	144	8,912
2042	163	72	-	129	4,946	1,181	774	999	256	-	248	144	8,912
2043	163	72	-	129	4,946	1,181	774	999	256	-	248	144	8,912
2044	164	72	-	129	4,959	1,185	776	1,002	257	-	248	144	8,936
2045	163	72	-	129	4,946	1,181	774	999	256	-	248	144	8,912
2046	163	72	-	129	4,946	1,181	774	999	256	-	248	144	8,912
2047	163	72	-	129	4,946	1,181	774	999	256	-	248	144	8,912
2048	164	2,950	-	129	4,959	1,185	776	1,002	257	-	248	144	11,814
2049	163	72	-	129	4,946	1,181	774	999	256	-	248	144	8,912
2050	163	6,547	-	129	4,946	1,181	774	999	256	-	248	144	15,387
2051	163	6,547	-	129	4,946	1,181	774	999	256	-	248	144	15,387
2052	164	9,427	-	129	4,959	1,185	776	1,002	257	-	248	144	18,291
2053	163	11,587	-	129	4,946	1,181	774	999	256	-	248	144	20,427
2054	163	7,267	-	129	4,946	1,181	774	999	256	-	248	144	16,107
2055	163	10,867	-	129	4,946	1,181	774	999	256	-	248	144	19,707
2056	164	12,307	-	129	4,959	1,185	776	1,002	257	-	248	144	21,171
2057	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2058	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2059	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2060	164	(0)	-	129	4,959	1,185	776	1,002	257	-	248	144	8,864

Xcel Energy
Spent Fuel Management Costs
60-year Decommissioning Period
DECON Method ($s in 000's)

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	Monticello												
	Emergency Planning Fees	Spent Fuel Capital and Transfer	Spent Fuel Pool O&M	ISFSI Operating Costs	Security Staff Cost	Utility Staff Cost	Insurance	Property taxes	NRC ISFSI Fees	Plant energy budget	Fixed Overhead	Railroad Track Maintenance	Total
2061	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2062	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2063	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2064	164	(0)	-	129	4,959	1,185	776	1,002	257	-	248	144	8,864
2065	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2066	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2067	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2068	164	(0)	-	129	4,959	1,185	776	1,002	257	-	248	144	8,864
2069	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2070	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2071	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2072	164	(0)	-	129	4,959	1,185	776	1,002	257	-	248	144	8,864
2073	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2074	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2075	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2076	164	(0)	-	129	4,959	1,185	776	1,002	257	-	248	144	8,864
2077	163	(0)	-	129	4,946	1,181	774	999	256	-	248	144	8,840
2078	163	2,076	-	129	4,946	1,181	774	999	256	-	248	144	10,916
2079	163	2,491	-	129	4,946	1,181	774	999	256	-	248	144	11,331
2080	164	2,076	-	129	4,959	1,185	776	1,002	257	-	248	144	10,940
2081	163	2,076	-	129	4,946	1,181	774	999	256	-	248	144	10,916
2082	163	2,076	-	129	4,946	1,181	774	999	256	-	248	144	10,916
2083	163	2,491	-	129	4,946	1,181	774	999	256	-	248	144	11,331
2084	164	2,076	-	129	4,959	1,185	776	1,002	257	-	248	144	10,940
2085	163	2,076	-	129	4,946	1,181	774	999	256	-	248	144	10,916
2086	163	2,076	-	129	4,946	1,181	774	999	256	-	248	144	10,916
2087	163	2,491	-	129	4,946	1,181	774	999	256	-	248	144	11,331
2088	164	4,954	-	129	4,959	1,185	776	1,002	257	-	248	144	13,818
2089	163	2,076	-	129	4,946	1,181	774	999	256	-	248	144	10,916
2090	163	807	-	124	4,770	1,139	746	964	255	-	239	139	9,346
2091	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	22,339	250,894	3,887	7,764	278,550	66,532	41,062	55,838	13,995	362	14,007	8,007	763,237

From Schedule A.02_Monticello 60-year for DECON Spent Fuel Cash Flows 763,237

Xcel Energy
Spent Fuel Management Costs
60-year Decommissioning Period
DECON Method ($s in 000's)

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	Emergency Planning Fees	PIIC Payments	Spent Fuel Capital and Transfer	Spent Fuel Pool O&M	ISFSI Operating Costs	Security Staff Cost	Utility Staff Cost	Insurance	Property taxes	NRC ISFSI Fees	Plant energy budget	Fixed Overhead	Railroad Track Maintenance	Total
2030	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2031	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2032	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2033	944	496	8	192	25	-	-	-	-	-	-	-	-	1,665
2034	2,392	1,250	149	486	64	-	-	-	-	-	-	-	-	4,340
2035	2,080	1,250	1,225	486	64	-	-	-	-	-	-	-	-	5,105
2036	2,050	1,250	4,215	487	65	-	-	-	-	-	-	-	-	8,066
2037	2,044	1,250	23,615	486	64	-	-	-	-	-	-	-	-	27,460
2038	1,705	1,250	39,795	402	64	432	101	-	-	-	-	-	-	43,750
2039	82	1,250	(1)	-	64	2,504	585	-	-	-	-	-	-	4,484
2040	82	1,250	11	-	65	2,510	586	-	1,397	73	121	238	80	6,412
2041	82	1,250	(1)	-	64	2,503	583	-	2,161	113	186	368	124	7,435
2042	82	1,250	(3)	-	64	2,503	584	140	1,827	137	88	273	97	7,042
2043	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2044	82	1,250	3	-	65	2,510	586	267	1,529	160	-	188	72	6,711
2045	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2046	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2047	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2048	82	1,250	3	-	65	2,510	586	267	1,529	160	-	188	72	6,711
2049	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2050	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2051	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2052	82	1,250	3	-	65	2,510	586	267	1,529	160	-	188	72	6,711
2053	82	1,250	414	-	64	2,503	584	266	1,525	159	-	187	72	7,107
2054	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2055	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2056	82	1,250	1,040	-	65	2,510	586	267	1,529	160	-	188	72	7,749
2057	82	1,250	622	-	64	2,503	584	266	1,525	159	-	187	72	7,315
2058	82	1,250	1,245	-	64	2,503	584	266	1,525	159	-	187	72	7,938
2059	82	1,250	622	-	64	2,503	584	266	1,525	159	-	187	72	7,315
2060	82	1,250	418	-	65	2,510	586	267	1,529	160	-	188	72	7,126

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	Prairie Island Unit 1													
	Emergency Planning Fees	PIIC Payments	Spent Fuel Capital and Transfer	Spent Fuel Pool O&M	ISFSI Operating Costs	Security Staff Cost	Utility Staff Cost	Insurance	Property taxes	NRC ISFSI Fees	Plant energy budget	Fixed Overhead	Railroad Track Maintenance	Total
2061	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2062	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2063	82	1,250	622	-	64	2,503	584	266	1,525	159	-	187	72	7,315
2064	82	1,250	833	-	65	2,510	586	267	1,529	160	-	188	72	7,541
2065	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2066	82	1,250	622	-	64	2,503	584	266	1,525	159	-	187	72	7,315
2067	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2068	82	1,250	833	-	65	2,510	586	267	1,529	160	-	188	72	7,541
2069	82	1,250	622	-	64	2,503	584	266	1,525	159	-	187	72	7,315
2070	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2071	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2072	82	1,250	833	-	65	2,510	586	267	1,529	160	-	188	72	7,541
2073	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2074	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2075	82	1,250	2,268	-	64	2,503	584	266	1,525	159	-	187	72	8,962
2076	82	1,250	833	-	65	2,510	586	267	1,529	160	-	188	72	7,541
2077	82	1,250	815	-	62	2,414	563	257	1,471	158	-	181	69	7,321
2078	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2079	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2080	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2081	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2082	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2083	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2084	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2085	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2086	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2087	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2088	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2089	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2090	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2091	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	14,397	55,496	89,952	2,537	2,857	98,037	22,872	9,459	58,753	5,897	395	7,436	2,817	370,904

From Schedule A.10_Prairie Island 1 60-year for DECON Spent Fuel Cash Flows 370,904

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	Prairie Island Unit 2													
	Emergency Planning Fees	PIIC Payments	Spent Fuel Capital and Transfer	Spent Fuel Pool O&M	ISFSI Operating Costs	Security Staff Cost	Utility Staff Cost	Insurance	Property taxes	NRC ISFSI Fees	Plant energy budget	Fixed Overhead	Railroad Track Maintenance	Total
2030	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2031	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2032	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2033	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2034	413	220	275	84	11	-	-	-	-	-	-	-	-	1,003
2035	2,392	1,250	1,422	486	64	-	-	-	-	-	-	-	-	5,613
2036	2,163	1,250	5,012	487	65	-	-	-	-	-	-	-	-	8,977
2037	2,044	1,250	18,653	486	64	-	-	-	-	-	-	-	-	22,497
2038	1,705	1,250	43,645	402	64	432	101	-	-	-	-	-	-	47,600
2039	82	1,250	(1)	-	64	2,504	585	-	-	-	-	-	-	4,484
2040	82	1,250	11	-	65	2,510	586	-	1,397	73	121	238	80	6,412
2041	82	1,250	(1)	-	64	2,503	583	-	2,161	113	186	368	124	7,435
2042	82	1,250	(3)	-	64	2,503	584	140	1,827	137	88	273	97	7,042
2043	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2044	82	1,250	3	-	65	2,510	586	267	1,529	160	-	188	72	6,711
2045	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2046	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2047	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2048	82	1,250	3	-	65	2,510	586	267	1,529	160	-	188	72	6,711
2049	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2050	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2051	82	1,250	(1)	-	64	2,503	584	266	1,525	159	-	187	72	6,692
2052	82	1,250	3	-	65	2,510	586	267	1,529	160	-	188	72	6,711
2053	82	1,250	414	-	64	2,503	584	266	1,525	159	-	187	72	7,107
2054	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2055	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2056	82	1,250	1,040	-	65	2,510	586	267	1,529	160	-	188	72	7,749
2057	82	1,250	622	-	64	2,503	584	266	1,525	159	-	187	72	7,315
2058	82	1,250	1,245	-	64	2,503	584	266	1,525	159	-	187	72	7,938
2059	82	1,250	622	-	64	2,503	584	266	1,525	159	-	187	72	7,315
2060	82	1,250	418	-	65	2,510	586	267	1,529	160	-	188	72	7,126

Xcel Energy
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	Prairie Island Unit 2													
	Emergency Planning Fees	PIIC Payments	Spent Fuel Capital and Transfer	Spent Fuel Pool O&M	ISFSI Operating Costs	Security Staff Cost	Utility Staff Cost	Insurance	Property taxes	NRC ISFSI Fees	Plant energy budget	Fixed Overhead	Railroad Track Maintenance	Total
2061	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2062	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2063	82	1,250	622	-	64	2,503	584	266	1,525	159	-	187	72	7,315
2064	82	1,250	833	-	65	2,510	586	267	1,529	160	-	188	72	7,541
2065	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2066	82	1,250	622	-	64	2,503	584	266	1,525	159	-	187	72	7,315
2067	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2068	82	1,250	833	-	65	2,510	586	267	1,529	160	-	188	72	7,541
2069	82	1,250	622	-	64	2,503	584	266	1,525	159	-	187	72	7,315
2070	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2071	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2072	82	1,250	833	-	65	2,510	586	267	1,529	160	-	188	72	7,541
2073	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2074	82	1,250	829	-	64	2,503	584	266	1,525	159	-	187	72	7,523
2075	82	1,250	2,268	-	64	2,503	584	266	1,525	159	-	187	72	8,962
2076	82	1,250	833	-	65	2,510	586	267	1,529	160	-	188	72	7,541
2077	82	1,250	815	-	62	2,414	563	257	1,471	158	-	181	69	7,321
2078	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2079	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2080	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2081	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2082	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2083	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2084	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2085	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2086	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2087	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2088	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2089	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2090	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2091	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	11,899	53,970	89,952	1,944	2,778	98,037	22,872	9,459	58,753	5,897	395	7,436	2,817	366,208

From Schedule A.10_Prairie Island 2 60-year for DECON Spent Fuel Cash Flows 366,208

Introduction

The escalation rate for decommissioning costs is an important element in determining the appropriate investment strategy, funding contributions, and the computation of the annual nuclear decommissioning external sinking fund accrual. This rate is used to inflate the 2020 decommissioning cost estimate out to the time that expenditures are predicted to occur. Since the decommissioning costs were provided by TLG in 2020 dollars (i.e., they are real costs), the escalation rate considers only the projected increases in costs from 2020 out to the estimated years of the final decommissioning expenditures. To arrive at these projections, long-range inflation and escalation assumptions are independently provided by Goldman Sachs Asset Management (GSAM).

Economic Forecast

The trend projection used for escalation is a baseline scenario based on a steady long-term real Gross Domestic Product (GDP) growth of 2.0 percent. The projection assumes that the economy suffers no major long-term mishaps, but grows smoothly, in the sense that actual output follows potential output relatively closely. This projection is best described as depicting the assumed mean of all possible paths that the economy could follow in the absence of major long-term disruptions. Such disruptions include large oil price shocks, untoward and persistent swings in macroeconomic policy, major international crises or excessively rapid increases in demand. The trend projection can be considered an unbiased reflection of the future performance of the economy. The real GDP forecast of 2.0 percent is slightly below the 3.1 percent average since 1947.

For the 60-Year Scenario, the 2020 decommissioning cost for Monticello and Prairie Island generating plants depict an overall expenditure period from 2033 to 2078 for the Prairie Island plant and from 2030 to 2091 for the Monticello plant. The expenditure pattern for this scenario requires the estimation of an escalation rate to 2091.

Inflation Factors

Inflation is the decrease in the purchasing power of money or the increase in the prices of goods and services. However, decommissioning is a unique combination of functions with many operations that are not performed often in

industry, and it may be more consistent to use a decommissioning-specific inflation factor rather than a general rate of inflation.

GSAM has refined the analysis surrounding the calculation of the escalation rate and believes its methodology provides an appropriate estimate. TLG provides a detailed decommissioning cost estimate that is site specific for the units at Monticello and Prairie Island. These site-specific decommissioning cost components need only be linked with appropriate escalation.

Escalation is broken down into two components: inflation and non-inflation escalation. Non-inflation escalation reflects idiosyncratic costs for decommissioning nuclear power plants, above and beyond the escalation associated with inflation.

The long-term escalation rates used in this analysis are as follows

Escalation Component	Trend Projection
Expected Inflation	1.58%
Non-inflation escalation (Non-labor costs)	1.00%
Total escalation (Non-labor costs)	**2.58%**
Non-inflation escalation (Labor costs)	2.20%
Total escalation (Labor costs)	**3.78%**

Long-term expected inflation is assumed to be 1.58 percent, which is estimated from the expected inflation implied in long-term US treasury rates. The long-term risk-free (treasury) rate is observed to be 1.41 percent and the observed long-term Treasury Inflation Protected Securities (TIPS) yield (proxy for assuming the long-term real rate of interest) is -0.16 percent. These imply expected inflation of 1.58 percent as the market cost to offset inflation. Non-inflation escalation is assumed to be 1.00 percent for non-labor costs, but 2.20% for labor costs.

The overall escalation rates in the above table should be compared with the 4.05% rate for labor and 2.85% for non-labor in the 2017 analysis, 4.36 percent escalation rate in the 2014 analysis, 3.63 percent escalation rate in the 2011 analysis and the escalation rate of 2.89 percent from the 2008 analysis.

Decommissioning Cost Breakdown and Escalation

GSAM related the calculation of the escalation rate to the detailed cost categories provided by TLG. The TLG cost estimates are divided into five

components or categories: labor, equipment & materials, energy, LLRW disposal, and other. GSAM began its forecast by separating labor from the other four categories of costs.

Inflation is the general increase in all prices across the economy. If all costs in every industry were analyzed, in aggregate they must increase by inflation. Therefore, an assumption of costs growing by more than inflation requires that other costs somewhere are growing less. We assume that the non-labor parts of the decommissioning costs grow at one percent more than inflation. In general, this increase would constitute a conservative assumption. However, given regulatory uncertainty and the complexities of forecasting technical change, the assumption that other costs grow faster than inflation seems reasonable. Historically, the escalation of nuclear decommissioning costs based on NRC filings and on engineer reports as reported in the Callan study[1] appears to have been substantially greater than inflation. Median escalation rates for all plants reviewed as part of the study are currently 3.24%.

According to economic theory, labor costs increase by inflation plus productivity (merit). We have assumed merit increases are 1.2 percent per year, consistent with a 2.00 percent long-term real GDP growth and an assumption that labor productivity accounts for 60 percent of GDP growth. Labor's share of GDP has varied since 1950 between 59 and 65 percent.

In the 2014 triennial filing, an average escalation rate was calculated and used to escalate all costs based on the percentage of costs coming from labor. In the 2017 triennial filing, the two different escalation rates were applied to labor and non-labor costs separately, which should be more precise than the previous approach. The 2017 and the 2020 triennial filings contain an additional third category for the Prairie Island Indian Community (PIIC) payments because they are determined by a settlement agreement that does not contain a provision for escalation beyond their current nominal amounts. These Labor, Non-Labor, and PIIC groups of cash flows are shown separately on Schedule F for the 2020 filing based upon the respective escalation rate applied.

Application of the Escalation Rate

A critical aspect of the valuation procedure is to ensure that assumptions are consistent between asset and liability growth. The analysis assumes that:

[1] Callan 2019 Nuclear Decommissioning Funding Study

Expected cost (liability) growth	=	inflation + non-inflation escalation
Expected pre-tax asset returns	=	inflation + real interest rate + risk premium

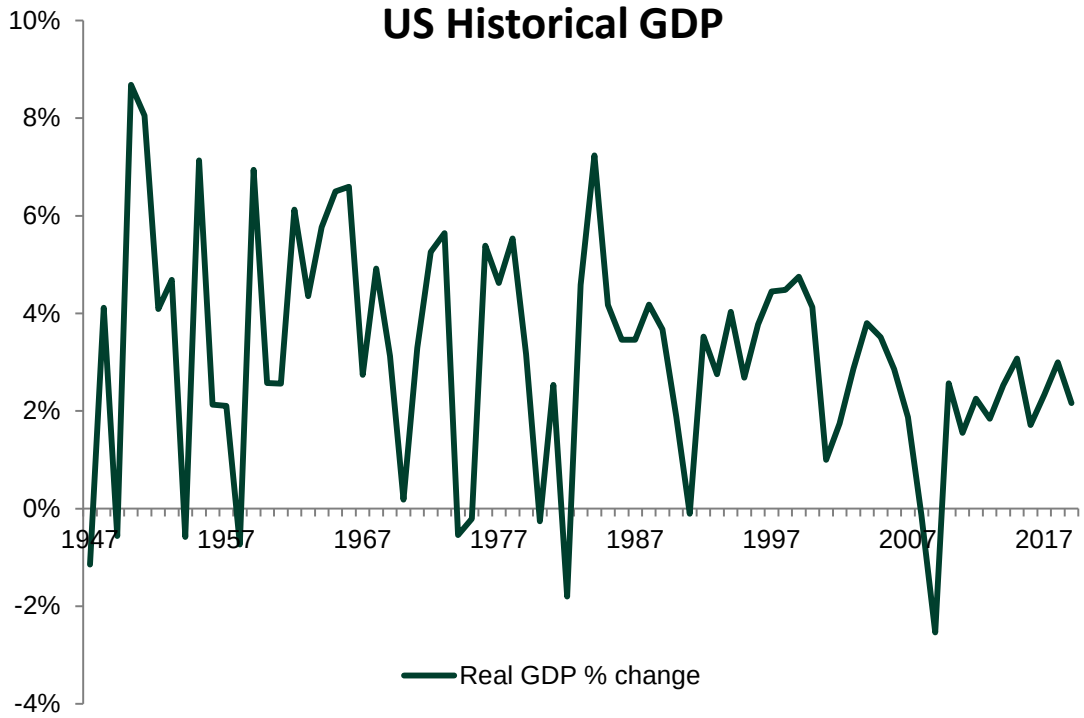
Note that inflation increases both pre-tax asset returns and decommissioning costs (i.e., the liability) equally. Thus, in the absence of taxes, inflation would be neutral to the valuation, which is consistent with economic theory based on real liability cash flows. The introduction of taxes, however, changes the analysis somewhat. Taxation means that lower inflation helps improve funded status, as the reduction in liability escalation will exceed the reduction in the after-tax asset return.

The other variables, however, have major implications for the analysis, since they are not offset in the same way as inflation. In general, the most important variables are non-inflation escalation, the real rate of interest, and the risk premium associated with the growth portfolio assets.

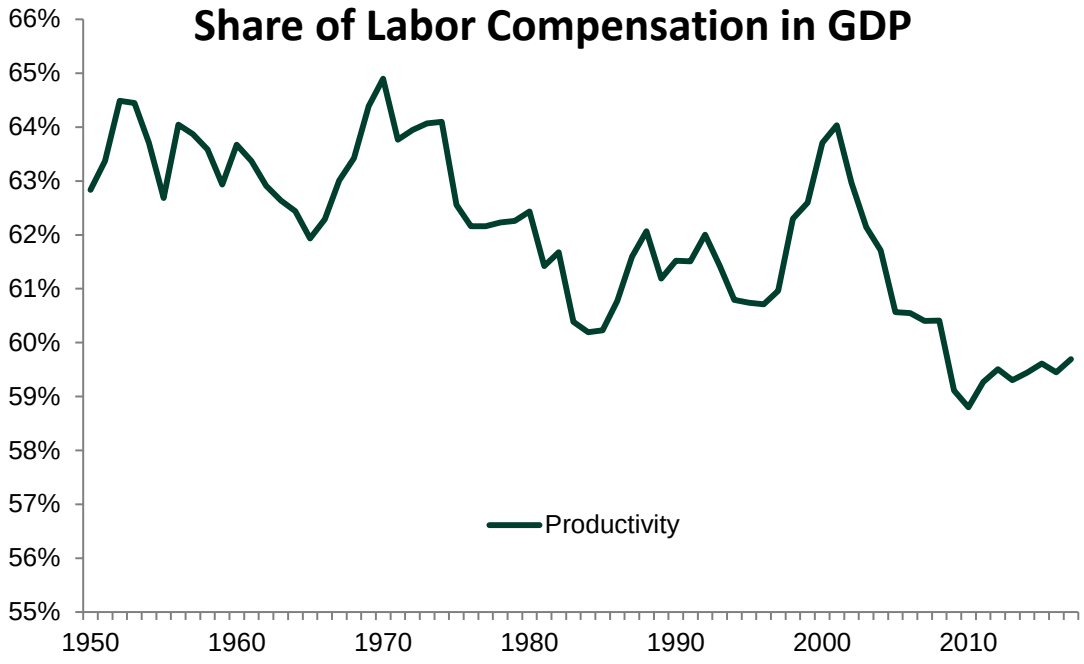
Historical Real GDP and Labor Productivity

In order to provide some context for the escalation assumptions presented above, below we present charts of historical real GDP and labor productivity for the US economy.

Analysis indicates that the real GDP growth assumption of 2.0 percent and labor share of GDP assumption of 60% are reasonable long-term forecasts.



Source: Bureau of Economic Analysis



Source: St. Louis Fed

Background

Per Commission Orders, beginning with Docket No. E002/D-86-604 and through subsequent dockets, the Company is required to review the financial parameters, the funding methodology, and cost estimate every three years. In between triennial filings, the Company submits an Informational Letter annually discussing NDT performance.

Since the nuclear power plants deliver power across state lines, each state is responsible for its share of the plants' ownership/use, and as such, its share of decommissioning cost. Based upon the demand of Minnesota Retail customers, Xcel Energy estimates that Minnesota's usage of the plants is 72.9219 percent. However, the engineering reports and asset-liability analysis, which use the engineering reports, do not distinguish between jurisdictions. Likewise, the analyses referred to in this schedule are performed on a total plant basis, and the figures are allocated to Minnesota by multiplying figures by 72.9219 percent.

There are references in this schedule to both the total across all jurisdictions (Total Company) and the MN Jurisdiction for various figures. References to the MN jurisdiction generally correspond to the Total Company multiplied by 72.9219 percent.

Recent Portfolio Updates

As discussed in previous triennial dockets, the Company's NDT Committee routinely evaluates both the NDT's performance and the overall investment strategy for the NDT (including its asset allocation), and it revises both the strategy and allocation as necessary.

Since the 2017 triennial filing no asset classes have been removed or added, however small adjustments to the weights of the portfolio have changed somewhat as a result of updates to capital market assumptions and forward looking expectations. The main changes since 2017 have been an increased weight in US equities, decreased weight in non-US equities, increase in investment grade fixed income and decrease in high yield and emerging market debt. We believe these updates have helped the portfolio performance, particularly during 2020. Xcel's private investments have been some of the best performing asset classes for the portfolio, and we expanded the target to private real estate since we expect to make further commitments there.

The 2017 and updated 2020 target asset allocations are included below for comparison:

Portfolio Line Item	2017 Target	2020 Target
Total Equity	60.0%	58.0%
Private Equity	10.0%	10.0%
US All Cap Equity	25.8%	27.9%
Non-US Developed Equity	14.1%	12.6%
Emerging Markets Equity	10.1%	7.5%
Fixed Income	30.0%	30.0%
Investment Grade Fixed Income	12.1%	19.0%
High Yield Fixed Income	10.0%	5.0%
Emerging Market Debt	7.9%	6.0%
Private Real Estate	10.0%	12.0%
Cash	0.0%	0.0%
Overall fund benchmark:	**100.0%**	**100.0%**

Trustee

BNY Mellon is the trustee for Xcel Energy's three external nuclear decommissioning Qualified Trusts (in aggregate the NDT). The primary duty of the trustee is the safe custody of its assets including handling the settlement of all purchases and sales, whether placed by the trustee or by an independent investment manager. The trustee has limited investment duties other than the responsibility for keeping cash balances temporarily invested. Other duties include paying income taxes on the earnings of the Qualified Trusts, paying invoices for services for the trust and investment managers, conducting investment performance reporting, and keeping accurate records of all of its activities with respect to the Qualified Trusts.

Investment Managers

Following regulatory approval of the life extension of the Monticello and Prairie Island nuclear generating plants, the Xcel Energy's NDT portfolio was updated to reflect a longer time horizon and a more diversified, higher risk, long-term investment strategy.

Since the 2017 triennial filing, the manager line-up was updated as a result of a change in emerging market equity managers, but has otherwise remained

consistent. The portfolio includes nine investment managers covering eight asset categories. Those asset managers and mandates include:

1. StepStone Group manages the private equity component of the portfolio.
2. Parametric Portfolio Advisors, a subsidiary of Eaton Vance Management, manages the U.S. equity component of the portfolio, and a portion of the non-U.S. developed market equity component of the portfolio. Parametric utilizes tax-efficient strategies with respect to the whole trust.
3. Axiom Investors manages a portion of the emerging market equity component of the portfolio.
4. Marathon International manages a portion of the non-U.S. developed market equity component of the portfolio
5. First Principles Capital Management manages the domestic investment grade fixed income component of the portfolio.
6. Eaton Vance Management manages the high yield fixed income component of the portfolio.
7. Wellington Management Company manages a portion of the emerging market equity and emerging markets fixed income components of the portfolio.
8. Marathon Asset Management manages a portion of the emerging markets fixed income component of the portfolio.
9. The Townsend Group manages the private real estate component of the portfolio.

Although the trusts are not subject to the Employee Retirement Income Security Act (ERISA), the company uses fiduciary standards similar to those imposed by ERISA for the management of the Trusts. A fiduciary as defined by the ERISA is any person who:

1. Exercises any discretionary control over the management of a plan or the management or disposition of its assets;
2. Renders investment advice for a fee with respect to the funds or property of a plan or has the authority to do so; or
3. Has any discretionary authority or responsibility in the administration of a plan.

Although Xcel Energy has established the general guidelines in the investment advisory contracts, the Company does not direct the purchase of individual investments. The investment managers, however, being fiduciaries to the NDT, must act in the best interests of the NDT.

Earnings Evaluation

When making comparisons between market value and book value (original cost), the current market value of the Qualified Trusts less an allowance for assumed taxes is used because it represents the value of the securities if they were sold today. For accounting purposes, Xcel Energy records the actual purchase price of the investments. Quarterly, a market value adjustment journal entry is made to book any unrealized gains or losses to special regulatory accounts per SFAS No. 115, Accounting for Certain Investments in Debt and Equity Securities (ASC 320 *Investments-Debt and Equity Securities*). The difference between market and book values represents the unrealized gains or losses. In addition, it should be noted that trustee fees, investment management fees, and income taxes also are paid from the Qualified Trusts, thereby impacting overall fund performance.

The trustee statements for the Qualified Trusts are a part of Schedule E and show the current holdings for the Qualified Trusts by operating unit and investment manager.

Benchmark Portfolio Performance

It is standard practice in the investment industry to measure the performance of a diversified portfolio, like the NDT, by identifying benchmarks that are representative of each asset class comprising the portfolio, and then to benchmark the total portfolio to the weighted sum of the individual benchmarks.

The updated 2020 target asset allocation and associated benchmarks are included below:

Portfolio Line Item	2020 Target	Benchmark (BM)
Total Equity	58.0%	Weighted average of equity BMs:
Private Equity	10.0%	Cambridge PE (1Q lagged)
US All Cap Equity	27.9%	Russell 3000
Non-US Developed Equity	12.6%	MSCI EAFE ND
Emerging Markets Equity	7.5%	MSCI EM ND
Fixed Income	30.0%	Weighted average of fixed income BMs:
Investment Grade Fixed Income	19.0%	75% Barclays Investment Grade Corporate Index, 25% Barclays U.S. TIPS 10+ year Index
High Yield Fixed Income	5.0%	BofA ML US High Yield
Emerging Market Debt	6.0%	JPM EM Bond Index GD
Private Real Estate	12.0%	NCREIF - ODCE (1Q lagged)
Cash	0.0%	Fed funds effective
Overall fund benchmark:	**100.0%**	**Weighted average of all portfolio BMs**

The focus of performance evaluation for the NDT should be at the overall fund benchmark level, given the portfolio is composed of several investment managers and assets classes that are designed to work together on the whole. The overall fund benchmark is comprised of the actual weights of each individual asset class benchmark as shown in the table above.

Both the performance of Xcel Energy's NDT asset portfolio and the performance of the weighted average overall fund benchmark are calculated by the trustee - an independent third party. Since benchmarks will be changed or updated over time, Xcel Energy will update the Commission with respect to future modifications as they become necessary.

Analytical Method

There are two principal components to determining the overall strategy for the NDT:

1. Investment strategy (*i.e.,* the composition of the investment portfolio); and
2. Contributions strategy, (*i.e.,* the annual annuity payment amount required to fund the decommissioning costs).

First, the liability is calculated based on the projected decommissioning costs and the projected escalation of these costs through time. The valuation of the liability involves the following steps:

i. obtaining the current decommissioning costs from TLG in real dollars;
ii. escalation of the real decommissioning cash flows to account for realized and expected future inflation and non-inflation escalation; and
iii. calculation of the present value of the escalated cash flows back to the valuation date, using the expected return on assets as the discount rate. For this analysis, the valuation date is June 30, 2020.

Second, the projected liability is compared to the projected value of the assets (investments) net of an allowance for taxes of the NDT.

Method – Determining Investment Strategy

In light of the benefits of the Energy Policy Act of 1992 for nuclear decommissioning trust investment management, the Company has established a nuclear decommissioning investment policy with the goal to maximize after-tax portfolio returns and minimize aggregate portfolio risk for external fund investing. This policy was approved in the 1993 filing. Accomplishing this goal requires finding the combination of assets that optimizes the after-tax risk/return characteristics of the fund which leads to full funding in the expected case when taken in combination with the solved contributions.

GSAM was engaged by the Company to recommend an appropriate investment strategy for trust assets intended for the eventual decommissioning of the Prairie Island and Monticello nuclear generating plants.

This process is called asset allocation optimization. Different mixes of assets can produce hundreds, or even thousands, of alternative combinations of risk and returns. As a result, asset allocation techniques have been developed to evaluate the various possible asset mixes and determine those combinations that are likely to deliver optimal performance in terms of risk and return.

This process has been used to perform a long-term optimization of the asset allocation for the Company's investments. In any investment there is always a trade-off between risk and the expected rate of return on that investment. Typically, strategies with higher expected returns also come with higher risk and vice versa. The goal is to optimize the trade-off between risk and return over the long term. If on the one hand too little risk is taken, then there is a significant chance that the trust remains underfunded, necessitating very large contributions into the trust in later years. If on the other hand too much risk is taken, there is a risk of significant underfunding of the NDT in the future, or of overfunding of the NDT, which because of the difficulty of removing assets from the Qualified Trust is also undesirable.

Method – Determining Contributions

Contributions are calculated in terms of the annual annuity payment amounts required to fund the difference between liabilities (the present value of decommissioning cash flows) and the projected asset level at the start of decommissioning.

The projected asset level in the future is calculated by applying the expected asset returns at any point in time to the pool of assets.

In the analysis, the liabilities are calculated as the present value of all the decommissioning costs. The present value is calculated in a two-stage process by:

1. Escalating the real decommissioning cash flows by the escalation factors discussed in Schedule C.
2. Discounting the escalated cash flows using the expected after-tax return on the asset portfolio.

As a result, the present value of the liabilities will depend on the escalation of the decommissioning costs and the expected return of the chosen investment portfolio. Because inflation impacts both the escalation of cash flows and the pre-tax discount rate, it only has a small impact on the value of the liabilities from the tax effects of changed inflation assumptions.

A measure of the degree to which assets will be able to meet the decommissioning cost liabilities is the funded status which is the ratio of the value of assets net of assumed taxes to the value of liabilities, expressed as a percentage.

Assumptions – Overview

The assumption set that goes into the process involves three different types of assumptions which are developed in a consistent manner:

- *Investment assumptions.* These include long-term expected returns, volatilities (standard deviations of returns) and correlations for different types of assets.
- *Other economic assumptions.* These include assumptions for the long-term inflation rate and the long-term escalation of decommissioning costs.
- *Tax assumptions.* These include assumptions for state and federal tax rates and deductibility.

Investment and Economic Assumptions

The development of consistent investment assumptions goes hand-in-hand with the development of other economic assumptions about inflation, interest rates, GDP growth, etc.

The return assumptions for each type of asset represent expected market returns for that asset class on a forward-looking basis. The assumptions reflect a blend of rigorous analysis of historical performance and the forward-looking views of the financial markets, as revealed through the yields on long term bonds, the price-earnings ratios of the major stock market indices, implied inflation expectations in TIPS, etc.

This methodology will produce more conservative expected rates of return than an analysis that looks simply at historical averages. The important distinction is that, in using this methodology, the expected asset return is tied to the inflation rate and overall risk-free rates, so at lower inflation and interest rates investors require lower rates of return. Current markets indicate much lower expected inflation over even long-term horizons than historical averages.

The inflation rate used for expected returns is matched to the inflation rate used for liability growth, enforcing the consistency of asset and liability assumptions.

Expected asset returns (on a pre-tax basis) are developed via a building-block approach that starts with the expected long-term real interest rate and expected long-term inflation. Together these two define the expected long-term nominal risk-free interest rate. Expected returns for different assets are then determined by adding appropriate risk premiums to this. In other words, we have the following relationship:

Expected net-of-fee, pre-tax asset return	=	inflation + real interest rate + risk premium - fees

The next step in the assumption setting process involves an analysis of historical risks and correlations of asset class returns to which subjective judgment is applied. The result of this analysis is incorporated into a risk matrix from which expected long-term risk premiums are estimated for each asset class.

The long-term nominal return expectations are then determined by combining the asset class risk premiums with expected inflation and real risk-free rate assumptions. As a final consideration, the nominal return assumptions are blended with current market conditions to develop long-term equilibrium expectations. The return and risk expectations for each asset class incorporate assumptions about historical return relationships, current financial market conditions and the degree of global capital market integration.

The assumptions pertaining to the volatility of investment returns are based on observed experience and calculated in terms of the standard deviation of historical asset returns.

The following table shows the expected return and volatility assumption inputs:

Xcel Energy
Portfolio Analysis

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Long-term Investment Assumptions for 2020 – Qualified Trust

	Expected pre-tax		Expected after-tax	
Asset class	**Arithmetic return**	**Volatility**	**Arithmetic return**	**Volatility**
US All Cap Equity (Passive)	6.53%	15.23%	4.71%	10.99%
EAFE Equity (Passive)	6.85%	15.63%	4.95%	11.28%
EAFE Equity (Active)	7.03%	16.01%	5.07%	11.55%
EM Equity	9.43%	21.28%	6.81%	15.35%
IG Fixed Income (10+ yr TIPS constant maturity)	3.55%	10.72%	2.84%	8.58%
US Corporate Fixed Income	2.77%	5.27%	2.00%	3.80%
High Yield Debt	3.95%	9.13%	2.85%	6.59%
EM Debt	4.39%	9.81%	3.17%	7.08%
Private Equity	10.13%	22.70%	7.31%	16.38%
Private Real Estate	6.96%	19.10%	5.02%	13.78%

These expected return assumptions are based on an assumed long-term risk-free rate of 1.412%, consisting of a -0.164% real asset return and expected inflation of 1.576%, (rounded to 1.58%) based on market bond rates.

The correlations between the investment returns of different asset classes are important characteristics, in addition to the expected returns and the volatility of returns. Recent and long-term historical data are used as a guide to setting these parameters. The table below shows the correlations between asset returns used in the analysis.

Long-Term Investment Return Correlations for 2020

	Asset class	1	2	3	4	5	6	7	8	9	10
1	US All Cap Equity (Passive)	1.00	0.85	0.83	0.71	0.17	0.34	0.63	0.46	0.86	0.53
2	EAFE Equity (Passive)	0.85	1.00	0.98	0.81	0.17	0.38	0.65	0.51	0.74	0.49
3	EAFE Equity (Active)	0.83	0.98	1.00	0.80	0.17	0.37	0.63	0.49	0.72	0.48
4	EM Equity	0.71	0.81	0.80	1.00	0.21	0.37	0.58	0.48	0.62	0.39
5	IG Fixed Income (10+ yr TIPS constant maturity)	0.17	0.17	0.17	0.21	1.00	0.67	0.18	0.42	0.12	0.28
6	US Corporate Fixed Income	0.34	0.38	0.37	0.37	0.67	1.00	0.54	0.61	0.26	0.42
7	High Yield Debt	0.63	0.65	0.63	0.58	0.18	0.54	1.00	0.61	0.50	0.49
8	EM Debt	0.46	0.51	0.49	0.48	0.42	0.61	0.61	1.00	0.38	0.39
9	Private Equity	0.86	0.74	0.72	0.62	0.12	0.26	0.50	0.38	1.00	0.50
10	Private Real Estate	0.53	0.49	0.48	0.39	0.28	0.42	0.49	0.39	0.50	1.00

Taxation Assumptions

The taxation assumptions, along with the investment and other economic assumptions are important inputs for both the asset allocation portion, and the overall analysis performed. The following table shows the applicable tax rates for the Qualified Trust.

Municipal bonds are assumed to be free of federal taxes. Therefore, only state taxes are imposed. In practice, some municipal bonds will be exempt from state taxes also, specifically municipal bonds issued by Minnesota, but these are assumed to be a small percentage of the portfolio.

Treasury bonds are exempt from state taxes. Therefore, treasuries are taxed only at the federal rate and not at the state tax rate.

The Company's view is that US stocks in the Qualified Trust do not earn a dividends' received deduction, therefore stock returns are assumed to be fully taxed.

Tax Element	Tax Rate
Federal tax rate for the qualified trust	20%
State tax on both the qualified trust and escrow account *Note: State taxes are deductible from federal taxes.*	9.8%

As a result, the total tax rates are (assuming that investments are fully taxed – this is modified for municipal bonds and treasuries):

Portfolio	Composite Tax Rate
Qualified Trust	27.84%*

*Calculation: 20% + 9.8% (1-20%)

These tax assumptions are incorporated into the after-tax expected returns in the table of investment assumptions above.

Results – Investment Strategy

The investment strategy is based on the use of an efficient risk-seeking portfolio (Growth Portfolio) for the majority of the investment period before decommissioning, and an efficient low-risk portfolio for the period just before decommissioning. The mix is determined by the following rule:

> *Five years prior to each decommissioning cash flow, the portion of the growth assets that are required to make that payment is reallocated into bonds.*

This strategy is efficient from an asset-liability management perspective in order to reduce the risk that market volatility significantly reduces the value of this portion of the assets just when they are needed to make payments.

A period of five years is needed for assets to earn their long-term rate of return with some degree of confidence. As discussed above, year to year variation can be very large for high returning assets, and five years is needed to justify long-term assumptions. Therefore, as decommissioning payments come due at less than five years, the assumption is that the funds are switched to bonds. Further details related to the selection of a five-year bond conversion period are described below.

Analysis of Bond Holding Period

Our analysis assumes that the funds are invested in bonds as a cash outlay is approached. For each expected annual outflow cash flow, assets are converted to bonds ahead of time to give more certainty to the ability to make the payment. It is important to recognize that not all funds are converted to bonds – only enough to cover each annual cash outflow. For example, if the conversion is at a five-year period, the first outflows expected in 2030 are converted to bonds in 2025; then in 2026, enough cash is converted to bonds to match the 2031 expected outflow. This is the same methodology that was used in the 2017 Filing.

Rates of Return

Note that the portion of the portfolio assigned to growth assets changes over time based on how large expected decommissioning payments will be over the next five years. The updated target asset allocation for the growth assets are shown in the table below:

Portfolio Line Item	2020 Target	Benchmark (BM)
Total Equity	58.0%	Weighted average of equity BMs:
Private Equity	10.0%	Cambridge PE (1Q lagged)
US All Cap Equity	27.9%	Russell 3000
Non-US Developed Equity	12.6%	MSCI EAFE ND
Emerging Markets Equity	7.5%	MSCI EM ND
Fixed Income	30.0%	Weighted average of fixed income BMs:
Investment Grade Fixed Income	19.0%	75% Barclays Investment Grade Corporate Index, 25% Barclays U.S. TIPS 10+ year Index
High Yield Fixed Income	5.0%	BofA ML US High Yield
Emerging Market Debt	6.0%	JPM EM Bond Index GD
Private Real Estate	12.0%	NCREIF - ODCE (1Q lagged)
Cash	0.0%	Fed funds effective
Overall fund benchmark:	**100.0%**	**Weighted average of all portfolio BMs**

Potential Growth Portfolios are the portfolios of assets that earn an expected rate of return with the lowest risk and the actual choice of the growth portfolio is based on setting the level of risk or return desired. Please note even the growth portion of the portfolio includes some bonds to provide diversification and efficiency. The 'growth portion' is not the same as the investment in equities.

The overall expected portfolio returns and volatilities for each plant's Qualified Trust are given in the table below:

Expected Returns for the Updated Strategy

	60-Year Scenario	
Nuclear Unit	**Operations**	**Decom.**
Monticello	3.80%	3.10%
Prairie Island Unit 1	4.01%	2.80%
Prairie Island Unit 2	3.98%	2.72%

To arrive at the rates of return listed in the table above, the analysis uses different rates of return for bonds and the NDT Growth Portfolio; and the weights assigned to these portfolios change through time. Therefore, expected combined rates of return vary through time; the expected rates included are Single Effective Rates, which are weighted average rates. This expected rate leads to the same final funding level if applied to each of these components that would be obtained by using the actual expected rates.

Conclusion

The analysis presented in this Schedule addresses the decisions relating to investment strategy, and contribution strategy.

In terms of investment strategy, GSAM's analysis has led to a recommended asset allocation for the growth portion of the assets that involves equities, fixed income and alternative assets. The portion of the assets required to meet each decommissioning payment is switched from growth assets into bonds five years prior to that payment.

Schedule E contains the documents required by the Commission to be filed with every submittal. Annually, the Company submits a compliance filing in April. These compliance filings include the Qualified Trust fund activity for the prior year. For example, the 2020 compliance filing made in Docket No. E002/M-17-828 included the Qualified Trust fund activity for 2019. Therefore, this filing only includes the activity for the Qualified Trust since the last compliance filing. The 2020 activity documents the roll forward of the Qualified Trust balances from January 1, 2020 through June 30, 2020.

The June 30, 2020 Qualified Trust balances for the two wholesale jurisdictions have been included in Schedule D.8 as these balances were used to assign 73.4886 percent to the beginning balance used in the accrual calculations. Below is a list of the schedules included.

Qualified Trust Analysis, Statements and Balances Supporting Schedules

D.1	Analysis of Qualified Trust Balances –January - June 2020
D.2	Trustee Statements – Qualified Trust, Monticello (All Managers, MN Jurisdiction)
D.3	Trustee Statements – Qualified Trust, Monticello (By Manager, Total Company)
D.4	Trustee Statements – Qualified Trust, Prairie Island Unit 1 (All Managers, MN Jurisdiction)
D.5	Trustee Statements – Qualified Trust, Prairie Island Unit 1 (By Manager, Total Company)
D.6	Trustee Statements – Qualified Trust, Prairie Island Unit 2 (All Managers, MN Jurisdiction)
D.7	Trustee Statements – Qualified Trust, Prairie Island Unit 2 (By Manager, Total Company)
D.8	June 30, 2020 Trustee Statements – Qualified Trust, MN and WI Wholesale, All Units

Xcel Energy
Qualified Trust Analysis, Statements and Balances
2020 Minnesota Jurisdiction Balance

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	Beginning Book Balance	Accruals	Gains & Losses	Dividends & Interest	Commissions, Taxes & Fees	Transfers & Adjustments	Ending Book Balance Jun. 30, 2020	Unrealized Gain/(Loss) Jun. 30, 2020	Ending Market Balance Jun. 30, 2020
Qualified Trust									
Prairie Island Unit 1	330,055,759	24,632	571,063	4,727,627	483,871	-	335,862,951	122,482,936	458,345,888
Prairie Island Unit 2	369,069,095	294,670	244,587	5,201,798	947,376	-	375,757,525	136,819,911	512,577,436
Monticello	582,627,195	6,696,114	(2,304,837)	7,878,014	(147,156)	-	594,749,330	199,027,932	793,777,262
Total	1,281,752,048	7,015,416	(1,489,188)	17,807,438	1,284,092	-	1,306,369,807	458,330,779	1,764,700,585

Xcel Energy
Qualified Trust Analysis, Statements and Balances
2020 FERC Jurisdiction Balance

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	Beginning Book Balance	Accruals	Gains & Losses	Dividends & Interest	Commissions, Taxes & Fees	Transfers & Adjustments	Ending Book Balance Jun. 30, 2020	Unrealized Gain/(Loss) Jun. 30, 2020	Ending Market Balance Jun. 30, 2020
FERC MN									
Qualified Trust									
Prairie Island Unit 1	8,112,332	-	14,392	119,143	12,195	-	8,258,063	3,292,582	11,550,645
Prairie Island Unit 2	7,528,546	-	5,006	106,379	19,388	-	7,659,319	2,819,569	10,478,888
Monticello	10,136,588	-	(42,183)	144,810	(2,558)	-	10,236,657	4,281,294	14,517,951
Total	25,777,466	-	(22,784)	370,333	29,025	-	26,154,039	10,393,445	36,547,484
FERC WI									
Qualified Trust									
Prairie Island Unit 1	6,416,304	-	8,872	73,443	7,518	-	6,506,136	613,978	7,120,114
Prairie Island Unit 2	6,060,873	-	3,955	84,044	15,317	-	6,164,189	2,114,524	8,278,713
Monticello	10,726,291	-	(42,252)	145,047	(2,562)	-	10,826,524	3,715,160	14,541,683
Total	23,203,468	-	(29,425)	302,533	20,272	-	23,496,849	6,443,661	29,940,511
						Total Wholesale	49,650,889	16,837,106	66,487,995
						MN Jurisdiction %	72.9219%	72.9219%	72.9219%
						Allocated to MN Jurisdiction	36,206,371	12,277,938	48,484,309

MN Jurisdiction Qualified Trust	458,330,779
Wlse Qualified Trust Allocated to MN Jurisdiction	470,608,717

Xcel Energy
Qualified Trust Analysis, Statements and Balances
2020 MN Adjusted Jurisdiction Balance

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	Beginning Balance	Accruals	Gains & Losses	Dividends & Interest	Commissions, Taxes & Fees	Transfers & Adjustments	Ending Book Balance Jun. 30, 2020	Unrealized Gain/(Loss) Jun. 30, 2020	Ending Market Balance Jun. 30, 2020
Qualified Trust									
Prairie Island Unit 1	340,650,317	24,632	588,027	4,868,064	498,246	-	346,629,286	125,331,674	471,960,960
Prairie Island Unit 2	378,978,757	294,670	251,122	5,340,658	972,683	-	385,837,890	140,417,945	526,255,835
Monticello	597,840,802	6,696,114	(2,366,408)	8,089,383	(150,890)	-	610,109,002	204,859,098	814,968,100
Total	1,317,469,876	7,015,416	(1,527,259)	18,298,105	1,320,040	-	1,342,576,178	470,608,717	1,813,184,895

Xcel Energy
Qualified Trust Analysis, Statements and Balances

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Schedule D.2
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BNY MELLON

Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

MONTICELLO-MINN - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
UNIT OF PARTICIPATION					
52,129,620.474 MONTICELLO QUALIFIED MTU 99VVAQUX7	15.23	594,749,329.88	793,777,261.79	100.00	199,027,931.91

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Status : FINAL

CASH MONTI - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
2,492,991.790 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	2,492,991.79	2,492,991.79	100.00	0.00

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BNY MELLON

Asset Detail - By Currency

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PARAMETRIC US MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
568,586.580 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	568,586.58	568,586.58	0.18	0.00
CASH		1,363.55	1,363.55	0.00	0.00
TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**569,950.13**	**569,950.13**	**0.18**	**0.00**
EQUITY					
9,209.000 ACCO BRANDS CORP 00081T108	7.10	53,751.48	65,383.90	0.02	11,632.42
422.000 ABM INDUSTRIES INC 000957100	36.30	9,646.92	15,318.60	0.00	5,671.68
8,068.000 AFLAC INC 001055102	36.03	229,312.36	290,690.04	0.09	61,377.68
762.000 AGCO CORP 001084102	55.46	30,154.04	42,260.52	0.01	12,106.48
9,187.000 AGNC INVESTMENT CORP 00123Q104	12.90	110,040.45	118,512.30	0.04	8,471.85
5,015.000 AES CORP/THE 00130H105	14.49	52,265.40	72,667.35	0.02	20,401.95

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Asset Detail - By Currency

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PARAMETRIC US MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
504.000 ASGN INC 00191U102	66.68	9,843.12	33,606.72	0.01	23,763.60
64,931.000 AT&T INC 00206R102	30.23	1,956,285.99	1,962,864.13	0.61	6,578.14
18,761.000 ABBOTT LABORATORIES 002824100	91.43	689,679.19	1,715,318.23	0.53	1,025,639.04
19,408.000 ABBVIE INC 00287Y109	98.18	816,789.50	1,905,477.44	0.59	1,088,687.94
735.000 ABIOMED INC 003654100	241.56	66,516.54	177,546.60	0.05	111,030.06
2,567.000 ACADIA HEALTHCARE CO INC 00404A109	25.12	58,281.03	64,483.04	0.02	6,202.01
1,787.000 ACADIA PHARMACEUTICALS INC 004225108	48.47	53,123.57	86,615.89	0.03	33,492.32
669.000 ACCELERON PHARMA INC 00434H108	95.27	61,240.26	63,735.63	0.02	2,495.37
1,185.000 ACI WORLDWIDE INC 004498101	26.99	15,102.21	31,983.15	0.01	16,880.94
8,019.000 ACTIVISION BLIZZARD INC 00507V109	75.90	255,361.77	608,642.10	0.19	353,280.33

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
397.000 ACUITY BRANDS INC 00508Y102	95.74	27,182.52	38,008.78	0.01	10,826.26
1,439.000 ADAPTIVE BIOTECHNOLOGIES CORP 00650F109	48.38	62,824.54	69,618.82	0.02	6,794.28
5,083.000 ADOBE INC 00724F101	435.31	365,930.33	2,212,680.73	0.68	1,846,750.40
1,775.000 ADTALEM GLOBAL EDUCATION INC 00737L103	31.15	42,493.50	55,291.25	0.02	12,797.75
1,295.000 ADVANCE AUTO PARTS INC 00751Y106	142.45	104,415.64	184,472.75	0.06	80,057.11
1,708.000 AECOM 00766T100	37.58	45,349.43	64,186.64	0.02	18,837.21
290.000 ADVANSIX INC 00773T101	11.74	1,983.74	3,404.60	0.00	1,420.86
13,652.000 ADVANCED MICRO DEVICES INC 007903107	52.61	32,082.20	718,231.72	0.22	686,149.52
1,712.000 ADVANCED DRAINAGE SYSTEMS INC 00790R104	49.40	59,116.59	84,572.80	0.03	25,456.21
1,109.000 ADVANCED ENERGY INDUSTRIES INC 007973100	67.79	57,562.65	75,179.11	0.02	17,616.46

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
890.000 AFFILIATED MANAGERS GROUP INC 008252108	74.56	56,390.22	66,358.40	0.02	9,968.18
3,468.000 AGILENT TECHNOLOGIES INC 00846U101	88.37	113,107.51	306,467.16	0.09	193,359.65
1,716.000 AGIOS PHARMACEUTICALS INC 00847X104	53.48	54,273.50	91,771.68	0.03	37,498.18
1,257.000 AGREE REALTY CORP 008492100	65.71	42,536.88	82,597.47	0.03	40,060.59
2,091.000 AIR PRODUCTS AND CHEMICALS INC 009158106	241.46	173,640.21	504,892.86	0.16	331,252.65
1,986.000 AKAMAI TECHNOLOGIES INC 00971T101	107.09	83,529.14	212,680.74	0.07	129,151.60
2,612.000 ALASKA AIR GROUP INC 011659109	36.26	72,175.66	94,711.12	0.03	22,535.46
220.000 ALBANY INTERNATIONAL CORP 012348108	58.71	5,442.80	12,916.20	0.00	7,473.40
884.000 ALBEMARLE CORP 012653101	77.21	49,357.70	68,253.64	0.02	18,895.94
7,416.000 ALCOA CORP 013872106	11.24	57,923.22	83,355.84	0.03	25,432.62

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,230.000	ALEXANDRIA REAL ESTATE EQUITIE 015271109	162.25	141,431.36	199,567.50	0.06	58,136.14
2,708.000	ALEXION PHARMACEUTICALS INC 015351109	112.24	207,036.72	303,945.92	0.09	96,909.20
819.000	ALIGN TECHNOLOGY INC 016255101	274.44	71,051.64	224,766.36	0.07	153,714.72
202.000	ALLEGHANY CORP 017175100	489.14	77,259.01	98,806.28	0.03	21,547.27
1,563.000	ALLIANCE DATA SYSTEMS CORP 018581108	45.12	56,073.24	70,522.56	0.02	14,449.32
2,636.000	ALLIANT ENERGY CORP 018802108	47.84	70,702.73	126,106.24	0.04	55,403.51
1,221.000	ALLISON TRANSMISSION HOLDINGS 01973R101	36.78	35,763.09	44,908.38	0.01	9,145.29
3,932.000	ALLSTATE CORP/THE 020002101	96.99	144,374.78	381,364.68	0.12	236,989.90
3,952.000	ALLY FINANCIAL INC 02005N100	19.83	63,098.68	78,368.16	0.02	15,269.48
1,152.000	ALNYLAM PHARMACEUTICALS INC 02043Q107	148.11	82,355.72	170,622.72	0.05	88,267.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,843.000 ALPHABET INC-CL C 02079K107	1,413.61	411,610.23	2,605,283.23	0.80	2,193,673.00
4,267.000 ALPHABET INC-CL A 02079K305	1,418.05	2,845,811.89	6,050,819.35	1.87	3,205,007.46
512.000 ALTERYX INC 02156B103	164.28	62,136.32	84,111.36	0.03	21,975.04
21,630.000 ALTRIA GROUP INC 02209S103	39.25	552,709.75	848,977.50	0.26	296,267.75
4,512.000 AMAZON.COM INC 023135106	2,758.82	2,808,740.79	12,447,795.84	3.84	9,639,055.05
323.000 AMEDISYS INC 023436108	198.54	55,065.04	64,128.42	0.02	9,063.38
242.000 AMERCO 023586100	302.19	57,812.33	73,129.98	0.02	15,317.65
2,584.000 AMEREN CORP 023608102	70.36	117,359.34	181,810.24	0.06	64,450.90
12,194.000 AMERICAN AIRLINES GROUP INC 02376R102	13.07	151,027.69	159,375.58	0.05	8,347.89
2,252.000 AMERICAN ASSETS TRUST INC 024013104	27.84	55,049.86	62,695.68	0.02	7,645.82

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6,549.000 AMERICAN ELECTRIC POWER CO INC 025537101	79.64	336,216.29	521,562.36	0.16	185,346.07
2,807.000 AMERICAN EQUITY INVESTMENT LIF 025676206	24.71	53,135.60	69,360.97	0.02	16,225.37
7,733.000 AMERICAN EXPRESS CO 025816109	95.20	522,609.41	736,181.60	0.23	213,572.19
1,708.000 AMERICAN FINANCIAL GROUP INC/O 025932104	63.46	73,145.52	108,389.68	0.03	35,244.16
4,525.000 AMERICAN HOMES 4 RENT 02665T306	26.90	71,030.84	121,722.50	0.04	50,691.66
9,287.000 AMERICAN INTERNATIONAL GROUP I 026874784	31.18	256,651.24	289,568.66	0.09	32,917.42
860.000 AMERICAN STATES WATER CO 029899101	78.63	34,907.40	67,621.80	0.02	32,714.40
4,255.000 AMERICAN TOWER CORP 03027X100	258.54	283,099.97	1,100,087.70	0.34	816,987.73
2,291.000 AMERICAN WATER WORKS CO INC 030420103	128.66	186,300.54	294,760.06	0.09	108,459.52
1,884.000 AMERICOLD REALTY TRUST 03064D108	36.30	59,322.74	68,389.20	0.02	9,066.46

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
19.000 AMERISAFE INC 03071H100	61.16	421.80	1,162.04	0.00	740.24
1,548.000 AMERISOURCEBERGEN CORP 03073E105	100.77	77,324.96	155,991.96	0.05	78,667.00
1,716.000 AMERIPRISE FINANCIAL INC 03076C106	150.04	80,214.18	257,468.64	0.08	177,254.46
2,927.000 AMETEK INC 031100100	89.37	117,246.66	261,585.99	0.08	144,339.33
6,259.000 AMGEN INC 031162100	235.86	455,245.50	1,476,247.74	0.46	1,021,002.24
6,310.000 AMICUS THERAPEUTICS INC 03152W109	15.08	52,346.45	95,154.80	0.03	42,808.35
3,839.000 AMPHENOL CORP 032095101	95.81	194,491.91	367,814.59	0.11	173,322.68
3,882.000 ANALOG DEVICES INC 032654105	122.64	260,813.90	476,088.48	0.15	215,274.58
1,562.000 ANAPLAN INC 03272L108	45.31	58,835.23	70,774.22	0.02	11,938.99
15,073.000 ANNALY CAPITAL MANAGEMENT INC 035710409	6.56	93,985.15	98,878.88	0.03	4,893.73

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
955.000 ANSYS INC 03662Q105	291.73	86,986.38	278,602.15	0.09	191,615.77
2,432.000 ANTHEM INC 036752103	262.98	224,533.02	639,567.36	0.20	415,034.34
1,655.000 APARTMENT INVESTMENT AND MANAG 03748R754	37.64	51,468.77	62,294.20	0.02	10,825.43
1,249.000 APOLLO GLOBAL MANAGEMENT INC 03768E105	49.92	66,170.77	62,350.08	0.02	-3,820.69
43,557.000 APPLE INC 037833100	364.80	1,303,849.02	15,889,593.60	4.90	14,585,744.58
337.000 APPLIED INDUSTRIAL TECHNOLOGIE 03820C105	62.39	11,522.03	21,025.43	0.01	9,503.40
11,981.000 APPLIED MATERIALS INC 038222105	60.45	181,133.38	724,251.45	0.22	543,118.07
672.000 APTARGROUP INC 038336103	111.98	38,910.28	75,250.56	0.02	36,340.28
2,636.000 ARAMARK 03852U106	22.57	59,987.18	59,494.52	0.02	-492.66
519.000 ARCBEST CORP 03937C105	26.51	10,037.46	13,758.69	0.00	3,721.23

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6,805.000 ARCHER-DANIELS-MIDLAND CO 039483102	39.90	216,964.82	271,519.50	0.08	54,554.68
1,732.000 ARES MANAGEMENT CORP 03990B101	39.70	52,423.98	68,760.40	0.02	16,336.42
1,160.000 ARENA PHARMACEUTICALS INC 040047607	62.95	48,870.00	73,022.00	0.02	24,152.00
573.000 ARISTA NETWORKS INC 040413106	210.03	42,579.63	120,347.19	0.04	77,767.56
804.000 ARMSTRONG WORLD INDUSTRIES INC 04247X102	77.96	57,395.46	62,679.84	0.02	5,284.38
1,924.000 ARROW ELECTRONICS INC 042735100	68.69	85,653.77	132,159.56	0.04	46,505.79
505.933 ARROW FINANCIAL CORP 042744102	29.73	9,761.14	15,041.39	0.00	5,280.25
1,607.000 ARROWHEAD PHARMACEUTICALS INC 04280A100	43.19	58,875.03	69,406.33	0.02	10,531.30
1,317.000 ARTESIAN RESOURCES CORP 043113208	36.29	40,051.95	47,793.93	0.01	7,741.98
683.000 ASHLAND GLOBAL HOLDINGS INC 044186104	69.10	18,811.39	47,195.30	0.01	28,383.91

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,040.000 ASPEN TECHNOLOGY INC 045327103	103.61	20,317.25	107,754.40	0.03	87,437.15
1,546.204 ASSOCIATED BANC-CORP 045487105	13.68	15,181.31	21,152.07	0.01	5,970.76
614.000 ASSURANT INC 04621X108	103.29	36,558.18	63,420.06	0.02	26,861.88
817.000 ATLANTIC UNION BANKSHARES CORP 04911A107	23.16	9,722.80	18,921.72	0.01	9,198.92
1,604.000 ATMOS ENERGY CORP 049560105	99.58	103,810.10	159,726.32	0.05	55,916.22
51.000 ATRION CORP 049904105	637.01	10,220.40	32,487.51	0.01	22,267.11
2,128.000 AUTODESK INC 052769106	239.19	109,944.88	508,996.32	0.16	399,051.44
2,939.000 AUTOMATIC DATA PROCESSING INC 053015103	148.89	147,707.41	437,587.71	0.13	289,880.30
1,723.000 AUTONATION INC 05329W102	37.58	56,528.35	64,750.34	0.02	8,221.99
274.000 AUTOZONE INC 053332102	1,128.12	172,252.84	309,104.88	0.10	136,852.04

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741.000 AVALARA INC 05338G106	133.09	58,303.44	98,619.69	0.03	40,316.25
1,469.000 AVALONBAY COMMUNITIES INC 053484101	154.64	227,193.19	227,166.16	0.07	-27.03
352.000 AVANOS MEDICAL INC 05350V106	29.39	7,654.28	10,345.28	0.00	2,691.00
1,988.000 AVANGRID INC 05351W103	41.98	80,250.62	83,456.24	0.03	3,205.62
4,032.000 AVANTOR INC 05352A100	17.00	57,866.22	68,544.00	0.02	10,677.78
1,043.000 AVERY DENNISON CORP 053611109	114.09	75,716.12	118,995.87	0.04	43,279.75
1,578.000 AVISTA CORP 05379B107	36.39	58,256.87	57,423.42	0.02	-833.45
844.000 AXON ENTERPRISE INC 05464C101	98.13	51,045.12	82,821.72	0.03	31,776.60
3,099.000 AXOS FINANCIAL INC 05465C100	22.08	55,014.72	68,425.92	0.02	13,411.20
1,891.000 BJ'S WHOLESALE CLUB HOLDINGS I 05550J101	37.27	66,710.02	70,477.57	0.02	3,767.55

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1,005.000 BWX TECHNOLOGIES INC 05605H100	56.64	18,989.84	56,923.20	0.02	37,933.36
270.000 BADGER METER INC 056525108	62.92	4,965.30	16,988.40	0.01	12,023.10
4,213.000 BAKER HUGHES CO 05722G100	15.39	55,660.41	64,838.07	0.02	9,177.66
123.000 BALCHEM CORP 057665200	94.86	5,078.67	11,667.78	0.00	6,589.11
4,452.000 BALL CORP 058498106	69.49	149,227.90	309,369.48	0.10	160,141.58
264.000 BANCFIRST CORP 05945F103	40.57	5,043.72	10,710.48	0.00	5,666.76
657.000 BANCORPSOUTH BANK 05971J102	22.74	6,878.79	14,940.18	0.00	8,061.39
72,709.000 BANK OF AMERICA CORP 060505104	23.75	968,907.38	1,726,838.75	0.53	757,931.37
876.000 BANK OF HAWAII CORP 062540109	61.41	40,008.36	53,795.16	0.02	13,786.80
3,815.000 BANK OF NEW YORK MELLON CORP/T 064058100	38.65	100,542.13	147,449.75	0.05	46,907.62

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3,092.000 BANK OZK 06417N103	23.47	55,027.14	72,569.24	0.02	17,542.10
433.000 BARNES GROUP INC 067806109	39.56	10,158.18	17,129.48	0.01	6,971.30
5,636.000 BAXTER INTERNATIONAL INC 071813109	86.10	152,124.64	485,259.60	0.15	333,134.96
3,041.221 BECTON DICKINSON AND CO 075887109	239.27	397,876.07	727,672.95	0.22	329,796.88
2,349.000 W R BERKLEY CORP 084423102	57.29	74,448.68	134,574.21	0.04	60,125.53
18,947.000 BERKSHIRE HATHAWAY INC 084670702	178.51	2,071,680.29	3,382,228.97	1.04	1,310,548.68
1,200.000 BERRY GLOBAL GROUP INC 08579W103	44.32	40,213.74	53,184.00	0.02	12,970.26
2,712.000 BEST BUY CO INC 086516101	87.27	61,649.26	236,676.24	0.07	175,026.98
500.000 BEYOND MEAT INC 08862E109	133.98	68,105.00	66,990.00	0.02	-1,115.00
251.000 BIO-RAD LABORATORIES INC 090572207	451.49	35,554.15	113,323.99	0.03	77,769.84

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,371.000	BIOMARIN PHARMACEUTICAL INC 09061G101	123.34	168,679.12	292,439.14	0.09	123,760.02
1,756.000	BIOGEN INC 09062X103	267.55	283,010.13	469,817.80	0.14	186,807.67
398.000	BIO-TECHNE CORP 09073M104	264.07	31,893.88	105,099.86	0.03	73,205.98
1,098.000	BLACK HILLS CORP 092113109	56.66	45,137.58	62,212.68	0.02	17,075.10
1,131.000	BLACK KNIGHT INC 09215C105	72.56	37,398.70	82,065.36	0.03	44,666.66
1,681.000	BLACKROCK INC 09247X101	544.09	546,008.94	914,615.29	0.28	368,606.35
2,628.000	BLACKSTONE MORTGAGE TRUST INC 09257W100	24.09	54,452.30	63,308.52	0.02	8,856.22
3,864.000	H&R BLOCK INC 093671105	14.28	56,348.30	55,177.92	0.02	-1,170.38
984.000	BLUEBIRD BIO INC 09609G100	61.04	39,143.52	60,063.36	0.02	20,919.84
958.000	BLUEPRINT MEDICINES CORP 09627Y109	78.00	50,524.92	74,724.00	0.02	24,199.08

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
5,009.000 BOEING CO/THE 097023105	183.30	518,913.27	918,149.70	0.28	399,236.43
4,827.000 BONANZA CREEK ENERGY INC 097793400	14.82	52,209.00	71,536.14	0.02	19,327.14
488.000 BOOKING HOLDINGS INC 09857L108	1,592.34	298,968.72	777,061.92	0.24	478,093.20
1,189.000 BOOZ ALLEN HAMILTON HOLDING CO 099502106	77.79	35,384.64	92,492.31	0.03	57,107.67
4,312.000 BORGWARNER INC 099724106	35.30	116,271.18	152,213.60	0.05	35,942.42
194.000 BOSTON BEER CO INC/THE 100557107	536.65	52,250.02	104,110.10	0.03	51,860.08
1,631.000 BOSTON PROPERTIES INC 101121101	90.38	126,937.57	147,409.78	0.05	20,472.21
14,631.000 BOSTON SCIENTIFIC CORP 101137107	35.11	197,384.02	513,694.41	0.16	316,310.39
216.000 BOTTOMLINE TECHNOLOGIES DE INC 101388106	50.77	5,080.32	10,966.32	0.00	5,886.00
1,597.000 BRADY CORP 104674106	46.82	42,160.80	74,771.54	0.02	32,610.74

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5,502.000 BRIGHAM MINERALS INC 10918L103	12.35	54,942.47	67,949.70	0.02	13,007.23
604.000 BRIGHT HORIZONS FAMILY SOLUTIO 109194100	117.20	51,726.56	70,788.80	0.02	19,062.24
2,094.000 BRIGHTHOUSE FINANCIAL INC 10922N103	27.82	50,334.29	58,255.08	0.02	7,920.79
24,635.000 BRISTOL-MYERS SQUIBB CO 110122108	58.80	966,940.85	1,448,538.00	0.45	481,597.15
5,542.000 BRIXMOR PROPERTY GROUP INC 11120U105	12.82	59,830.89	71,048.44	0.02	11,217.55
1,417.000 BROADRIDGE FINANCIAL SOLUTIONS 11133T103	126.19	68,784.04	178,811.23	0.06	110,027.19
4,275.000 BROADCOM INC 11135F101	315.61	509,170.04	1,349,232.75	0.42	840,062.71
6,273.000 BROOKFIELD PROPERTY REIT INC 11282X103	9.96	59,692.59	62,479.08	0.02	2,786.49
1,850.000 BROWN & BROWN INC 115236101	40.76	23,300.75	75,406.00	0.02	52,105.25
3,276.000 BROWN-FORMAN CORP 115637209	63.66	58,999.29	208,550.16	0.06	149,550.87

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1,908.000 116794108	BRUKER CORP	40.68	35,736.84	77,617.44	0.02	41,880.60
68.000 116881202	BRUNOS INC NEW	0.00	680.00	0.00	0.00	-680.00
1,071.000 117043109	BRUNSWICK CORP/DE	64.01	23,452.29	68,554.71	0.02	45,102.42
736.000 122017106	BURLINGTON STORES INC	196.93	34,793.91	144,940.48	0.04	110,146.57
5,682.000 124411109	BYLINE BANCORP INC	13.10	58,043.79	74,434.20	0.02	16,390.41
1,212.000 12503M108	CBOE GLOBAL MARKETS INC	93.28	78,991.48	113,055.36	0.03	34,063.88
2,495.000 12504L109	CBRE GROUP INC	45.22	54,041.71	112,823.90	0.03	58,782.19
1,269.000 12508E101	CDK GLOBAL INC	41.42	38,612.21	52,561.98	0.02	13,949.77
1,730.000 12514G108	CDW CORP/DE	116.18	112,501.84	200,991.40	0.06	88,489.56
1,695.000 12541W209	CH ROBINSON WORLDWIDE INC	79.06	107,640.41	134,006.70	0.04	26,366.29

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3,861.000 CIGNA CORP 125523100	187.65	304,454.79	724,516.65	0.22	420,061.86
3,531.000 CME GROUP INC 12572Q105	162.54	336,441.82	573,928.74	0.18	237,486.92
2,574.000 CMS ENERGY CORP 125896100	58.42	91,725.52	150,373.08	0.05	58,647.56
3,166.000 CNA FINANCIAL CORP 126117100	32.15	86,313.05	101,786.90	0.03	15,473.85
5,114.000 CNO FINANCIAL GROUP INC 12621E103	15.57	58,913.26	79,624.98	0.02	20,711.72
278.000 CSG SYSTEMS INTERNATIONAL INC 126349109	41.39	5,017.90	11,506.42	0.00	6,488.52
9,648.000 CSX CORP 126408103	69.74	129,147.47	672,851.52	0.21	543,704.05
551.000 CTS CORP 126501105	20.04	4,959.00	11,042.04	0.00	6,083.04
5,714.000 CNX RESOURCES CORP 12653C108	8.65	32,118.55	49,426.10	0.02	17,307.55
710.000 CVB FINANCIAL CORP 126600105	18.74	6,248.00	13,305.40	0.00	7,057.40

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13,545.000 CVS HEALTH CORP 126650100	64.97	549,217.19	880,018.65	0.27	330,801.46
12.000 CABLE ONE INC 12685J105	1,774.85	1,902.67	21,298.20	0.01	19,395.53
2,476.000 CABOT CORP 127055101	37.05	74,074.54	91,735.80	0.03	17,661.26
5,743.000 CABOT OIL & GAS CORP 127097103	17.18	93,127.74	98,664.74	0.03	5,537.00
483.000 CABOT MICROELECTRONICS CORP 12709P103	139.54	55,414.59	67,397.82	0.02	11,983.23
361.000 CACI INTERNATIONAL INC 127190304	216.88	36,219.13	78,293.68	0.02	42,074.55
2,138.000 CADENCE DESIGN SYSTEMS INC 127387108	95.96	21,828.98	205,162.48	0.06	183,333.50
7,106.000 CAESARS ENTERTAINMENT CORP 127686103	12.13	57,240.28	86,195.78	0.03	28,955.50
1,871.000 CALIFORNIA WATER SERVICE GROUP 130788102	47.70	42,284.60	89,246.70	0.03	46,962.10
781.000 CALLAWAY GOLF CO 131193104	17.51	4,810.96	13,675.31	0.00	8,864.35

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1,315.000 CAMDEN PROPERTY TRUST 133131102	91.22	101,540.02	119,954.30	0.04	18,414.28
1,364.000 CAMPBELL SOUP CO 134429109	49.63	55,117.42	67,695.32	0.02	12,577.90
376.000 CANNAE HOLDINGS INC 13765N107	41.10	3,243.61	15,453.60	0.00	12,209.99
5,644.000 CAPITAL ONE FINANCIAL CORP 14040H105	62.59	335,095.74	353,257.96	0.11	18,162.22
3,086.000 CARDINAL HEALTH INC 14149Y108	52.19	156,023.88	161,058.34	0.05	5,034.46
4,078.000 CARETRUST REIT INC 14174T107	17.16	55,363.85	69,978.48	0.02	14,614.63
620.000 CARLISLE COS INC 142339100	119.67	38,181.49	74,195.40	0.02	36,013.91
1,937.000 CARMAX INC 143130102	89.55	50,536.33	173,458.35	0.05	122,922.02
9,095.000 CARNIVAL CORP 143658300	16.42	112,658.39	149,339.90	0.05	36,681.51
9,936.000 CARRIER GLOBAL CORP 14448C104	22.22	124,878.43	220,777.92	0.07	95,899.49

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727.000 CARTER'S INC 146229109	80.70	29,892.09	58,668.90	0.02	28,776.81
903.000 CARVANA CO 146869102	120.20	51,109.80	108,540.60	0.03	57,430.80
331.000 CASEY'S GENERAL STORES INC 147528103	149.52	14,247.60	49,491.12	0.02	35,243.52
1,355.000 CATALENT INC 148806102	73.30	55,742.91	99,321.50	0.03	43,578.59
5,986.000 CATERPILLAR INC 149123101	126.50	404,233.46	757,229.00	0.23	352,995.54
2,285.000 CATHAY GENERAL BANCORP 149150104	26.30	53,262.30	60,095.50	0.02	6,833.20
211.000 CAVCO INDUSTRIES INC 149568107	192.85	9,826.27	40,691.35	0.01	30,865.08
1,375.000 CELANESE CORP 150870103	86.34	44,646.25	118,717.50	0.04	74,071.25
6,735.000 CENTENE CORP 15135B101	63.55	212,978.91	428,009.25	0.13	215,030.34
5,131.000 CENTERPOINT ENERGY INC 15189T107	18.67	74,714.02	95,795.77	0.03	21,081.75

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1,929.000 CENTRAL GARDEN & PET CO 153527205	33.79	40,373.97	65,180.91	0.02	24,806.94
3,932.000 CENTRAL PACIFIC FINANCIAL CORP 154760409	16.03	57,543.97	63,029.96	0.02	5,485.99
1,057.000 CERIDIAN HCM HOLDING INC 15677J108	79.27	57,930.07	83,788.39	0.03	25,858.32
3,081.000 CERNER CORP 156782104	68.55	114,498.76	211,202.55	0.07	96,703.79
513.000 CHARLES RIVER LABORATORIES INT 159864107	174.35	27,316.20	89,441.55	0.03	62,125.35
1,938.000 CHARTER COMMUNICATIONS INC 16119P108	510.04	150,416.94	988,457.52	0.30	838,040.58
1,469.000 CHEGG INC 163092109	67.26	58,417.28	98,804.94	0.03	40,387.66
77.000 CHEMED CORP 16359R103	451.07	4,924.15	34,732.39	0.01	29,808.24
3,492.000 CHENIERE ENERGY INC 16411R208	48.32	110,810.09	168,733.44	0.05	57,923.35
19,687.000 CHEVRON CORP 166764100	89.23	1,443,118.49	1,756,671.01	0.54	313,552.52

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278.000 CHIPOTLE MEXICAN GRILL INC 169656105	1,052.36	86,984.13	292,556.08	0.09	205,571.95
809.000 CHOICE HOTELS INTERNATIONAL IN 169905106	78.90	50,449.24	63,830.10	0.02	13,380.86
2,956.000 CHURCH & DWIGHT CO INC 171340102	77.30	75,327.61	228,498.80	0.07	153,171.19
345.000 CHURCHILL DOWNS INC 171484108	133.15	4,940.40	45,936.75	0.01	40,996.35
1,857.000 CIENA CORP 171779309	54.16	31,006.71	100,575.12	0.03	69,568.41
5,180.000 CIMAREX ENERGY CO 171798101	27.49	85,915.30	142,398.20	0.04	56,482.90
5,185.000 CINEMARK HOLDINGS INC 17243V102	11.55	60,047.30	59,886.75	0.02	-160.55
47,534.000 CISCO SYSTEMS INC 17275R102	46.64	1,275,900.15	2,216,985.76	0.68	941,085.61
1,141.000 CINTAS CORP 172908105	266.36	83,269.78	303,916.76	0.09	220,646.98
15,712.000 CITIGROUP INC 172967424	51.10	630,296.51	802,883.20	0.25	172,586.69

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7,942.000 CITIZENS FINANCIAL GROUP INC 174610105	25.24	159,720.21	200,456.08	0.06	40,735.87
1,532.000 CITRIX SYSTEMS INC 177376100	147.91	53,657.01	226,598.12	0.07	172,941.11
733.000 CITY HOLDING CO 177835105	65.17	32,880.72	47,769.61	0.01	14,888.89
974.000 CLEAN HARBORS INC 184496107	59.98	42,690.42	58,420.52	0.02	15,730.10
1,303.000 CLOROX CO/THE 189054109	219.37	134,982.96	285,839.11	0.09	150,856.15
9,400.000 CLOUDERA INC 18914U100	12.72	54,478.00	119,568.00	0.04	65,090.00
166.000 COCA-COLA CONSOLIDATED INC 191098102	229.19	10,121.02	38,045.54	0.01	27,924.52
36,770.000 COCA-COLA CO/THE 191216100	44.68	1,105,682.35	1,642,883.60	0.51	537,201.25
1,254.000 COGENT COMMUNICATIONS HOLDINGS 19239V302	77.36	46,546.44	97,009.44	0.03	50,463.00
1,619.000 COGNEX CORP 192422103	59.72	26,127.81	96,686.68	0.03	70,558.87

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5,797.000 COGNIZANT TECHNOLOGY SOLUTIONS 192446102	56.82	172,503.91	329,385.54	0.10	156,881.63
238.000 COHERENT INC 192479103	130.98	20,339.96	31,173.24	0.01	10,833.28
157.000 COHEN & STEERS INC 19247A100	68.05	4,953.35	10,683.85	0.00	5,730.50
6,515.000 COLGATE-PALMOLIVE CO 194162103	73.26	204,069.68	477,288.90	0.15	273,219.22
314.000 COLUMBIA BANKING SYSTEM INC 197236102	28.35	5,221.82	8,900.33	0.00	3,678.51
48,060.000 COMCAST CORP 20030N101	38.98	1,009,600.50	1,873,378.80	0.58	863,778.30
1,709.000 COMERICA INC 200340107	38.10	47,887.28	65,112.90	0.02	17,225.62
1,689.000 COMMERCE BANCSHARES INC/MO 200525103	59.47	42,794.57	100,444.83	0.03	57,650.26
4,111.000 COMMERCIAL METALS CO 201723103	20.40	61,026.54	83,864.40	0.03	22,837.86
6,699.000 COMMSCOPE HOLDING CO INC 20337X109	8.33	51,151.86	55,802.67	0.02	4,650.81

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2,401.000 COMMUNITY BANK SYSTEM INC 203607106	57.02	77,074.14	136,905.02	0.04	59,830.88
739.000 COMMUNITY TRUST BANCORP INC 204149108	32.76	18,132.37	24,209.64	0.01	6,077.27
5,464.000 CONAGRA BRANDS INC 205887102	35.17	117,821.30	192,168.88	0.06	74,347.58
161.000 CONMED CORP 207410101	71.99	4,929.82	11,590.39	0.00	6,660.57
7,216.000 CONOCOPHILLIPS 20825C104	42.02	245,952.98	303,216.32	0.09	57,263.34
2,681.000 CONSOLIDATED EDISON INC 209115104	71.93	125,152.03	192,844.33	0.06	67,692.30
1,775.000 CONSTELLATION BRANDS INC 21036P108	174.95	104,451.36	310,536.25	0.10	206,084.89
615.000 COOPER COS INC/THE 216648402	283.64	94,741.02	174,438.60	0.05	79,697.58
2,877.000 COOPER TIRE & RUBBER CO 216831107	27.61	59,748.66	79,433.97	0.02	19,685.31
1,936.000 COPART INC 217204106	83.27	22,347.69	161,210.72	0.05	138,863.03

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468.000 CORESITE REALTY CORP 21870Q105	121.06	53,581.32	56,656.08	0.02	3,074.76
15,772.000 COREPOINT LODGING INC 21872L104	4.21	59,642.09	66,400.12	0.02	6,758.03
815.000 CORNERSTONE ONDEMAND INC 21925Y103	38.56	23,040.05	31,426.40	0.01	8,386.35
11,899.000 CORNING INC 219350105	25.90	224,058.17	308,184.10	0.10	84,125.93
7,918.000 CORTEVA INC 22052L104	26.79	163,910.60	212,123.22	0.07	48,212.62
4,475.000 COSTCO WHOLESALE CORP 22160K105	303.21	467,093.65	1,356,864.75	0.42	889,771.10
315.000 COSTAR GROUP INC 22160N109	710.67	21,128.49	223,861.05	0.07	202,732.56
669.000 COUPA SOFTWARE INC 22266L106	277.04	104,378.58	185,339.76	0.06	80,961.18
388.000 CRANE CO 224399105	59.46	18,197.20	23,070.48	0.01	4,873.28
210.000 CREDIT ACCEPTANCE CORP 225310101	419.01	45,091.20	87,992.10	0.03	42,900.90

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PARAMETRIC US MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
875.000 CREE INC 225447101	59.19	20,825.00	51,791.25	0.02	30,966.25
4,540.000 CROWN CASTLE INTERNATIONAL COR 22822V101	167.35	359,735.78	759,769.00	0.23	400,033.22
1,595.000 CROWN HOLDINGS INC 228368106	65.13	50,121.38	103,882.35	0.03	53,760.97
2,840.000 CRYOLIFE INC 228903100	19.17	57,252.02	54,442.80	0.02	-2,809.22
1,954.000 CUBESMART 229663109	26.99	37,192.18	52,738.46	0.02	15,546.28
1,263.000 CULLEN/FROST BANKERS INC 229899109	74.71	71,034.01	94,358.73	0.03	23,324.72
1,804.000 CUMMINS INC 231021106	173.26	187,042.38	312,561.04	0.10	125,518.66
434.000 CURTISS-WRIGHT CORP 231561101	89.28	14,975.69	38,747.52	0.01	23,771.83
1,166.000 CYRUSONE INC 23283R100	72.75	42,663.94	84,826.50	0.03	42,162.56
5,224.000 DR HORTON INC 23331A109	55.45	145,627.63	289,670.80	0.09	144,043.17

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,244.000 DTE ENERGY CO 233331107	107.50	51,903.91	133,730.00	0.04	81,826.09
6,643.000 DXC TECHNOLOGY CO 23355L106	16.50	106,051.99	109,609.50	0.03	3,557.51
6,215.000 DANA INC 235825205	12.19	56,941.23	75,760.85	0.02	18,819.62
6,703.000 DANAHER CORP 235851102	176.83	353,161.83	1,185,291.49	0.37	832,129.66
2,273.000 DARDEN RESTAURANTS INC 237194105	75.77	128,307.67	172,225.21	0.05	43,917.54
3,850.000 DARLING INGREDIENTS INC 237266101	24.62	42,350.00	94,787.00	0.03	52,437.00
1,619.000 DATADOG INC 23804L103	86.95	132,754.90	140,772.05	0.04	8,017.15
1,950.000 DAVITA INC 23918K108	79.14	90,147.42	154,323.00	0.05	64,175.58
397.000 DECKERS OUTDOOR CORP 243537107	196.39	55,007.84	77,966.83	0.02	22,958.99
3,265.000 DEERE & CO 244199105	157.15	190,351.72	513,094.75	0.16	322,743.03

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
4,470.000	DELEK US HOLDINGS INC 24665A103	17.41	47,498.75	77,822.70	0.02	30,323.95
1,596.000	DELL TECHNOLOGIES INC 24703L202	54.94	66,910.12	87,684.24	0.03	20,774.12
6,419.000	DELTA AIR LINES INC 247361702	28.05	57,186.69	180,052.95	0.06	122,866.26
3,476.000	DENTSPLY SIRONA INC 24906P109	44.06	110,335.10	153,152.56	0.05	42,817.46
854.000	DEXCOM INC 252131107	405.40	61,633.18	346,211.60	0.11	284,578.42
4,300.000	DIAMONDBACK ENERGY INC 25278X109	41.82	112,686.50	179,826.00	0.06	67,139.50
2,041.000	DIGITAL REALTY TRUST INC 253868103	142.11	154,122.78	290,046.51	0.09	135,923.73
19,798.000	WALT DISNEY CO/THE 254687106	111.51	823,052.54	2,207,674.98	0.68	1,384,622.44
4,200.000	DISCOVER FINANCIAL SERVICES 254709108	50.09	101,117.46	210,378.00	0.06	109,260.54
918.000	DISCOVERY INC 25470F104	21.10	18,899.18	19,369.80	0.01	470.62

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,628.000 DISCOVERY INC 25470F302	19.26	34,329.39	31,355.28	0.01	-2,974.11
2,734.000 DISH NETWORK CORP 25470M109	34.51	59,893.27	94,350.34	0.03	34,457.07
1,819.000 DOCUSIGN INC 256163106	172.21	174,167.25	313,249.99	0.10	139,082.74
1,219.000 DOLBY LABORATORIES INC 25659T107	65.87	42,713.76	80,295.53	0.02	37,581.77
2,824.000 DOLLAR GENERAL CORP 256677105	190.51	151,528.16	538,000.24	0.17	386,472.08
2,060.000 DOLLAR TREE INC 256746108	92.68	60,408.58	190,920.80	0.06	130,512.22
9,999.000 DOMINION ENERGY INC 25746U109	81.18	568,194.98	811,718.82	0.25	243,523.84
658.000 DOMINO'S PIZZA INC 25754A201	369.44	28,175.56	243,091.52	0.07	214,915.96
1,291.000 DONALDSON CO INC 257651109	46.52	39,551.27	60,057.32	0.02	20,506.05
35.000 DONEGAL GROUP INC 257701201	14.22	442.05	497.70	0.00	55.65

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753.000 DORMAN PRODUCTS INC 258278100	67.07	36,708.75	50,503.71	0.02	13,794.96
2,870.000 DOUGLAS EMMETT INC 25960P109	30.66	72,130.85	87,994.20	0.03	15,863.35
1,594.000 DOVER CORP 260003108	96.56	55,683.38	153,916.64	0.05	98,233.26
7,891.000 DOW INC 260557103	40.76	271,089.46	321,637.16	0.10	50,547.70
3,259.000 DROPBOX INC 26210C104	21.77	52,686.73	70,948.43	0.02	18,261.70
3,709.000 DUKE REALTY CORP 264411505	35.39	71,982.68	131,261.51	0.04	59,278.83
7,323.000 DUKE ENERGY CORP 26441C204	79.89	427,905.03	585,034.47	0.18	157,129.44
1,071.000 DUNKIN' BRANDS GROUP INC 265504100	65.23	34,657.56	69,861.33	0.02	35,203.77
10,935.000 DUPONT DE NEMOURS INC 26614N102	53.13	435,152.35	580,976.55	0.18	145,824.20
321.000 DYCOM INDUSTRIES INC 267475101	40.89	4,798.95	13,125.69	0.00	8,326.74

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2,312.000 DYNATRACE INC 268150109	40.60	59,180.64	93,867.20	0.03	34,686.56
5,021.000 EOG RESOURCES INC 26875P101	50.66	215,223.64	254,363.86	0.08	39,140.22
10,562.000 EQT CORP 26884L109	11.90	60,472.45	125,687.80	0.04	65,215.35
3,289.000 EPR PROPERTIES 26884U109	33.13	77,680.32	108,964.57	0.03	31,284.25
1,775.000 EAGLE BANCORP INC 268948106	32.75	53,291.38	58,131.25	0.02	4,839.87
3,295.000 E*TRADE FINANCIAL CORP 269246401	49.73	29,391.40	163,860.35	0.05	134,468.95
1,015.000 EAGLE MATERIALS INC 26969P108	70.22	61,123.22	71,273.30	0.02	10,150.08
2,079.000 EAST WEST BANCORP INC 27579R104	36.24	36,100.19	75,342.96	0.02	39,242.77
2,005.000 EASTERLY GOVERNMENT PROPERTIES 27616P103	23.12	35,106.55	46,355.60	0.01	11,249.05
172.000 EASTGROUP PROPERTIES INC 277276101	118.61	9,958.80	20,400.92	0.01	10,442.12

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1,439.000 EASTMAN CHEMICAL CO 277432100	69.64	81,420.59	100,211.96	0.03	18,791.37
8,344.000 EBAY INC 278642103	52.45	100,170.00	437,642.80	0.13	337,472.80
2,656.000 ECOLAB INC 278865100	198.95	219,765.39	528,411.20	0.16	308,645.81
4,049.000 EDISON INTERNATIONAL 281020107	54.31	184,784.29	219,901.19	0.07	35,116.90
2,588.000 EDITAS MEDICINE INC 28106W103	29.58	52,424.94	76,553.04	0.02	24,128.10
6,867.000 EDWARDS LIFESCIENCES CORP 28176E108	69.11	157,534.59	474,578.37	0.15	317,043.78
4,250.000 8X8 INC 282914100	16.00	64,881.25	68,000.00	0.02	3,118.75
906.000 EL PASO ELECTRIC CO 283677854	67.00	35,207.16	60,702.00	0.02	25,494.84
3,258.000 ELECTRONIC ARTS INC 285512109	132.05	82,502.94	430,218.90	0.13	347,715.96
6,352.000 ELEMENT SOLUTIONS INC 28618M106	10.85	54,055.52	68,919.20	0.02	14,863.68

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
532.000 EMCOR GROUP INC 29084Q100	66.14	15,119.44	35,186.48	0.01	20,067.04
1,119.000 EMERGENT BIOSOLUTIONS INC 29089Q105	79.08	40,214.76	88,490.52	0.03	48,275.76
7,974.000 EMERSON ELECTRIC CO 291011104	62.03	371,888.90	494,627.22	0.15	122,738.32
1,098.000 ENANTA PHARMACEUTICALS INC 29251M106	50.21	55,668.11	55,130.58	0.02	-537.53
220.000 ENCORE WIRE CORP 292562105	48.82	5,108.40	10,740.40	0.00	5,632.00
1,017.000 ENCOMPASS HEALTH CORP 29261A100	61.93	34,026.48	62,982.81	0.02	28,956.33
329.000 ENERSYS 29275Y102	64.38	12,202.61	21,181.02	0.01	8,978.41
1,068.000 ENTEGRIS INC 29362U104	59.05	10,455.72	63,065.40	0.02	52,609.68
2,306.000 ENTERGY CORP 29364G103	93.81	175,488.38	216,325.86	0.07	40,837.48
390.000 ENTERPRISE FINANCIAL SERVICES 293712105	31.12	5,190.90	12,136.80	0.00	6,945.90

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
311.000	EPAM SYSTEMS INC 29414B104	252.01	63,369.24	78,375.11	0.02	15,005.87
3,068.000	ENVISTA HOLDINGS CORP 29415F104	21.09	63,343.86	64,704.12	0.02	1,360.26
830.000	EPLUS INC 294268107	70.68	34,930.55	58,664.40	0.02	23,733.85
1,705.000	EQUIFAX INC 294429105	171.88	110,223.97	293,055.40	0.09	182,831.43
830.000	EQUINIX INC 29444U700	702.30	271,387.54	582,909.00	0.18	311,521.46
6,960.000	EQUITABLE HOLDINGS INC 29452E101	19.29	119,960.60	134,258.40	0.04	14,297.80
1,496.000	EQUITY COMMONWEALTH 294628102	32.20	29,873.99	48,171.20	0.01	18,297.21
1,144.000	EQUITY LIFESTYLE PROPERTIES IN 29472R108	62.48	30,069.60	71,477.12	0.02	41,407.52
3,859.000	EQUITY RESIDENTIAL 29476L107	58.82	205,247.43	226,986.38	0.07	21,738.95
358.000	ERIE INDEMNITY CO 29530P102	191.90	64,250.26	68,700.20	0.02	4,449.94

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,325.000 29664W105	ESPERION THERAPEUTICS INC	51.31	35,808.26	170,605.75	0.05	134,797.49
3,633.000 29670G102	ESSENTIAL UTILITIES INC	42.24	53,303.37	153,457.92	0.05	100,154.55
674.000 297178105	ESSEX PROPERTY TRUST INC	229.17	119,651.37	154,460.58	0.05	34,809.21
1,927.000 29786A106	ETSY INC	106.23	53,662.31	204,705.21	0.06	151,042.90
437.000 298736109	EURONET WORLDWIDE INC	95.82	22,510.60	41,873.34	0.01	19,362.74
427.000 29977A105	EVERCORE INC	58.92	15,145.56	25,158.84	0.01	10,013.28
2,583.000 30034W106	EVERGY INC	59.29	96,265.92	153,146.07	0.05	56,880.15
3,249.000 30040W108	EVERSOURCE ENERGY	83.27	147,365.80	270,544.23	0.08	123,178.43
6,878.000 30057T105	EVOQUA WATER TECHNOLOGIES CORP	18.60	58,915.02	127,930.80	0.04	69,015.78
1,828.000 30063P105	EXACT SCIENCES CORP	86.94	70,881.86	158,926.32	0.05	88,044.46

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
13,079.000	EXELON CORP 30161N101	36.29	412,508.49	474,636.91	0.15	62,128.42
5,342.000	EXELIXIS INC 30161Q104	23.74	40,652.62	126,819.08	0.04	86,166.46
902.000	EXLSERVICE HOLDINGS INC 302081104	63.40	42,078.30	57,186.80	0.02	15,108.50
1,013.000	EXPEDIA GROUP INC 30212P303	82.20	37,157.14	83,268.60	0.03	46,111.46
1,167.000	EXPEDITORS INTERNATIONAL OF WA 302130109	76.04	82,287.71	88,738.68	0.03	6,450.97
1,086.000	EXTRA SPACE STORAGE INC 30225T102	92.37	86,722.98	100,313.82	0.03	13,590.84
38,064.000	EXXON MOBIL CORP 30231G102	44.72	2,111,648.53	1,702,222.08	0.52	-409,426.45
1,314.000	FLIR SYSTEMS INC 302445101	40.57	36,174.42	53,308.98	0.02	17,134.56
2,027.000	FMC CORP 302491303	99.62	120,029.53	201,929.74	0.06	81,900.21
25,877.000	FACEBOOK INC 30303M102	227.07	2,204,293.06	5,875,890.39	1.81	3,671,597.33

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333.000 FACTSET RESEARCH SYSTEMS INC 303075105	328.47	56,664.90	109,380.51	0.03	52,715.61
317.000 FAIR ISAAC CORP 303250104	418.04	9,189.83	132,518.68	0.04	123,328.85
45.000 FAIRFAX FINANCIAL HOLDINGS LTD 303901102	308.84	19,776.54	13,897.80	0.00	-5,878.74
5,462.000 FARMERS NATIONAL BANC CORP 309627107	11.86	57,531.33	64,779.32	0.02	7,247.99
1,232.000 FASTLY INC 31188V100	85.13	65,997.08	104,880.16	0.03	38,883.08
6,532.000 FASTENAL CO 311900104	42.84	132,149.78	279,830.88	0.09	147,681.10
922.000 FEDERAL REALTY INVESTMENT TRUS 313747206	85.21	69,538.17	78,563.62	0.02	9,025.45
2,297.000 FEDEX CORP 31428X106	140.22	237,378.43	322,085.34	0.10	84,706.91
1,561.000 FERRO CORP 315405100	11.94	8,366.96	18,638.34	0.01	10,271.38
475.000 F5 NETWORKS INC 315616102	139.48	36,797.75	66,253.00	0.02	29,455.25

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6,986.000 FIDELITY NATIONAL INFORMATION 31620M106	134.09	523,714.03	936,752.74	0.29	413,038.71
4,074.000 FIDELITY NATIONAL FINANCIAL IN 31620R303	30.66	94,312.42	124,908.84	0.04	30,596.42
9,395.000 FIFTH THIRD BANCORP 316773100	19.28	146,066.45	181,135.60	0.06	35,069.15
311.000 FINANCIAL INSTITUTIONS INC 317585404	18.61	5,010.21	5,787.71	0.00	777.50
5,019.000 FIREEYE INC 31816Q101	12.18	64,122.72	61,106.33	0.02	-3,016.39
1,458.000 FIRST AMERICAN FINANCIAL CORP 31847R102	48.02	57,512.94	70,013.16	0.02	12,500.22
10,745.000 FIRST BANCORP/PUERTO RICO 318672706	5.59	44,428.78	60,064.55	0.02	15,635.77
3,652.000 FIRST BUSEY CORP 319383204	18.65	56,446.66	68,109.80	0.02	11,663.14
37.000 FIRST CITIZENS BANCSHARES INC/ 31946M103	405.02	6,464.27	14,985.74	0.00	8,521.47
4,791.000 FIRST FINANCIAL BANCORP 320209109	13.89	55,317.09	66,546.99	0.02	11,229.90

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2,034.000 FIRST FINANCIAL BANKSHARES INC 32020R109	28.89	31,004.77	58,762.26	0.02	27,757.49
1,295.000 FIRST INDUSTRIAL REALTY TRUST 32054K103	38.44	16,776.50	49,779.80	0.02	33,003.30
1,236.000 FIRST INTERSTATE BANCSYSTEM IN 32055Y201	30.96	35,473.20	38,266.56	0.01	2,793.36
593.000 FIRST MIDWEST BANCORP INC/IL 320867104	13.35	6,955.89	7,916.55	0.00	960.66
1,599.000 FIRST REPUBLIC BANK/CA 33616C100	105.99	100,282.21	169,478.01	0.05	69,195.80
269.000 1ST SOURCE CORP 336901103	35.58	4,912.90	9,571.02	0.00	4,658.12
249.000 FIRSTCASH INC 33767D105	67.48	9,691.08	16,802.52	0.01	7,111.44
5,999.000 FISERV INC 337738108	97.62	128,790.13	585,622.38	0.18	456,832.25
735.000 FLAGSTAR BANCORP INC 337930705	29.43	9,929.85	21,631.05	0.01	11,701.20
5,736.000 FIRSTENERGY CORP 337932107	38.78	204,266.60	222,442.08	0.07	18,175.48

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
15,557.000 FITBIT INC 33812L102	6.46	49,554.04	100,498.22	0.03	50,944.18
702.000 FIVE BELOW INC 33829M101	106.91	58,499.42	75,050.82	0.02	16,551.40
810.000 FIVE9 INC 338307101	110.67	54,488.70	89,642.70	0.03	35,154.00
972.000 FLEETCOR TECHNOLOGIES INC 339041105	251.53	112,503.74	244,487.16	0.08	131,983.42
7,257.000 FLUOR CORP 343412102	12.08	51,275.70	87,664.56	0.03	36,388.86
2,237.000 FOOT LOCKER INC 344849104	29.16	61,824.49	65,230.92	0.02	3,406.43
41,292.000 FORD MOTOR CO 345370860	6.08	219,059.06	251,055.36	0.08	31,996.30
1,355.000 FORTINET INC 34959E109	137.27	39,030.38	186,000.85	0.06	146,970.47
2,881.000 FORTUNE BRANDS HOME & SECURITY 34964C106	63.93	96,788.66	184,182.33	0.06	87,393.67
234.000 FORWARD AIR CORP 349853101	49.82	7,607.34	11,657.88	0.00	4,050.54

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
5,256.000 FOX CORP 35137L105	26.82	144,939.20	140,965.92	0.04	-3,973.28
230.000 FRANKLIN ELECTRIC CO INC 353514102	52.52	5,146.25	12,079.60	0.00	6,933.35
5,420.000 FRANKLIN RESOURCES INC 354613101	20.97	87,926.61	113,657.40	0.04	25,730.79
11,798.000 FRANKLIN STREET PROPERTIES COR 35471R106	5.09	57,992.17	60,051.82	0.02	2,059.65
16,115.000 FREEPORT-MCMORAN INC 35671D857	11.57	88,650.58	186,450.55	0.06	97,799.97
4,360.000 FRESHPET INC 358039105	83.66	40,460.80	364,757.60	0.11	324,296.80
1,797.000 HB FULLER CO 359694106	44.60	55,317.26	80,146.20	0.02	24,828.94
3,539.000 FULTON FINANCIAL CORP 360271100	10.53	35,391.42	37,265.67	0.01	1,874.25
369.000 GATX CORP 361448103	60.98	13,379.94	22,501.62	0.01	9,121.68
1,864.000 GCI LIBERTY INC 36164V305	71.12	32,725.89	132,567.68	0.04	99,841.79

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764.000 GCP APPLIED TECHNOLOGIES INC 36164Y101	18.58	7,318.90	14,195.12	0.00	6,876.22
1,830.000 ARTHUR J GALLAGHER & CO 363576109	97.49	77,958.38	178,406.70	0.06	100,448.32
2,030.000 GAMING AND LEISURE PROPERTIES 36467J108	34.60	63,219.20	70,238.00	0.02	7,018.80
1,046.000 GARTNER INC 366651107	121.33	42,532.46	126,911.18	0.04	84,378.72
1,313.000 GENERAC HOLDINGS INC 368736104	121.93	42,725.02	160,094.09	0.05	117,369.07
3,045.000 GENERAL DYNAMICS CORP 369550108	149.46	281,415.26	455,105.70	0.14	173,690.44
76,025.000 GENERAL ELECTRIC CO 369604103	6.83	637,830.71	519,250.75	0.16	-118,579.96
6,766.000 GENERAL MILLS INC 370334104	61.65	239,423.22	417,123.90	0.13	177,700.68
8,652.000 GENERAL MOTORS CO 37045V100	25.30	214,108.66	218,895.60	0.07	4,786.94
4,529.000 GENTEX CORP 371901109	25.77	76,951.18	116,712.33	0.04	39,761.15

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1,783.000 GENUINE PARTS CO 372460105	86.96	93,732.89	155,049.68	0.05	61,316.79
327.000 GENTHERM INC 37253A103	38.90	5,310.48	12,720.30	0.00	7,409.82
2,087.000 GETTY REALTY CORP 374297109	29.68	35,963.76	61,942.16	0.02	25,978.40
457.000 GIBRALTAR INDUSTRIES INC 374689107	48.01	4,958.45	21,940.57	0.01	16,982.12
13,240.000 GILEAD SCIENCES INC 375558103	76.94	378,445.95	1,018,685.60	0.31	640,239.65
572.000 GLACIER BANCORP INC 37637Q105	35.29	7,424.56	20,185.88	0.01	12,761.32
1,609.000 GLAUKOS CORP 377322102	38.42	64,196.05	61,817.78	0.02	-2,378.27
1,093.000 GLOBAL BLOOD THERAPEUTICS INC 37890U108	63.13	53,403.51	69,001.09	0.02	15,597.58
4,072.000 GLOBAL NET LEASE INC 379378201	16.73	57,608.73	68,124.56	0.02	10,515.83
2,902.000 GLOBAL PAYMENTS INC 37940X102	169.62	126,102.27	492,237.24	0.15	366,134.97

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6,312.000 GLOBAL MEDICAL REIT INC 37954A204	11.33	64,608.32	71,514.96	0.02	6,906.64
1,554.000 GLOBUS MEDICAL INC 379577208	47.71	43,107.96	74,141.34	0.02	31,033.38
1,580.000 GLOBE LIFE INC 37959E102	74.23	72,968.11	117,283.40	0.04	44,315.29
1,959.000 GODADDY INC 380237107	73.33	98,747.43	143,653.47	0.04	44,906.04
3,366.000 GOLDMAN SACHS GROUP INC/THE 38141G104	197.62	554,348.69	665,188.92	0.21	110,840.23
9,901.000 GOODYEAR TIRE & RUBBER CO/THE 382550101	8.95	70,945.66	88,564.45	0.03	17,618.79
773.000 W R GRACE & CO 38388F108	50.81	30,396.83	39,276.13	0.01	8,879.30
1,350.000 GRACO INC 384109104	47.99	22,596.88	64,786.50	0.02	42,189.62
556.000 WW GRAINGER INC 384802104	314.16	114,495.46	174,672.96	0.05	60,177.50
844.000 GRAND CANYON EDUCATION INC 38526M106	90.53	53,699.75	76,407.32	0.02	22,707.57

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2,476.000 GRAPHIC PACKAGING HOLDING CO 388689101	13.99	23,992.56	34,639.24	0.01	10,646.68
22,719.000 GREAT AJAX CORP 38983D300	9.20	190,712.79	209,014.80	0.06	18,302.01
715.000 GREEN DOT CORP 39304D102	49.08	9,066.20	35,092.20	0.01	26,026.00
3,254.000 GREENBRIER COS INC/THE 393657101	22.75	55,705.35	74,028.50	0.02	18,323.15
511.000 GRIFFON CORP 398433102	18.52	4,997.58	9,463.72	0.00	4,466.14
111.000 GROUP 1 AUTOMOTIVE INC 398905109	65.97	4,362.30	7,322.67	0.00	2,960.37
1,396.000 GRUBHUB INC 400110102	70.30	41,991.68	98,138.80	0.03	56,147.12
835.000 GUARDANT HEALTH INC 40131M109	81.13	52,571.60	67,743.55	0.02	15,171.95
754.000 GUIDEWIRE SOFTWARE INC 40171V100	110.85	47,497.94	83,580.90	0.03	36,082.96
379.000 H&E EQUIPMENT SERVICES INC 404030108	18.48	4,839.83	7,003.92	0.00	2,164.09

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3,244.000 HCA HEALTHCARE INC 40412C101	97.06	229,952.82	314,862.64	0.10	84,909.82
15,348.000 HP INC 40434L105	17.43	205,505.08	267,515.64	0.08	62,010.56
1,307.000 HAEMONETICS CORP 405024100	89.56	42,582.06	117,054.92	0.04	74,472.86
5,249.000 HALLIBURTON CO 406216101	12.98	58,557.59	68,132.02	0.02	9,574.43
3,615.000 HALOZYME THERAPEUTICS INC 40637H109	26.81	56,932.02	96,918.15	0.03	39,986.13
4,512.000 HANESBRANDS INC 410345102	11.29	34,039.20	50,940.48	0.02	16,901.28
2,318.000 HANNON ARMSTRONG SUSTAINABLE I 41068X100	28.46	58,801.07	65,970.28	0.02	7,169.21
595.000 HANOVER INSURANCE GROUP INC/TH 410867105	101.33	24,926.93	60,291.35	0.02	35,364.42
3,130.000 HARTFORD FINANCIAL SERVICES GR 416515104	38.55	62,178.99	120,661.50	0.04	58,482.51
885.000 HASBRO INC 418056107	74.95	24,773.31	66,330.75	0.02	41,557.44

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879.000 HAWAIIAN HOLDINGS INC 419879101	14.04	5,054.25	12,341.16	0.00	7,286.91
1,810.000 HEALTHCARE REALTY TRUST INC 421946104	29.29	53,191.85	53,014.90	0.02	-176.95
2,154.000 HEALTHCARE TRUST OF AMERICA IN 42225P501	26.52	54,492.27	57,124.08	0.02	2,631.81
6,690.000 HEALTHPEAK PROPERTIES INC 42250P103	27.56	158,345.80	184,376.40	0.06	26,030.60
1,010.000 HEICO CORP 422806109	99.65	17,623.45	100,646.50	0.03	83,023.05
366.000 HEIDRICK & STRUGGLES INTERNATI 422819102	21.62	4,933.68	7,912.92	0.00	2,979.24
687.000 JACK HENRY & ASSOCIATES INC 426281101	184.03	20,129.10	126,428.61	0.04	106,299.51
7,784.000 HERITAGE COMMERCE CORP 426927109	7.51	56,211.71	58,418.92	0.02	2,207.21
905.000 HERITAGE FINANCIAL CORP/WA 42722X106	20.00	12,758.94	18,100.00	0.01	5,341.06
5,080.000 HERITAGE INSURANCE HOLDINGS IN 42727J102	13.09	58,368.10	66,497.20	0.02	8,129.10

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1,156.000 HERSHEY CO/THE 427866108	129.62	91,315.96	149,840.72	0.05	58,524.76
1,230.000 HESS CORP 42809H107	51.81	56,418.95	63,726.30	0.02	7,307.35
15,925.000 HEWLETT PACKARD ENTERPRISE CO 42824C109	9.73	125,363.63	154,950.25	0.05	29,586.62
779.000 HEXCEL CORP 428291108	45.22	16,335.63	35,226.38	0.01	18,890.75
939.000 HILL-ROM HOLDINGS INC 431475102	109.78	45,222.43	103,083.42	0.03	57,860.99
3,367.000 HILLTOP HOLDINGS INC 432748101	18.45	55,050.39	62,121.15	0.02	7,070.76
1,630.000 HILTON WORLDWIDE HOLDINGS INC 43300A203	73.45	83,560.88	119,723.50	0.04	36,162.62
2,235.000 HOLLYFRONTIER CORP 436106108	29.20	54,859.72	65,262.00	0.02	10,402.28
2,721.000 HOLOGIC INC 436440101	57.00	59,385.61	155,097.00	0.05	95,711.39
4,348.000 HOME BANCSHARES INC/AR 436893200	15.38	54,336.74	66,872.24	0.02	12,535.50

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11,748.000 HOME DEPOT INC/THE 437076102	250.51	768,363.84	2,942,991.48	0.91	2,174,627.64
351.000 HOMESTREET INC 43785V102	24.61	5,101.71	8,638.11	0.00	3,536.40
8,115.000 HONEYWELL INTERNATIONAL INC 438516106	144.59	464,466.13	1,173,347.85	0.36	708,881.72
6,631.000 HOPE BANCORP INC 43940T109	9.22	56,700.05	61,137.82	0.02	4,437.77
331.000 HORACE MANN EDUCATORS CORP 440327104	36.73	4,951.76	12,157.63	0.00	7,205.87
6,318.000 HORIZON BANCORP INC/IN 440407104	10.69	57,238.50	67,539.42	0.02	10,300.92
2,759.000 HORMEL FOODS CORP 440452100	48.27	80,688.14	133,176.93	0.04	52,488.79
10,860.000 HOST HOTELS & RESORTS INC 44107P104	10.79	125,565.06	117,179.40	0.04	-8,385.66
4,693.000 HOSTESS BRANDS INC 44109J106	12.22	51,979.95	57,348.46	0.02	5,368.51
4,411.000 HOWMET AEROSPACE INC 443201108	15.85	67,206.58	69,914.35	0.02	2,707.77

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293.000 HUB GROUP INC 443320106	47.86	10,600.74	14,022.98	0.00	3,422.24
1,126.000 HUBBELL INC 443510607	125.36	98,771.32	141,155.36	0.04	42,384.04
392.000 HUBSPOT INC 443573100	224.35	56,649.57	87,945.20	0.03	31,295.63
1,441.000 HUMANA INC 444859102	387.75	113,343.03	558,747.75	0.17	445,404.72
1,282.000 JB HUNT TRANSPORT SERVICES INC 445658107	120.34	85,169.79	154,275.88	0.05	69,106.09
12,950.000 HUNTINGTON BANCSHARES INC/OH 446150104	9.04	84,082.71	117,003.25	0.04	32,920.54
434.000 HUNTINGTON INGALLS INDUSTRIES 446413106	174.49	16,354.58	75,728.66	0.02	59,374.08
4,558.000 HUNTSMAN CORP 447011107	17.97	67,368.77	81,907.26	0.03	14,538.49
165.000 HURON CONSULTING GROUP INC 447462102	44.25	4,851.00	7,301.25	0.00	2,450.25
492.000 IDT CORP 448947507	6.53	1,807.88	3,212.76	0.00	1,404.88

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885.000 IAC/INTERACTIVECORP 44919P508	323.40	92,324.53	286,209.00	0.09	193,884.47
1,967.000 IAA INC 449253103	38.57	47,284.35	75,867.19	0.02	28,582.84
198.000 ICF INTERNATIONAL INC 44925C103	64.83	4,950.00	12,836.34	0.00	7,886.34
345.000 ICU MEDICAL INC 44930G107	184.31	56,169.45	63,586.95	0.02	7,417.50
519.000 IPG PHOTONICS CORP 44980X109	160.39	51,597.86	83,242.41	0.03	31,644.55
2,669.000 ISTAR INC 45031U101	12.32	20,312.66	32,882.08	0.01	12,569.42
732.000 ITT INC 45073V108	58.74	14,239.70	42,997.68	0.01	28,757.98
1,426.000 IBERIABANK CORP 450828108	45.54	52,424.62	64,940.04	0.02	12,515.42
566.000 IDACORP INC 451107106	87.37	34,926.70	49,451.42	0.02	14,524.72
659.000 IDEX CORP 45167R104	158.04	28,666.50	104,148.36	0.03	75,481.86

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778.000 IDEXX LABORATORIES INC 45168D104	330.16	30,505.88	256,864.48	0.08	226,358.60
3,803.000 ILLINOIS TOOL WORKS INC 452308109	174.85	207,782.97	664,954.55	0.21	457,171.58
1,558.000 ILLUMINA INC 452327109	370.35	267,954.89	577,005.30	0.18	309,050.41
4,213.000 IMMUNOMEDICS INC 452907108	35.44	62,926.15	149,308.72	0.05	86,382.57
1,669.000 INCYTE CORP 45337C102	103.97	48,566.12	173,525.93	0.05	124,959.81
2,271.000 INDEPENDENCE HOLDING CO 453440307	30.59	36,795.88	69,469.89	0.02	32,674.01
4,470.000 INDEPENDENCE REALTY TRUST INC 45378A106	11.49	35,985.74	51,360.30	0.02	15,374.56
386.000 INDEPENDENT BANK CORP 453836108	67.09	12,619.40	25,896.74	0.01	13,277.34
4,000.000 INDEPENDENT BANK CORP/MI 453838609	14.85	52,879.40	59,400.00	0.02	6,520.60
2,049.000 INDEPENDENT BANK GROUP INC 45384B106	40.52	52,998.28	83,025.48	0.03	30,027.20

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2,331.000 INGERSOLL RAND INC 45687V106	28.12	17,557.02	65,547.72	0.02	47,990.70
408.000 INGEVITY CORP 45688C107	52.57	7,393.99	21,448.56	0.01	14,054.57
301.000 INGLES MARKETS INC 457030104	43.07	4,809.98	12,964.07	0.00	8,154.09
608.000 INGREDION INC 457187102	83.00	29,897.31	50,464.00	0.02	20,566.69
305.000 INSIGHT ENTERPRISES INC 45765U103	49.20	5,072.15	15,006.00	0.00	9,933.85
620.000 INPHI CORP 45772F107	117.50	58,006.21	72,850.00	0.02	14,843.79
352.000 INSPERITY INC 45778Q107	64.73	5,026.56	22,784.96	0.01	17,758.40
631.000 INSULET CORP 45784P101	194.26	37,635.57	122,578.06	0.04	84,942.49
1,344.000 INTEGRA LIFESCIENCES HOLDINGS 457985208	46.99	42,994.56	63,154.56	0.02	20,160.00
41,529.000 INTEL CORP 458140100	59.83	992,103.41	2,484,680.07	0.77	1,492,576.66

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883.000 INTER PARFUMS INC 458334109	48.15	29,156.66	42,516.45	0.01	13,359.79
1,471.000 INTERACTIVE BROKERS GROUP INC 45841N107	41.77	24,094.98	61,443.67	0.02	37,348.69
866.000 INTERCEPT PHARMACEUTICALS INC 45845P108	47.91	54,436.76	41,490.06	0.01	-12,946.70
6,284.000 INTERCONTINENTAL EXCHANGE INC 45866F104	91.60	290,596.31	575,614.40	0.18	285,018.09
1,145.000 INTERDIGITAL INC 45867G101	56.63	52,188.37	64,841.35	0.02	12,652.98
752.000 INTERNATIONAL BANCSHARES CORP 459044103	32.02	16,765.34	24,079.04	0.01	7,313.70
7,233.000 INTERNATIONAL BUSINESS MACHINE 459200101	120.77	675,861.85	873,529.41	0.27	197,667.56
976.000 INTERNATIONAL FLAVORS & FRAGRA 459506101	122.46	68,870.50	119,520.96	0.04	50,650.46
1,842.000 INTERNATIONAL PAPER CO 460146103	35.21	61,224.83	64,856.82	0.02	3,631.99
4,603.000 INTERPUBLIC GROUP OF COS INC/T 460690100	17.16	46,710.78	78,987.48	0.02	32,276.70

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
4,795.000	INTRA-CELLULAR THERAPIES INC 46116X101	25.67	43,902.16	123,087.65	0.04	79,185.49
2,729.000	INTUIT INC 461202103	296.19	376,588.56	808,302.51	0.25	431,713.95
1,306.000	INTUITIVE SURGICAL INC 46120E602	569.83	246,962.47	744,197.98	0.23	497,235.51
4,811.000	INVITATION HOMES INC 46187W107	27.53	109,177.59	132,446.83	0.04	23,269.24
1,217.000	IONIS PHARMACEUTICALS INC 462222100	58.96	22,602.17	71,754.32	0.02	49,152.15
1,860.000	IQVIA HOLDINGS INC 46266C105	141.88	174,940.72	263,896.80	0.08	88,956.08
7,929.000	IRIDIUM COMMUNICATIONS INC 46269C102	25.44	65,731.41	201,713.76	0.06	135,982.35
1,274.000	IROBOT CORP 462726100	83.90	42,284.06	106,888.60	0.03	64,604.54
2,552.000	IRON MOUNTAIN INC 46284V101	26.10	59,887.68	66,607.20	0.02	6,719.52
324.000	ITRON INC 465741106	66.25	11,877.84	21,465.00	0.01	9,587.16

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31,172.000 JPMORGAN CHASE & CO 46625H100	94.06	1,368,392.83	2,932,038.32	0.90	1,563,645.49
2,076.000 JABIL INC 466313103	32.08	43,910.14	66,598.08	0.02	22,687.94
350.000 JACK IN THE BOX INC 466367109	74.09	10,024.00	25,931.50	0.01	15,907.50
1,042.000 JACOBS ENGINEERING GROUP INC 469814107	84.80	45,738.78	88,361.60	0.03	42,622.82
4,491.000 JEFFERIES FINANCIAL GROUP INC 47233W109	15.55	58,724.82	69,835.05	0.02	11,110.23
4,035.000 JETBLUE AIRWAYS CORP 477143101	10.90	24,492.45	43,981.50	0.01	19,489.05
29,185.000 JOHNSON & JOHNSON 478160104	140.63	2,626,444.67	4,104,286.55	1.27	1,477,841.88
519.000 JONES LANG LASALLE INC 48020Q107	103.46	45,104.12	53,695.74	0.02	8,591.62
507.000 J2 GLOBAL INC 48123V102	63.21	14,786.94	32,047.47	0.01	17,260.53
4,430.000 JUNIPER NETWORKS INC 48203R104	22.86	76,619.79	101,269.80	0.03	24,650.01

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1,822.000 KLA CORP 482480100	194.48	119,828.49	354,342.56	0.11	234,514.07
4,128.000 KKR & CO INC 48251W104	30.88	126,548.84	127,472.64	0.04	923.80
130.000 KAISER ALUMINUM CORP 483007704	73.62	6,880.90	9,570.60	0.00	2,689.70
1,110.000 KANSAS CITY SOUTHERN 485170302	149.29	65,587.67	165,711.90	0.05	100,124.23
2,800.000 KB HOME 48666K109	30.68	58,078.12	85,904.00	0.03	27,825.88
2,529.000 KELLOGG CO 487836108	66.06	154,966.22	167,065.74	0.05	12,099.52
713.000 KEMPER CORP 488401100	72.52	20,151.16	51,706.76	0.02	31,555.60
2,528.000 KENNAMETAL INC 489170100	28.71	57,600.17	72,578.88	0.02	14,978.71
5,640.000 KEYCORP 493267108	12.18	51,640.52	68,695.20	0.02	17,054.68
1,996.000 KEYSIGHT TECHNOLOGIES INC 49338L103	100.78	43,300.23	201,156.88	0.06	157,856.65

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4,071.000 KIMBERLY-CLARK CORP 494368103	141.35	405,635.84	575,435.85	0.18	169,800.01
5,803.000 KIMCO REALTY CORP 49446R109	12.84	60,733.39	74,510.52	0.02	13,777.13
16,786.000 KINDER MORGAN INC 49456B101	15.17	256,912.86	254,643.62	0.08	-2,269.24
1,185.000 KIRBY CORP 497266106	53.56	53,786.22	63,468.60	0.02	9,682.38
6,325.000 KITE REALTY GROUP TRUST 49803T300	11.54	59,238.62	72,990.50	0.02	13,751.88
5,076.000 KNOLL INC 498904200	12.19	54,484.69	61,876.44	0.02	7,391.75
2,500.000 KNIGHT-SWIFT TRANSPORTATION HO 499049104	41.71	67,917.96	104,275.00	0.03	36,357.04
2,042.000 KORN FERRY 500643200	30.73	55,119.19	62,750.66	0.02	7,631.47
8,192.000 KRAFT HEINZ CO/THE 500754106	31.89	231,241.84	261,242.88	0.08	30,001.04
1,748.000 KRATOS DEFENSE & SECURITY SOLU 50077B207	15.63	10,068.48	27,321.24	0.01	17,252.76

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7,248.000 KRATON CORP 50077C106	17.28	53,314.04	125,245.44	0.04	71,931.40
9,608.000 KROGER CO/THE 501044101	33.85	109,909.11	325,230.80	0.10	215,321.69
7,922.000 KRONOS WORLDWIDE INC 50105F105	10.41	62,469.97	82,468.02	0.03	19,998.05
416.000 LHC GROUP INC 50187A107	174.32	55,689.92	72,517.12	0.02	16,827.20
2,344.000 LKQ CORP 501889208	26.20	58,429.20	61,412.80	0.02	2,983.60
214.000 LCI INDUSTRIES 50189K103	114.98	4,981.92	24,605.72	0.01	19,623.80
972.000 LPL FINANCIAL HOLDINGS INC 50212V100	78.40	51,399.36	76,204.80	0.02	24,805.44
2,445.000 L3HARRIS TECHNOLOGIES INC 502431109	169.67	157,203.59	414,843.15	0.13	257,639.56
515.000 LA-Z-BOY INC 505336107	27.06	4,830.70	13,935.90	0.00	9,105.20
1,305.000 LABORATORY CORP OF AMERICA HOL 50540R409	166.11	164,239.52	216,773.55	0.07	52,534.03

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7,269.000 LAKELAND BANCORP INC 511637100	11.43	70,889.03	83,084.67	0.03	12,195.64
1,170.000 LAKELAND FINANCIAL CORP 511656100	46.59	30,263.12	54,510.30	0.02	24,247.18
1,269.000 LAM RESEARCH CORP 512807108	323.46	31,132.80	410,470.74	0.13	379,337.94
837.000 LAMAR ADVERTISING CO 512816109	66.76	29,927.49	55,878.12	0.02	25,950.63
1,451.000 LAMB WESTON HOLDINGS INC 513272104	63.93	35,428.61	92,762.43	0.03	57,333.82
151.000 LANCASTER COLONY CORP 513847103	154.99	9,917.68	23,403.49	0.01	13,485.81
381.000 LANDSTAR SYSTEM INC 515098101	112.31	17,145.00	42,790.11	0.01	25,645.11
3,543.000 LAS VEGAS SANDS CORP 517834107	45.54	127,091.94	161,348.22	0.05	34,256.28
2,563.000 ESTEE LAUDER COS INC/THE 518439104	188.68	275,046.13	483,586.84	0.15	208,540.71
900.000 LEAR CORP 521865204	109.02	44,976.99	98,118.00	0.03	53,141.01

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1,215.000 LEGGETT & PLATT INC 524660107	35.15	29,719.20	42,707.25	0.01	12,988.05
1,711.000 LEGG MASON INC 524901105	49.75	51,343.53	85,122.25	0.03	33,778.72
2,055.000 LEIDOS HOLDINGS INC 525327102	93.67	71,313.65	192,491.85	0.06	121,178.20
1,519.000 LENNAR CORP 526057104	61.62	56,787.59	93,600.78	0.03	36,813.19
54.000 LENNAR CORP 526057302	46.09	1,770.94	2,488.86	0.00	717.92
514.000 LENNOX INTERNATIONAL INC 526107107	232.99	23,730.67	119,756.86	0.04	96,026.19
1,869.000 LIBERTY BROADBAND CORP 530307305	123.96	168,577.66	231,681.24	0.07	63,103.58
2,305.000 LIBERTY MEDIA CORP-LIBERTY SIR 531229409	34.52	68,974.69	79,568.60	0.02	10,593.91
1,942.000 LIBERTY MEDIA CORP-LIBERTY FOR 531229870	29.18	60,546.85	56,667.56	0.02	-3,879.29
631.000 LIFE STORAGE INC 53223X107	94.95	50,095.94	59,913.45	0.02	9,817.51

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8,953.000 ELI LILLY AND CO 532457108	164.18	797,769.24	1,469,903.54	0.45	672,134.30
622.000 LINCOLN ELECTRIC HOLDINGS INC 533900106	84.24	32,375.10	52,397.28	0.02	20,022.18
4,063.000 LINCOLN NATIONAL CORP 534187109	36.79	124,639.03	149,477.77	0.05	24,838.74
100.000 LINDSAY CORP 535555106	92.21	6,217.00	9,221.00	0.00	3,004.00
181.000 LITTELFUSE INC 537008104	170.63	9,973.10	30,884.03	0.01	20,910.93
2,182.000 LIVE NATION ENTERTAINMENT INC 538034109	44.33	60,240.00	96,728.06	0.03	36,488.06
645.000 LIVERAMP HOLDINGS INC 53815P108	42.47	7,759.35	27,393.15	0.01	19,633.80
2,423.000 LOCKHEED MARTIN CORP 539830109	364.92	594,601.59	884,201.16	0.27	289,599.57
2,614.000 LOEWS CORP 540424108	34.29	81,208.91	89,634.06	0.03	8,425.15
818.000 LOGMEIN INC 54142L109	84.77	55,239.54	69,341.86	0.02	14,102.32

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2,122.000 LOUISIANA-PACIFIC CORP 546347105	25.65	36,880.36	54,429.30	0.02	17,548.94
8,935.000 LOWE'S COS INC 548661107	135.12	255,551.34	1,207,297.20	0.37	951,745.86
1,294.000 LULULEMON ATHLETICA INC 550021109	312.01	109,246.90	403,740.94	0.12	294,494.04
2,705.000 LYFT INC 55087P104	33.01	83,300.06	89,292.05	0.03	5,991.99
626.000 M&T BANK CORP 55261F104	103.97	49,737.49	65,085.22	0.02	15,347.73
2,366.000 MDC HOLDINGS INC 552676108	35.70	58,843.66	84,466.20	0.03	25,622.54
1,859.000 MDU RESOURCES GROUP INC 552690109	22.18	38,865.53	41,232.62	0.01	2,367.09
882.000 MGE ENERGY INC 55277P104	64.51	25,174.38	56,897.82	0.02	31,723.44
7,754.000 MGM RESORTS INTERNATIONAL 552953101	16.80	104,591.54	130,267.20	0.04	25,675.66
523.000 MKS INSTRUMENTS INC 55306N104	113.24	21,341.81	59,224.52	0.02	37,882.71

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593.000 MSA SAFETY INC 553498106	114.44	55,319.71	67,862.92	0.02	12,543.21
954.000 MSCI INC 55354G100	333.82	34,965.92	318,464.28	0.10	283,498.36
215.000 MYR GROUP INC 55405W104	31.91	5,061.10	6,860.65	0.00	1,799.55
1,201.000 STEVEN MADDEN LTD 556269108	24.69	20,129.58	29,652.69	0.01	9,523.11
233.000 MADISON SQUARE GARDEN SPORTS C 55825T103	146.89	37,162.79	34,225.37	0.01	-2,937.42
233.000 MADISON SQUARE GARDEN ENTERTAI 55826T102	75.00	14,101.87	17,475.00	0.01	3,373.13
1,121.000 MANHATTAN ASSOCIATES INC 562750109	94.20	31,487.64	105,598.20	0.03	74,110.56
656.000 MANPOWERGROUP INC 56418H100	68.75	31,605.26	45,100.00	0.01	13,494.74
770.000 MANTECH INTERNATIONAL CORP/VA 564563104	68.49	53,807.60	52,737.30	0.02	-1,070.30
5,669.000 MARATHON PETROLEUM CORP 56585A102	37.38	124,537.48	211,907.22	0.07	87,369.74

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513.000 MARCUS CORP/THE 566330106	13.27	4,945.32	6,807.51	0.00	1,862.19
73.000 MARKEL CORP 570535104	923.17	27,502.53	67,391.41	0.02	39,888.88
346.000 MARKETAXESS HOLDINGS INC 57060D108	500.92	27,960.82	173,318.32	0.05	145,357.50
778.000 MARRIOTT VACATIONS WORLDWIDE C 57164Y107	82.21	35,022.18	63,959.38	0.02	28,937.20
5,354.000 MARSH & MCLENNAN COS INC 571748102	107.37	213,446.86	574,858.98	0.18	361,412.12
3,578.000 MARRIOTT INTERNATIONAL INC/MD 571903202	85.73	169,300.00	306,741.94	0.09	137,441.94
595.000 MARTEN TRANSPORT LTD 573075108	25.16	4,971.82	14,970.20	0.00	9,998.38
458.000 MARTIN MARIETTA MATERIALS INC 573284106	206.57	44,419.35	94,609.06	0.03	50,189.71
2,430.000 MASCO CORP 574599106	50.21	28,982.15	122,010.30	0.04	93,028.15
875.000 MASIMO CORP 574795100	227.99	36,303.75	199,491.25	0.06	163,187.50

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450.000 MASTEC INC 576323109	44.87	8,212.50	20,191.50	0.01	11,979.00
9,649.000 MASTERCARD INC 57636Q104	295.70	518,861.49	2,853,209.30	0.88	2,334,347.81
861.000 MATCH GROUP INC 57665R106	107.05	54,268.83	92,170.05	0.03	37,901.22
2,418.000 MAXIM INTEGRATED PRODUCTS INC 57772K101	60.61	59,634.93	146,554.98	0.05	86,920.05
1,228.000 MAXLINEAR INC 57776J100	21.46	10,794.12	26,352.88	0.01	15,558.76
866.000 MAXIMUS INC 577933104	70.45	20,860.81	61,009.70	0.02	40,148.89
1,514.000 MCCORMICK & CO INC/MD 579780206	179.41	136,147.09	271,626.74	0.08	135,479.65
8,363.000 MCDONALD'S CORP 580135101	184.47	574,383.11	1,542,722.61	0.48	968,339.50
507.000 MCGRATH RENTCORP 580589109	54.01	14,893.26	27,383.07	0.01	12,489.81
1,667.000 MCKESSON CORP 58155Q103	153.42	91,895.48	255,751.14	0.08	163,855.66

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3,853.000 MEDICAL PROPERTIES TRUST INC 58463J304	18.80	47,930.78	72,436.40	0.02	24,505.62
340.000 MEDIFAST INC 58470H101	138.77	8,673.40	47,181.80	0.01	38,508.40
27,811.000 MERCK & CO INC 58933Y105	77.33	1,290,076.54	2,150,624.63	0.66	860,548.09
744.000 MERCURY SYSTEMS INC 589378108	78.66	58,525.12	58,523.04	0.02	-2.08
984.000 MERIDIAN BANCORP INC 58958U103	11.60	5,120.14	11,414.40	0.00	6,294.26
222.000 MERITAGE HOMES CORP 59001A102	76.12	5,072.70	16,898.64	0.01	11,825.94
1,923.000 MERITOR INC 59001K100	19.80	9,634.23	38,075.40	0.01	28,441.17
1,807.000 METLIFE INC 59156R108	36.52	59,412.86	65,991.64	0.02	6,578.78
324.000 METTLER-TOLEDO INTERNATIONAL I 592688105	805.55	59,209.59	260,998.20	0.08	201,788.61
80,370.000 MICROSOFT CORP 594918104	203.51	4,405,578.23	16,356,098.70	5.04	11,950,520.47

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3,063.000 MICROCHIP TECHNOLOGY INC 595017104	105.31	161,328.43	322,564.53	0.10	161,236.10
11,682.000 MICRON TECHNOLOGY INC 595112103	51.52	228,300.18	601,856.64	0.19	373,556.46
811.000 MID-AMERICA APARTMENT COMMUNIT 59522J103	114.67	47,776.97	92,997.37	0.03	45,220.40
527.000 MIDDLEBY CORP/THE 596278101	78.94	23,201.74	41,601.38	0.01	18,399.64
255.000 MIDDLESEX WATER CO 596680108	67.18	4,924.05	17,130.90	0.01	12,206.85
4,073.000 MIDLAND STATES BANCORP INC 597742105	14.95	55,449.11	60,891.35	0.02	5,442.24
152.000 MINERALS TECHNOLOGIES INC 603158106	46.93	4,883.76	7,133.36	0.00	2,249.60
655.000 MIRATI THERAPEUTICS INC 60468T105	114.17	50,683.90	74,781.35	0.02	24,097.45
250.000 MOBILE MINI INC 60740F105	29.50	5,067.50	7,375.00	0.00	2,307.50
3,223.000 MODERNA INC 60770K107	64.21	55,263.33	206,948.83	0.06	151,685.50

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
879.000 MOHAWK INDUSTRIES INC 608190104	101.76	72,055.32	89,447.04	0.03	17,391.72
445.000 MOLINA HEALTHCARE INC 60855R100	177.98	24,630.60	79,201.10	0.02	54,570.50
1,797.000 MOMENTA PHARMACEUTICALS INC 60877T100	33.27	65,550.57	59,786.19	0.02	-5,764.38
13,784.000 MONDELEZ INTERNATIONAL INC 609207105	51.13	288,157.31	704,775.92	0.22	416,618.61
395.000 MONGODB INC 60937P106	226.34	59,366.80	89,404.30	0.03	30,037.50
3,367.000 MONMOUTH REAL ESTATE INVESTMEN 609720107	14.49	35,589.19	48,787.83	0.02	13,198.64
514.000 MONOLITHIC POWER SYSTEMS INC 609839105	237.00	21,705.94	121,818.00	0.04	100,112.06
629.000 MONRO INC 610236101	54.94	26,212.87	34,557.26	0.01	8,344.39
3,912.000 MONSTER BEVERAGE CORP 61174X109	69.32	128,985.58	271,179.84	0.08	142,194.26
1,859.000 MOODY'S CORP 615369105	274.73	159,496.44	510,723.07	0.16	351,226.63

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
360.000 MOOG INC 615394202	52.98	14,846.40	19,072.80	0.01	4,226.40
12,774.000 MORGAN STANLEY 617446448	48.30	328,195.17	616,984.20	0.19	288,789.03
611.000 MORNINGSTAR INC 617700109	140.97	52,271.05	86,132.67	0.03	33,861.62
1,721.000 MOTOROLA SOLUTIONS INC 620076307	140.13	147,656.70	241,163.73	0.07	93,507.03
600.000 MUELLER INDUSTRIES INC 624756102	26.58	10,908.00	15,948.00	0.00	5,040.00
1,824.000 MUELLER WATER PRODUCTS INC 624758108	9.43	10,086.72	17,200.32	0.01	7,113.60
399.000 MURPHY USA INC 626755102	112.59	11,529.40	44,923.41	0.01	33,394.01
4,687.000 MYERS INDUSTRIES INC 628464109	14.55	58,241.91	68,195.85	0.02	9,953.94
549.000 MYOKARDIA INC 62857M105	96.62	58,213.22	53,044.38	0.02	-5,168.84
273.000 NBT BANCORP INC 628778102	30.76	5,978.70	8,397.48	0.00	2,418.78

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,910.000 NRG ENERGY INC 629377508	32.56	38,748.10	127,309.60	0.04	88,561.50
49.000 NVR INC 62944T105	3,258.75	49,298.50	159,678.75	0.05	110,380.25
1,524.000 NASDAQ INC 631103108	119.47	91,654.28	182,072.28	0.06	90,418.00
1,594.000 NATIONAL INSTRUMENTS CORP 636518102	38.71	59,620.44	61,703.74	0.02	2,083.30
7,602.000 NATIONAL OILWELL VARCO INC 637071101	12.25	79,711.97	93,124.50	0.03	13,412.53
1,962.000 NATIONAL RETAIL PROPERTIES INC 637417106	35.48	58,800.37	69,611.76	0.02	10,811.39
1,979.000 NATIONAL STORAGE AFFILIATES TR 637870106	28.66	40,549.71	56,718.14	0.02	16,168.43
2,309.000 NATIONAL VISION HOLDINGS INC 63845R107	30.52	58,229.20	70,470.68	0.02	12,241.48
84.000 NATIONAL WESTERN LIFE GROUP IN 638517102	203.19	13,623.84	17,067.96	0.01	3,444.12
1,887.000 NEKTAR THERAPEUTICS 640268108	23.16	10,001.10	43,702.92	0.01	33,701.82

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
233.000 NELNET INC 64031N108	47.74	5,039.79	11,123.42	0.00	6,083.63
433.000 NEOGEN CORP 640491106	77.60	9,941.91	33,600.80	0.01	23,658.89
2,404.000 NETAPP INC 64110D104	44.37	103,541.43	106,665.48	0.03	3,124.05
4,558.000 NETFLIX INC 64110L106	455.04	778,538.45	2,074,072.32	0.64	1,295,533.87
910.000 NEUROCRINE BIOSCIENCES INC 64125C109	122.00	20,787.24	111,020.00	0.03	90,232.76
1,312.000 NEVRO CORP 64157F103	119.47	49,434.60	156,744.64	0.05	107,310.04
1,812.000 NEW JERSEY RESOURCES CORP 646025106	32.65	57,737.33	59,161.80	0.02	1,424.47
9,887.000 NEW RESIDENTIAL INVESTMENT COR 64828T201	7.43	60,661.74	73,460.41	0.02	12,798.67
1,158.000 NEW RELIC INC 64829B100	68.90	52,178.69	79,786.20	0.02	27,607.51
4,772.000 NEWELL BRANDS INC 651229106	15.88	60,346.94	75,779.36	0.02	15,432.42

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136.000 NEWMARKET CORP 651587107	400.48	54,023.28	54,465.28	0.02	442.00
9,739.000 NEWMONT CORP 651639106	61.74	312,787.40	601,285.86	0.19	288,498.46
5,413.000 NEWS CORP 65249B109	11.86	60,116.36	64,198.18	0.02	4,081.82
4,096.000 NEXTERA ENERGY INC 65339F101	240.17	228,858.38	983,736.32	0.30	754,877.94
3,119.000 NEXPOINT RESIDENTIAL TRUST INC 65341D102	35.35	39,345.24	110,256.65	0.03	70,911.41
13,587.000 NIKE INC 654106103	98.05	698,707.75	1,332,205.35	0.41	633,497.60
2,607.000 NISOURCE INC 65473P105	22.74	27,532.93	59,283.18	0.02	31,750.25
7,756.000 NOBLE ENERGY INC 655044105	8.96	55,460.40	69,493.76	0.02	14,033.36
572.000 NORDSON CORP 655663102	189.71	43,237.16	108,514.12	0.03	65,276.96
2,804.000 NORFOLK SOUTHERN CORP 655844108	175.57	121,256.74	492,298.28	0.15	371,041.54

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,524.000 NORTHERN TRUST CORP 665859104	79.34	174,455.00	200,254.16	0.06	25,799.16
2,113.000 NORTHROP GRUMMAN CORP 666807102	307.44	130,834.58	649,620.72	0.20	518,786.14
5,643.000 NORTONLIFELOCK INC 668771108	19.83	98,955.00	111,900.69	0.03	12,945.69
2,365.000 NU SKIN ENTERPRISES INC 67018T105	38.23	49,445.32	90,413.95	0.03	40,968.63
3,269.000 NUANCE COMMUNICATIONS INC 67020Y100	25.31	58,554.75	82,722.05	0.03	24,167.30
3,209.000 NUCOR CORP 670346105	41.41	123,551.82	132,884.69	0.04	9,332.87
3,261.000 NUTANIX INC 67059N108	23.71	59,179.10	77,302.01	0.02	18,122.91
6,282.000 NVIDIA CORP 67066G104	379.91	405,978.49	2,386,594.62	0.74	1,980,616.13
743.000 NUVASIVE INC 670704105	55.66	36,726.49	41,355.38	0.01	4,628.89
1,751.000 OGE ENERGY CORP 670837103	30.36	47,625.60	53,160.36	0.02	5,534.76

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482.000 O'REILLY AUTOMOTIVE INC 67103H107	421.67	113,425.46	203,244.94	0.06	89,819.48
9,433.000 OCCIDENTAL PETROLEUM CORP 674599105	18.30	141,334.92	172,623.90	0.05	31,288.98
12,402.000 OCEANEERING INTERNATIONAL INC 675232102	6.39	44,342.15	79,248.78	0.02	34,906.63
652.000 OCEANFIRST FINANCIAL CORP 675234108	17.63	8,482.52	11,494.76	0.00	3,012.24
33,560.000 OFFICE DEPOT INC 676220106	2.35	50,512.80	78,866.00	0.02	28,353.20
1,010.000 OKTA INC 679295105	200.23	117,525.96	202,232.30	0.06	84,706.34
847.000 OLD DOMINION FREIGHT LINE INC 679580100	169.59	13,604.70	143,642.73	0.04	130,038.03
752.000 OLD NATIONAL BANCORP/IN 680033107	13.76	7,753.12	10,347.52	0.00	2,594.40
1,142.000 OLLIE'S BARGAIN OUTLET HOLDING 681116109	97.65	52,919.57	111,516.30	0.03	58,596.73
2,430.000 OMNICOM GROUP INC 681919106	54.60	113,723.75	132,678.00	0.04	18,954.25

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,072.000 OMEGA HEALTHCARE INVESTORS INC 681936100	29.73	77,860.62	91,330.56	0.03	13,469.94
3,940.000 ON SEMICONDUCTOR CORP 682189105	19.82	40,396.83	78,090.80	0.02	37,693.97
488.000 ONE GAS INC 68235P108	77.05	7,459.70	37,600.40	0.01	30,140.70
316.000 ONE LIBERTY PROPERTIES INC 682406103	17.62	4,964.36	5,567.92	0.00	603.56
5,797.000 ONEOK INC 682680103	33.22	168,420.89	192,576.34	0.06	24,155.45
25,217.000 ORACLE CORP 68389X105	55.27	450,511.79	1,393,743.59	0.43	943,231.80
220.000 ORMAT TECHNOLOGIES INC 686688102	63.49	4,802.60	13,967.80	0.00	9,165.20
1,107.000 OSHKOSH CORP 688239201	71.62	23,667.66	79,283.34	0.02	55,615.68
4,074.000 OTIS WORLDWIDE CORP 68902V107	56.86	149,444.83	231,647.64	0.07	82,202.81
1,277.000 OTTER TAIL CORP 689648103	38.79	35,347.36	49,534.83	0.02	14,187.47

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,446.000 OWENS CORNING 690742101	55.76	40,919.94	80,628.96	0.02	39,709.02
155.000 OXFORD INDUSTRIES INC 691497309	44.01	5,068.50	6,821.55	0.00	1,753.05
5,276.000 PNC FINANCIAL SERVICES GROUP I 693475105	105.21	440,191.91	555,087.96	0.17	114,896.05
1,656.000 PNM RESOURCES INC 69349H107	38.44	40,561.08	63,656.64	0.02	23,095.56
1,986.000 PPG INDUSTRIES INC 693506107	106.06	105,038.40	210,635.16	0.06	105,596.76
4,036.000 PPL CORP 69351T106	25.84	103,666.96	104,290.24	0.03	623.28
627.000 PRA HEALTH SCIENCES INC 69354M108	97.29	51,144.39	61,000.83	0.02	9,856.44
193.000 PS BUSINESS PARKS INC 69360J107	132.40	9,588.24	25,553.20	0.01	15,964.96
946.000 PTC INC 69370C100	77.79	21,587.72	73,589.34	0.02	52,001.62
3,671.000 PACCAR INC 693718108	74.85	149,774.67	274,774.35	0.08	124,999.68

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3,094.000 PACIFIC PREMIER BANCORP INC 69478X105	21.68	57,020.54	67,077.92	0.02	10,057.38
752.000 PACIRA BIOSCIENCES INC 695127100	52.47	12,791.52	39,457.44	0.01	26,665.92
863.000 PACKAGING CORP OF AMERICA 695156109	99.80	22,248.14	86,127.40	0.03	63,879.26
3,436.000 PACWEST BANCORP 695263103	19.71	55,169.98	67,723.56	0.02	12,553.58
998.000 PALO ALTO NETWORKS INC 697435105	229.67	142,809.78	229,210.66	0.07	86,400.88
7,133.000 PAR PACIFIC HOLDINGS INC 69888T207	8.99	58,126.11	64,125.67	0.02	5,999.56
7,043.000 PARK HOTELS & RESORTS INC 700517105	9.89	56,912.44	69,655.27	0.02	12,742.83
340.000 PARK NATIONAL CORP 700658107	70.38	21,654.60	23,929.20	0.01	2,274.60
1,413.000 PARKER-HANNIFIN CORP 701094104	183.27	93,345.65	258,960.51	0.08	165,614.86
24,642.000 PATTERSON-UTI ENERGY INC 703481101	3.47	52,122.83	85,507.74	0.03	33,384.91

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3,189.000 PAYCHEX INC 704326107	75.75	122,181.96	241,566.75	0.07	119,384.79
400.000 PAYCOM SOFTWARE INC 70432V102	309.73	111,880.00	123,892.00	0.04	12,012.00
486.000 PAYLOCITY HOLDING CORP 70438V106	145.89	66,222.36	70,902.54	0.02	4,680.18
12,807.000 PAYPAL HOLDINGS INC 70450Y103	174.23	420,338.66	2,231,363.61	0.69	1,811,024.95
5,109.000 PEBBLEBROOK HOTEL TRUST 70509V100	13.66	56,995.89	69,788.94	0.02	12,793.05
354.000 PENSKE AUTOMOTIVE GROUP INC 70959W103	38.71	7,625.16	13,703.34	0.00	6,078.18
2,793.000 PEOPLES BANCORP INC/OH 709789101	21.28	57,646.93	59,435.04	0.02	1,788.11
16,635.000 PEPSICO INC 713448108	132.26	1,508,907.16	2,200,145.10	0.68	691,237.94
1,407.000 PERKINELMER INC 714046109	98.09	72,251.90	138,012.63	0.04	65,760.73
1,312.000 PERSPECTA INC 715347100	23.23	13,507.85	30,477.76	0.01	16,969.91

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52,099.000 PFIZER INC 717081103	32.70	1,566,651.88	1,703,637.30	0.53	136,985.42
11,995.000 PHILIP MORRIS INTERNATIONAL IN 718172109	70.06	526,391.25	840,369.70	0.26	313,978.45
4,892.000 PHILLIPS 66 718546104	71.90	166,189.77	351,734.80	0.11	185,545.03
3,550.000 PHYSICIANS REALTY TRUST 71943U104	17.52	54,870.25	62,196.00	0.02	7,325.75
1,515.000 PINNACLE FINANCIAL PARTNERS IN 72346Q104	41.99	53,087.55	63,614.85	0.02	10,527.30
1,117.000 PINNACLE WEST CAPITAL CORP 723484101	73.29	60,274.75	81,864.93	0.03	21,590.18
4,268.000 PINTEREST INC 72352L106	22.17	94,775.94	94,621.56	0.03	-154.38
993.000 PIONEER NATURAL RESOURCES CO 723787107	97.70	77,374.26	97,016.10	0.03	19,641.84
172.000 PIPER SANDLER COS 724078100	59.16	4,819.44	10,175.52	0.00	5,356.08
1,033.000 PLANET FITNESS INC 72703H101	60.57	58,561.84	62,568.81	0.02	4,006.97

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298.000 PLEXUS CORP 729132100	70.56	9,506.20	21,026.88	0.01	11,520.68
760.000 POLARIS INC 731068102	92.55	60,351.60	70,338.00	0.02	9,986.40
1,242.000 POLYONE CORP 73179P106	26.23	20,837.56	32,577.66	0.01	11,740.10
382.000 POOL CORP 73278L105	271.87	10,948.12	103,854.34	0.03	92,906.22
1,547.000 POPULAR INC 733174700	37.17	41,928.35	57,501.99	0.02	15,573.64
1,280.000 PORTLAND GENERAL ELECTRIC CO 736508847	41.81	45,493.20	53,516.80	0.02	8,023.60
733.000 POST HOLDINGS INC 737446104	87.62	48,673.46	64,225.46	0.02	15,552.00
229.000 POWER INTEGRATIONS INC 739276103	118.13	8,408.88	27,051.77	0.01	18,642.89
878.000 PREFERRED BANK/LOS ANGELES CA 740367404	42.85	26,866.80	37,622.30	0.01	10,755.50
1,790.000 PRESTIGE CONSUMER HEALTHCARE I 74112D101	37.56	51,440.64	67,232.40	0.02	15,791.76

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2,501.000 T ROWE PRICE GROUP INC 74144T108	123.50	119,183.16	308,873.50	0.10	189,690.34
1,148.000 PRICESMART INC 741511109	60.33	64,737.14	69,258.84	0.02	4,521.70
865.000 PRIMERICA INC 74164M108	116.60	44,720.50	100,859.00	0.03	56,138.50
2,497.000 PRIMO WATER CORP 74167P108	13.75	40,067.33	34,333.75	0.01	-5,733.58
3,234.000 PRINCIPAL FINANCIAL GROUP INC 74251V102	41.54	101,904.48	134,340.36	0.04	32,435.88
4,556.000 PROASSURANCE CORP 74267C106	14.47	65,998.66	65,925.32	0.02	-73.34
25,830.000 PROCTER & GAMBLE CO/THE 742718109	119.57	1,848,835.71	3,088,493.10	0.95	1,239,657.39
6,503.000 PROGRESSIVE CORP/THE 743315103	80.11	222,797.51	520,955.33	0.16	298,157.82
7,695.000 PROLOGIS INC 74340W103	93.33	297,662.54	718,174.35	0.22	420,511.81
544.000 PROOFPOINT INC 743424103	111.12	46,560.96	60,449.28	0.02	13,888.32

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
613.000 PROS HOLDINGS INC 74346Y103	44.43	9,814.13	27,235.59	0.01	17,421.46
1,592.000 PROSPERITY BANCSHARES INC 743606105	59.38	74,266.31	94,532.96	0.03	20,266.65
688.000 PROTO LABS INC 743713109	112.47	53,918.56	77,379.36	0.02	23,460.80
6,060.000 PRUDENTIAL FINANCIAL INC 744320102	60.90	340,169.49	369,054.00	0.11	28,884.51
4,296.000 PUBLIC SERVICE ENTERPRISE GROU 744573106	49.16	132,634.02	211,191.36	0.07	78,557.34
1,814.000 PUBLIC STORAGE 74460D109	191.89	242,590.24	348,088.46	0.11	105,498.22
2,828.000 PULTEGROUP INC 745867101	34.03	52,675.64	96,236.84	0.03	43,561.20
4,392.000 PURE STORAGE INC 74624M102	17.33	57,523.07	76,113.36	0.02	18,590.29
122.000 QUAKER CHEMICAL CORP 747316107	185.65	4,941.00	22,649.30	0.01	17,708.30
1,105.000 QTS REALTY TRUST INC 74736A103	64.09	52,741.12	70,819.45	0.02	18,078.33

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,160.000 QORVO INC 74736K101	110.53	29,297.77	128,214.80	0.04	98,917.03
3,086.000 Q2 HOLDINGS INC 74736L109	85.79	110,962.13	264,747.94	0.08	153,785.81
12,501.000 QUALCOMM INC 747525103	91.21	471,755.20	1,140,216.21	0.35	668,461.01
781.000 QUALYS INC 74758T303	104.02	28,037.90	81,239.62	0.03	53,201.72
1,822.000 QUANTA SERVICES INC 74762E102	39.23	42,147.42	71,477.06	0.02	29,329.64
1,242.000 QUEST DIAGNOSTICS INC 74834L100	113.96	86,130.62	141,538.32	0.04	55,407.70
330.000 QUIDEL CORP 74838J101	223.74	61,399.80	73,834.20	0.02	12,434.40
7,639.000 QURATE RETAIL INC 74915M100	9.50	57,297.50	72,570.50	0.02	15,273.00
793.000 RLI CORP 749607107	82.10	65,517.66	65,105.30	0.02	-412.36
77.000 RMR GROUP INC/THE 74967R106	29.47	1,001.00	2,269.19	0.00	1,268.19

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1,120.000 RPM INTERNATIONAL INC 749685103	75.06	27,540.52	84,067.20	0.03	56,526.68
55,021.000 RTI SURGICAL HOLDINGS INC 74975N105	3.18	154,465.45	174,966.78	0.05	20,501.33
246.000 RAFAEL HOLDINGS INC 75062E106	14.37	691.75	3,535.02	0.00	2,843.27
25,078.000 RANGE RESOURCES CORP 75281A109	5.63	48,781.71	141,189.14	0.04	92,407.43
1,428.000 RAYMOND JAMES FINANCIAL INC 754730109	68.83	60,409.74	98,289.24	0.03	37,879.50
16,240.000 RAYTHEON TECHNOLOGIES CORP 75513E101	61.62	563,465.44	1,000,708.80	0.31	437,243.36
130.000 RBC BEARINGS INC 75524B104	134.04	4,838.60	17,425.20	0.01	12,586.60
2,167.000 REALTY INCOME CORP 756109104	59.50	87,676.21	128,936.50	0.04	41,260.29
397.000 REATA PHARMACEUTICALS INC 75615P103	156.02	64,536.32	61,939.94	0.02	-2,596.38
1,462.000 REGENCY CENTERS CORP 758849103	45.89	60,904.61	67,091.18	0.02	6,186.57

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1,029.000 REGENERON PHARMACEUTICALS INC 75886F107	623.65	266,680.68	641,735.85	0.20	375,055.17
8,710.000 REGIONS FINANCIAL CORP 7591EP100	11.12	55,933.70	96,855.20	0.03	40,921.50
669.000 REINSURANCE GROUP OF AMERICA I 759351604	78.44	41,224.82	52,476.36	0.02	11,251.54
643.000 RELIANCE STEEL & ALUMINUM CO 759509102	94.93	34,415.93	61,039.99	0.02	26,624.06
415.000 RENASANT CORP 75970E107	24.90	6,102.92	10,333.50	0.00	4,230.58
637.000 REPLIGEN CORP 759916109	123.61	60,183.76	78,739.57	0.02	18,555.81
2,681.000 REPUBLIC SERVICES INC 760759100	82.05	66,865.64	219,976.05	0.07	153,110.41
1,722.000 RESMED INC 761152107	192.00	106,801.77	330,624.00	0.10	223,822.23
9,207.000 RETAIL OPPORTUNITY INVESTMENTS 76131N101	11.33	84,417.53	104,315.31	0.03	19,897.78
4,720.000 REVANCE THERAPEUTICS INC 761330109	24.42	54,119.80	115,262.40	0.04	61,142.60

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2,265.000 REXNORD CORP 76169B102	29.15	57,993.38	66,024.75	0.02	8,031.37
1,933.000 RINGCENTRAL INC 76680R206	285.01	29,110.98	550,924.33	0.17	521,813.35
1,166.000 ROBERT HALF INTERNATIONAL INC 770323103	52.83	34,465.11	61,599.78	0.02	27,134.67
1,240.000 ROCKWELL AUTOMATION INC 773903109	213.00	81,197.00	264,120.00	0.08	182,923.00
110.000 ROGERS CORP 775133101	124.60	4,951.10	13,706.00	0.00	8,754.90
1,203.000 ROKU INC 77543R102	116.53	141,816.23	140,185.59	0.04	-1,630.64
1,396.000 ROLLINS INC 775711104	42.39	22,843.03	59,176.44	0.02	36,333.41
1,290.000 ROPER TECHNOLOGIES INC 776696106	388.26	368,027.82	500,855.40	0.15	132,827.58
3,978.000 ROSS STORES INC 778296103	85.24	194,450.14	339,084.72	0.10	144,634.58
746.000 ROYAL GOLD INC 780287108	124.32	43,299.19	92,742.72	0.03	49,443.53

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275.000 RUSH ENTERPRISES INC 781846209	41.46	5,049.00	11,401.50	0.00	6,352.50
281.000 S&T BANCORP INC 783859101	23.45	4,979.32	6,589.45	0.00	1,610.13
2,731.000 S&P GLOBAL INC 78409V104	329.48	252,553.91	899,809.88	0.28	647,255.97
1,131.000 SBA COMMUNICATIONS CORP 78410G104	297.92	50,146.35	336,947.52	0.10	286,801.17
1,672.000 SEI INVESTMENTS CO 784117103	54.98	50,149.42	91,926.56	0.03	41,777.14
1,473.000 SL GREEN REALTY CORP 78440X101	49.29	56,929.08	72,604.17	0.02	15,675.09
3,438.000 SLM CORP 78442P106	7.03	19,830.04	24,169.14	0.01	4,339.10
31,841.000 SM ENERGY CO 78454L100	3.75	53,975.49	119,403.75	0.04	65,428.26
558.000 SPS COMMERCE INC 78463M107	75.12	10,041.21	41,916.96	0.01	31,875.75
2,688.000 SS&C TECHNOLOGIES HOLDINGS INC 78467J100	56.48	96,327.54	151,818.24	0.05	55,490.70

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641.000 SVB FINANCIAL GROUP 78486Q101	215.53	64,993.76	138,154.73	0.04	73,160.97
4,374.000 SABRA HEALTH CARE REIT INC 78573L106	14.43	59,093.37	63,116.82	0.02	4,023.45
9,419.000 SABRE CORP 78573M104	8.06	59,350.35	75,917.14	0.02	16,566.79
495.000 SAFETY INSURANCE GROUP INC 78648T100	76.26	29,328.75	37,748.70	0.01	8,419.95
1,717.000 SAGE THERAPEUTICS INC 78667J108	41.58	65,654.49	71,392.86	0.02	5,738.37
168.000 SAIA INC 78709Y105	111.18	1,733.76	18,678.24	0.01	16,944.48
7,257.000 SALESFORCE.COM INC 79466L302	187.33	477,395.89	1,359,453.81	0.42	882,057.92
6,947.000 SALLY BEAUTY HOLDINGS INC 79546E104	12.53	55,780.37	87,045.91	0.03	31,265.54
175.000 SANDERSON FARMS INC 800013104	115.89	8,447.25	20,280.75	0.01	11,833.50
276.000 SANDY SPRING BANCORP INC 800363103	24.78	4,832.76	6,839.28	0.00	2,006.52

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3,867.000 SANTANDER CONSUMER USA HOLDING 80283M101	18.41	60,078.84	71,191.47	0.02	11,112.63
1,000.000 SAREPTA THERAPEUTICS INC 803607100	160.34	51,480.00	160,340.00	0.05	108,860.00
1,460.000 HENRY SCHEIN INC 806407102	58.39	37,746.40	85,249.40	0.03	47,503.00
23,283.000 SCHLUMBERGER LTD 806857108	18.39	389,885.55	428,174.37	0.13	38,288.82
12,816.000 CHARLES SCHWAB CORP/THE 808513105	33.74	285,208.42	432,411.84	0.13	147,203.42
190.000 SCHWEITZER-MAUDUIT INTERNATION 808541106	33.41	5,102.45	6,347.90	0.00	1,245.45
649.000 SCIENCE APPLICATIONS INTERNATI 808625107	77.68	45,166.18	50,414.32	0.02	5,248.14
604.000 SCOTTS MIRACLE-GRO CO/THE 810186106	134.47	42,563.88	81,219.88	0.03	38,656.00
621.000 SEACOAST BANKING CORP OF FLORI 811707801	20.40	4,685.76	12,668.40	0.00	7,982.64
1,269.000 SEALED AIR CORP 81211K100	32.85	29,787.80	41,686.65	0.01	11,898.85

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1,177.000 SEATTLE GENETICS INC 812578102	169.92	25,325.08	199,995.84	0.06	174,670.76
429.000 SELECTIVE INSURANCE GROUP INC 816300107	52.74	6,803.94	22,625.46	0.01	15,821.52
2,097.000 SEMTECH CORP 816850101	52.22	42,254.55	109,505.34	0.03	67,250.79
3,384.000 SEMPRA ENERGY 816851109	117.23	236,478.26	396,706.32	0.12	160,228.06
1,485.000 SERVICE CORP INTERNATIONAL/US 817565104	38.89	13,780.80	57,751.65	0.02	43,970.85
10,406.000 SERVICE PROPERTIES TRUST 81761L102	7.09	62,441.00	73,778.54	0.02	11,337.54
1,195.000 SERVICEMASTER GLOBAL HOLDINGS 81761R109	35.69	29,923.91	42,649.55	0.01	12,725.64
2,007.000 SERVICENOW INC 81762P102	405.06	228,093.79	812,955.42	0.25	584,861.63
1,362.000 SHENANDOAH TELECOMMUNICATIONS 82312B106	49.29	27,076.56	67,132.98	0.02	40,056.42
958.000 SHERWIN-WILLIAMS CO/THE 824348106	577.85	188,989.87	553,580.30	0.17	364,590.43

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842.000 SIGNATURE BANK/NEW YORK NY 82669G104	106.92	62,258.68	90,026.64	0.03	27,767.96
588.000 SILICON LABORATORIES INC 826919102	100.27	34,485.81	58,958.76	0.02	24,472.95
284.000 SILGAN HOLDINGS INC 827048109	32.39	5,689.94	9,198.76	0.00	3,508.82
1,266.000 SIMMONS FIRST NATIONAL CORP 828730200	17.11	15,451.53	21,661.26	0.01	6,209.73
3,915.000 SIMON PROPERTY GROUP INC 828806109	68.38	222,670.62	267,707.70	0.08	45,037.08
20,595.000 SIRIUS XM HOLDINGS INC 82968B103	5.87	40,984.05	120,892.65	0.04	79,908.60
3,809.000 SIX FLAGS ENTERTAINMENT CORP 83001A102	19.21	58,501.33	73,170.89	0.02	14,669.56
3,023.000 SKECHERS USA INC 830566105	31.38	56,693.01	94,861.74	0.03	38,168.73
1,661.000 SKYWORKS SOLUTIONS INC 83088M102	127.86	41,005.04	212,375.46	0.07	171,370.42
3,286.000 SLACK TECHNOLOGIES INC 83088V102	31.09	106,356.39	102,161.74	0.03	-4,194.65

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2,452.000 A O SMITH CORP 831865209	47.12	31,556.68	115,538.24	0.04	83,981.56
1,359.000 SMARTSHEET INC 83200N103	50.92	67,024.08	69,200.28	0.02	2,176.20
1,070.000 J M SMUCKER CO/THE 832696405	105.81	111,921.65	113,216.70	0.03	1,295.05
490.000 SNAP-ON INC 833034101	138.51	39,011.50	67,869.90	0.02	28,858.40
432.000 SOLAREDGE TECHNOLOGIES INC 83417M104	138.78	66,143.52	59,952.96	0.02	-6,190.56
995.000 SONOCO PRODUCTS CO 835495102	52.29	41,690.05	52,028.55	0.02	10,338.50
1,836.000 SOUTH JERSEY INDUSTRIES INC 838518108	24.99	42,962.40	45,881.64	0.01	2,919.24
503.000 SOUTH STATE CORP 840441109	47.66	16,034.04	23,972.98	0.01	7,938.94
13,973.000 SOUTHERN CO/THE 842587107	51.85	647,881.08	724,500.05	0.22	76,618.97
1,263.000 SOUTHERN COPPER CORP 84265V105	39.77	35,427.15	50,229.51	0.02	14,802.36

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1,108.000 SOUTHSIDE BANCSHARES INC 84470P109	27.72	16,283.15	30,713.76	0.01	14,430.61
7,440.000 SOUTHWEST AIRLINES CO 844741108	34.18	130,995.25	254,299.20	0.08	123,303.95
48,043.000 SPECTRUM PHARMACEUTICALS INC 84763A108	3.38	146,290.34	162,385.34	0.05	16,095.00
2,852.000 SPIRIT AEROSYSTEMS HOLDINGS IN 848574109	23.94	57,116.30	68,276.88	0.02	11,160.58
931.000 SPIRE INC 84857L101	65.71	59,491.49	61,176.01	0.02	1,684.52
1,668.000 SPLUNK INC 848637104	198.70	129,164.85	331,431.60	0.10	202,266.75
3,619.000 SQUARE INC 852234103	104.94	154,177.53	379,777.86	0.12	225,600.33
2,133.000 STAG INDUSTRIAL INC 85254J102	29.32	52,210.17	62,539.56	0.02	10,329.39
1,586.000 STANLEY BLACK & DECKER INC 854502101	139.38	99,451.77	221,056.68	0.07	121,604.91
12,364.000 STARBUCKS CORP 855244109	73.59	263,631.50	909,866.76	0.28	646,235.26

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308.000 STATE AUTO FINANCIAL CORP 855707105	17.85	4,989.60	5,497.80	0.00	508.20
3,765.000 STATE STREET CORP 857477103	63.55	208,774.16	239,265.75	0.07	30,491.59
3,095.000 STEEL DYNAMICS INC 858119100	26.09	67,336.96	80,748.55	0.02	13,411.59
1,619.000 STERICYCLE INC 858912108	55.98	82,153.38	90,631.62	0.03	8,478.24
1,475.000 STIFEL FINANCIAL CORP 860630102	47.43	58,937.33	69,959.25	0.02	11,021.92
1,395.000 STOCK YARDS BANCORP INC 861025104	40.20	27,532.50	56,079.00	0.02	28,546.50
3,306.000 STORE CAPITAL CORP 862121100	23.81	61,843.73	78,715.86	0.02	16,872.13
204.000 STRATEGIC EDUCATION INC 86272C103	153.65	9,764.90	31,344.60	0.01	21,579.70
4,138.000 STRYKER CORP 863667101	180.19	348,927.12	745,626.22	0.23	396,699.10
11,419.000 SUMMIT HOTEL PROPERTIES INC 866082100	5.93	61,039.55	67,714.67	0.02	6,675.12

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581.000 SUN COMMUNITIES INC 866674104	135.68	42,847.63	78,830.08	0.02	35,982.45
2,377.000 SUNSTONE HOTEL INVESTORS INC 867892101	8.15	19,479.71	19,372.55	0.01	-107.16
1,479.000 SYNOPSYS INC 871607107	195.00	39,454.24	288,405.00	0.09	248,950.76
390.000 SYNNEX CORP 87162W100	119.77	23,023.70	46,710.30	0.01	23,686.60
6,468.000 SYNCHRONY FINANCIAL 87165B103	22.16	114,068.18	143,330.88	0.04	29,262.70
5,579.000 SYSCO CORP 871829107	54.66	224,023.10	304,948.14	0.09	80,925.04
2,587.000 TCF FINANCIAL CORP 872307103	29.42	63,624.95	76,109.54	0.02	12,484.59
3,100.000 TD AMERITRADE HOLDING CORP 87236Y108	36.38	72,874.49	112,778.00	0.03	39,903.51
13,658.000 TJX COS INC/THE 872540109	50.56	448,157.95	690,548.48	0.21	242,390.53
4,275.000 T-MOBILE US INC 872590104	104.15	165,524.86	445,241.25	0.14	279,716.39

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
4,275.000 T-MOBILE US INC 872590112 RTS	0.17	20,520.00	718.20	0.00	-19,801.80
1,451.000 TAKE-TWO INTERACTIVE SOFTWARE 874054109	139.57	111,716.68	202,516.07	0.06	90,799.39
5,175.000 TARGET CORP 87612E106	119.93	395,645.24	620,637.75	0.19	224,992.51
7,572.000 TARGA RESOURCES CORP 87612G101	20.07	64,567.66	151,970.04	0.05	87,402.38
2,206.000 TAUBMAN CENTERS INC 876664103	37.76	69,416.79	83,298.56	0.03	13,881.77
3,701.000 TEGNA INC 87901J105	11.14	38,739.39	41,229.14	0.01	2,489.75
611.000 TELADOC HEALTH INC 87918A105	190.84	65,474.76	116,603.24	0.04	51,128.48
535.000 TELEDYNE TECHNOLOGIES INC 879360105	310.95	45,249.54	166,358.25	0.05	121,108.71
460.000 TELEFLEX INC 879369106	363.98	44,985.47	167,430.80	0.05	122,445.33
497.000 TEMPUR SEALY INTERNATIONAL INC 88023U101	71.95	19,671.26	35,759.15	0.01	16,087.89

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
724.000 10X GENOMICS INC 88025U109	89.31	64,052.28	64,660.44	0.02	608.16
2,996.000 TENET HEALTHCARE CORP 88033G407	18.11	58,748.77	54,257.56	0.02	-4,491.21
205.000 TENNANT CO 880345103	65.01	9,667.80	13,327.05	0.00	3,659.25
2,753.000 TERADATA CORP 88076W103	20.80	54,638.28	57,262.40	0.02	2,624.12
1,729.000 TERADYNE INC 880770102	84.51	29,563.28	146,117.79	0.05	116,554.51
567.000 TERRENO REALTY CORP 88146M101	52.64	9,769.41	29,846.88	0.01	20,077.47
1,538.000 TESLA INC 88160R101	1,079.81	609,685.87	1,660,747.78	0.51	1,051,061.91
853.000 TETRA TECH INC 88162G103	79.12	53,064.06	67,489.36	0.02	14,425.30
10,284.000 TEXAS INSTRUMENTS INC 882508104	126.97	492,982.83	1,305,759.48	0.40	812,776.65
1,020.000 TEXAS ROADHOUSE INC 882681109	52.57	35,720.40	53,621.40	0.02	17,901.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,535.000 TEXTRON INC 883203101	32.91	92,187.47	116,336.85	0.04	24,149.38
414.000 TRADE DESK INC/THE 88339J105	406.50	132,282.09	168,291.00	0.05	36,008.91
4,496.000 THERMO FISHER SCIENTIFIC INC 883556102	362.34	426,912.17	1,629,080.64	0.50	1,202,168.47
6,054.000 3M CO 88579Y101	155.99	519,946.75	944,363.46	0.29	424,416.71
753.000 TIFFANY & CO 886547108	121.94	96,376.47	91,820.82	0.03	-4,555.65
1,937.000 TIMKEN CO/THE 887389104	45.49	59,799.48	88,114.13	0.03	28,314.65
354.000 TOMPKINS FINANCIAL CORP 890110109	64.77	13,784.76	22,928.58	0.01	9,143.82
271.000 TOPBUILD CORP 89055F103	113.77	3,771.58	30,831.67	0.01	27,060.09
984.000 TORO CO/THE 891092108	66.34	14,696.04	65,278.56	0.02	50,582.52
1,087.000 TOWNE BANK/PORTSMOUTH VA 89214P109	18.84	14,036.02	20,479.08	0.01	6,443.06

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,371.000 TRACTOR SUPPLY CO 892356106	131.79	46,974.62	180,684.09	0.06	133,709.47
1,014.000 TRADEWEB MARKETS INC 892672106	58.14	63,547.31	58,953.96	0.02	-4,593.35
626.000 TRANSDIGM GROUP INC 893641100	442.05	134,841.04	276,723.30	0.09	141,882.26
1,464.000 TRANSUNION 89400J107	87.04	74,222.48	127,426.56	0.04	53,204.08
634.000 TRAVELERS COS INC/THE 89417E109	114.05	51,410.30	72,307.70	0.02	20,897.40
760.000 TREX CO INC 89531P105	130.07	4,913.40	98,853.20	0.03	93,939.80
422.000 TRICO BANCSHARES 896095106	30.45	6,055.70	12,849.90	0.00	6,794.20
2,230.000 TRIMBLE INC 896239100	43.19	52,048.06	96,313.70	0.03	44,265.64
3,272.000 TRINITY INDUSTRIES INC 896522109	21.29	56,005.28	69,660.88	0.02	13,655.60
15,791.000 TRUIST FINANCIAL CORP 89832Q109	37.55	439,468.56	592,952.05	0.18	153,483.49

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508.000 TRUSTMARK CORP 898402102	24.52	11,536.68	12,456.16	0.00	919.48
2,159.000 TTEC HOLDINGS INC 89854H102	46.56	53,580.58	100,523.04	0.03	46,942.46
1,290.000 TWILIO INC 90138F102	219.42	128,694.63	283,051.80	0.09	154,357.17
8,504.000 TWITTER INC 90184L102	29.79	170,446.48	253,334.16	0.08	82,887.68
3,019.000 2U INC 90214J101	37.96	54,875.32	114,601.24	0.04	59,725.92
605.000 TYLER TECHNOLOGIES INC 902252105	346.88	24,641.80	209,862.40	0.06	185,220.60
3,168.000 TYSON FOODS INC 902494103	59.71	51,073.23	189,161.28	0.06	138,088.05
1,807.000 UDR INC 902653104	37.38	45,305.15	67,545.66	0.02	22,240.51
2,602.000 UGI CORP 902681105	31.80	64,577.68	82,743.60	0.03	18,165.92
254.000 UMB FINANCIAL CORP 902788108	51.55	10,170.16	13,093.70	0.00	2,923.54

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,662.000 UFP INDUSTRIES INC 90278Q108	49.51	41,326.13	82,285.62	0.03	40,959.49
6,718.000 US BANCORP 902973304	36.82	221,704.40	247,356.76	0.08	25,652.36
13,321.000 UBER TECHNOLOGIES INC 90353T100	31.08	445,296.26	414,016.68	0.13	-31,279.58
587.000 UBIQUITI INC 90353W103	174.56	10,114.01	102,466.72	0.03	92,352.71
629.000 ULTA BEAUTY INC 90384S303	203.42	67,430.73	127,951.18	0.04	60,520.45
1,387.000 ULTRAGENYX PHARMACEUTICAL INC 90400D108	78.22	55,908.03	108,491.14	0.03	52,583.11
1,390.000 UMPQUA HOLDINGS CORP 904214103	10.64	14,640.26	14,789.60	0.00	149.34
6,495.000 UNDER ARMOUR INC 904311107	9.74	67,325.67	63,261.30	0.02	-4,064.37
97.000 UNIFIRST CORP/MA 904708104	178.95	4,938.27	17,358.15	0.01	12,419.88
7,580.000 UNION PACIFIC CORP 907818108	169.07	486,029.85	1,281,550.60	0.40	795,520.75

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2,209.000 UNITED BANKSHARES INC/WV 909907107	27.66	54,954.97	61,100.94	0.02	6,145.97
2,503.000 UNITED AIRLINES HOLDINGS INC 910047109	34.61	56,248.54	86,628.83	0.03	30,380.29
8,702.000 UNITED INSURANCE HOLDINGS CORP 910710102	7.82	64,870.58	68,049.64	0.02	3,179.06
7,764.000 UNITED PARCEL SERVICE INC 911312106	111.18	658,270.06	863,201.52	0.27	204,931.46
1,265.000 UNITED RENTALS INC 911363109	149.04	78,089.85	188,535.60	0.06	110,445.75
3,144.000 US FOODS HOLDING CORP 912008109	19.72	57,713.12	61,999.68	0.02	4,286.56
463.000 UNITED THERAPEUTICS CORP 91307C102	121.00	26,249.51	56,023.00	0.02	29,773.49
10,501.000 UNITEDHEALTH GROUP INC 91324P102	294.95	991,058.51	3,097,269.95	0.95	2,106,211.44
434.000 UNITIL CORP 913259107	44.82	12,143.23	19,451.88	0.01	7,308.65
4,632.000 UNIVAR SOLUTIONS INC 91336L107	16.86	55,718.23	78,095.52	0.02	22,377.29

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802.000 UNIVERSAL DISPLAY CORP 91347P105	149.62	42,778.68	119,995.24	0.04	77,216.56
706.000 UNIVERSAL HEALTH REALTY INCOME 91359E105	79.49	35,504.74	56,119.94	0.02	20,615.20
17,135.000 UNITY BIOTECHNOLOGY INC 91381U101	8.68	145,738.17	148,731.80	0.05	2,993.63
583.000 UNIVERSAL HEALTH SERVICES INC 913903100	92.89	26,135.84	54,154.87	0.02	28,019.03
3,818.000 UNIVEST FINANCIAL CORP 915271100	16.14	57,003.57	61,622.52	0.02	4,618.95
3,998.000 UNUM GROUP 91529Y106	16.59	57,876.05	66,326.82	0.02	8,450.77
6,461.000 URBAN EDGE PROPERTIES 91704F104	11.87	61,158.36	76,692.07	0.02	15,533.71
1,653.000 US ECOLOGY INC 91734M103	33.88	50,843.01	56,003.64	0.02	5,160.63
1,561.000 VF CORP 918204108	60.94	37,707.49	95,127.34	0.03	57,419.85
442.000 VSE CORP 918284100	31.39	4,906.20	13,874.38	0.00	8,968.18

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
318.000 VAIL RESORTS INC 91879Q109	182.15	21,824.38	57,923.70	0.02	36,099.32
2,741.000 VALERO ENERGY CORP 91913Y100	58.82	131,343.38	161,225.62	0.05	29,882.24
242.000 VALMONT INDUSTRIES INC 920253101	113.62	20,410.28	27,496.04	0.01	7,085.76
2,477.000 VALVOLINE INC 92047W101	19.33	33,886.88	47,880.41	0.01	13,993.53
371.000 VAREX IMAGING CORP 92214X106	15.15	5,354.41	5,620.65	0.00	266.24
928.000 VARIAN MEDICAL SYSTEMS INC 92220P105	122.52	39,655.34	113,698.56	0.04	74,043.22
81.000 VECTRUS INC 92242T101	49.13	1,152.03	3,979.53	0.00	2,827.50
1,382.000 VEEVA SYSTEMS INC 922475108	234.42	35,627.96	323,968.44	0.10	288,340.48
5,006.000 VENTAS INC 92276F100	36.62	162,374.61	183,319.72	0.06	20,945.11
12,129.000 VEREIT INC 92339V100	6.43	60,346.77	77,989.47	0.02	17,642.70

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,338.000 VERISIGN INC 92343E102	206.83	31,500.80	276,738.54	0.09	245,237.74
45,284.000 VERIZON COMMUNICATIONS INC 92343V104	55.13	1,605,355.90	2,496,506.92	0.77	891,151.02
1,475.000 VERISK ANALYTICS INC 92345Y106	170.20	74,381.41	251,045.00	0.08	176,663.59
2,762.000 VERTEX PHARMACEUTICALS INC 92532F100	290.31	349,888.44	801,836.22	0.25	451,947.78
6,628.000 VIAVI SOLUTIONS INC 925550105	12.74	42,419.20	84,440.72	0.03	42,021.52
9,022.000 VIACOMCBS INC 92556H206	23.32	143,881.54	210,393.04	0.06	66,511.50
3,656.000 VICI PROPERTIES INC 925652109	20.19	63,052.72	73,814.64	0.02	10,761.92
18,929.000 VISA INC 92826C839	193.17	851,620.99	3,656,514.93	1.13	2,804,893.94
1,153.000 VISHAY INTERTECHNOLOGY INC 928298108	15.27	10,884.32	17,606.31	0.01	6,721.99
1,123.000 VISTEON CORP 92839U206	68.50	59,633.26	76,925.50	0.02	17,292.24

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
4,458.000 VISTRA CORP 92840M102	18.62	76,686.61	83,007.96	0.03	6,321.35
424.000 VLASIC FOODS INTL INC COM 928559103	0.00	4,492.60	0.00	0.00	-4,492.60
840.000 VMWARE INC 928563402	154.86	37,371.60	130,082.40	0.04	92,710.80
14,238.000 VONAGE HOLDINGS CORP 92886T201	10.06	44,085.50	143,234.28	0.04	99,148.78
936.000 VULCAN MATERIALS CO 929160109	115.85	51,676.89	108,435.60	0.03	56,758.71
328.000 WD-40 CO 929236107	198.30	23,211.58	65,042.40	0.02	41,830.82
587.000 WSFS FINANCIAL CORP 929328102	28.70	9,817.89	16,846.90	0.01	7,029.01
1,802.000 WP CAREY INC 92936U109	67.65	109,125.11	121,905.30	0.04	12,780.19
4,961.000 WEC ENERGY GROUP INC 92939U106	87.65	312,325.53	434,831.65	0.13	122,506.12
1,081.000 WESTINGHOUSE AIR BRAKE TECHNOL 929740108	57.57	45,201.57	62,233.17	0.02	17,031.60

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16,332.000 WALMART INC 931142103	119.78	1,160,364.35	1,956,246.96	0.60	795,882.61
7,958.000 WALGREENS BOOTS ALLIANCE INC 931427108	42.39	324,541.89	337,339.62	0.10	12,797.73
1,272.000 WASHINGTON FEDERAL INC 938824109	26.84	19,728.72	34,140.48	0.01	14,411.76
526.000 WASHINGTON TRUST BANCORP INC 940610108	32.75	11,698.24	17,226.50	0.01	5,528.26
4,163.000 WASTE MANAGEMENT INC 94106L109	105.91	298,933.34	440,903.33	0.14	141,969.99
330.000 WATERS CORP 941848103	180.40	39,539.61	59,532.00	0.02	19,992.39
223.000 WATSCO INC 942622200	177.70	14,637.72	39,627.10	0.01	24,989.38
239.000 WATTS WATER TECHNOLOGIES INC 942749102	81.00	7,918.07	19,359.00	0.01	11,440.93
687.000 WAYFAIR INC 94419L101	197.61	59,311.46	135,758.07	0.04	76,446.61
572.000 WEBSTER FINANCIAL CORP 947890109	28.61	11,422.84	16,364.92	0.01	4,942.08

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4,148.000 WEINGARTEN REALTY INVESTORS 948741103	18.93	71,107.53	78,521.64	0.02	7,414.11
27,474.000 WELLS FARGO & CO 949746101	25.60	961,857.47	703,334.40	0.22	-258,523.07
5,164.000 WELLTOWER INC 95040Q104	51.75	221,880.30	267,237.00	0.08	45,356.70
4,237.000 WENDY'S CO/THE 95058W100	21.78	19,744.42	92,281.86	0.03	72,537.44
261.000 WESBANCO INC 950810101	20.31	4,909.41	5,300.91	0.00	391.50
715.000 WEST PHARMACEUTICAL SERVICES I 955306105	227.17	38,477.44	162,426.55	0.05	123,949.11
229.000 WESTAMERICA BANCORP 957090103	57.42	11,021.77	13,149.18	0.00	2,127.41
1,683.000 WESTERN ALLIANCE BANCORP 957638109	37.87	51,479.55	63,735.21	0.02	12,255.66
2,369.000 WESTERN DIGITAL CORP 958102105	44.15	67,475.04	104,591.35	0.03	37,116.31
381.000 WEX INC 96208T104	165.01	20,544.63	62,868.81	0.02	42,324.18

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7,858.000 WEYERHAEUSER CO 962166104	22.46	146,457.77	176,490.68	0.05	30,032.91
545.000 WHIRLPOOL CORP 963320106	129.53	46,266.85	70,593.85	0.02	24,327.00
9,973.000 WILLIAMS COS INC/THE 969457100	19.02	175,491.12	189,686.46	0.06	14,195.34
1,116.000 WILLIAMS-SONOMA INC 969904101	82.01	45,329.34	91,523.16	0.03	46,193.82
1,742.000 WINTRUST FINANCIAL CORP 97650W108	43.62	56,089.82	75,986.04	0.02	19,896.22
4,046.000 WOLVERINE WORLD WIDE INC 978097103	23.81	67,621.53	96,335.26	0.03	28,713.73
488.000 WOODWARD INC 980745103	77.55	15,796.56	37,844.40	0.01	22,047.84
1,824.000 WORKDAY INC 98138H101	187.36	175,757.13	341,744.64	0.11	165,987.51
2,407.000 WORLD FUEL SERVICES CORP 981475106	25.76	54,752.21	62,004.32	0.02	7,252.11
456.000 WORTHINGTON INDUSTRIES INC 981811102	37.30	8,974.08	17,008.80	0.01	8,034.72

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Report ID : IACS0005
Base Currency : USD
Status : FINAL

PARAMETRIC US MON - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,044.000 WYNDHAM DESTINATIONS INC 98310W108	28.18	64,657.66	85,779.92	0.03	21,122.26
1,961.000 WYNDHAM HOTELS & RESORTS INC 98311A105	42.62	60,942.73	83,577.82	0.03	22,635.09
742.000 WYNN RESORTS LTD 983134107	74.49	60,873.68	55,271.58	0.02	-5,602.10
2,753.000 XPO LOGISTICS INC 983793100	77.25	78,460.50	212,669.25	0.07	134,208.75
3,901.000 XPERI HOLDING CORP 98390M103	14.76	52,570.97	57,578.76	0.02	5,007.79
2,717.000 XILINX INC 983919101	98.39	63,931.01	267,325.63	0.08	203,394.62
1,269.000 XYLEM INC/NY 98419M100	64.96	33,996.51	82,434.24	0.03	48,437.73
545.000 YORK WATER CO/THE 987184108	47.96	10,224.20	26,138.20	0.01	15,914.00
2,336.000 YUM! BRANDS INC 988498101	86.91	87,408.55	203,021.76	0.06	115,613.21
4,123.000 YUM CHINA HOLDINGS INC 98850P109	48.07	85,474.39	198,192.61	0.06	112,718.22

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PARAMETRIC US MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
612.000 ZEBRA TECHNOLOGIES CORP 989207105	255.95	18,948.88	156,641.40	0.05	137,692.52
1,169.000 ZENDESK INC 98936J101	88.53	54,766.80	103,491.57	0.03	48,724.77
1,620.000 ZILLOW GROUP INC 98954M200	57.61	53,764.70	93,328.20	0.03	39,563.50
2,160.000 ZIMMER BIOMET HOLDINGS INC 98956P102	119.36	167,932.13	257,817.60	0.08	89,885.47
2,461.000 ZIONS BANCORP NA 989701107	34.00	65,129.76	83,674.00	0.03	18,544.24
5,182.000 ZOETIS INC 98978V103	137.04	270,797.15	710,141.28	0.22	439,344.13
901.000 ZSCALER INC 98980G102	109.50	59,552.41	98,659.50	0.03	39,107.09
1,776.000 ZOOM VIDEO COMMUNICATIONS INC 98980L101	253.54	430,800.44	450,287.04	0.14	19,486.60
15,998.000 ZYNGA INC 98986T108	9.54	47,054.75	152,620.92	0.05	105,566.17
1,069.000 ALLEGION PLC G0176J109	102.22	34,764.11	109,273.18	0.03	74,509.07

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
18,234.000 AMCOR PLC G0250X107	10.21	169,393.67	186,169.14	0.06	16,775.47
1,779.000 AMDOCS LTD G02602103	60.88	52,712.09	108,305.52	0.03	55,593.43
2,883.000 AON PLC G0403H108	192.60	161,003.23	555,265.80	0.17	394,262.57
1,924.000 ARGO GROUP INTERNATIONAL HOLDI G0464B107	34.83	53,946.57	67,012.92	0.02	13,066.35
1,966.000 ASSURED GUARANTY LTD G0585R106	24.41	26,934.20	47,990.06	0.01	21,055.86
1,301.000 ATLASSIAN CORP PLC G06242104	180.27	107,117.28	234,531.27	0.07	127,413.99
1,981.000 ATHENE HOLDING LTD G0684D107	31.19	53,868.78	61,787.39	0.02	7,918.61
1,354.000 AXIS CAPITAL HOLDINGS LTD G0692U109	40.56	47,999.07	54,918.24	0.02	6,919.17
3,078.000 AXALTA COATING SYSTEMS LTD G0750C108	22.55	56,774.09	69,408.90	0.02	12,634.81
1,464.000 BIOHAVEN PHARMACEUTICAL HOLDIN G11196105	73.11	48,778.16	107,033.04	0.03	58,254.88

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
7,281.000	ACCENTURE PLC G1151C101	214.72	565,596.66	1,563,376.32	0.48	997,779.66
2,819.000	CARDTRONICS PLC G1991C105	23.98	52,593.44	67,599.62	0.02	15,006.18
4,261.000	CONSOLIDATED WATER CO LTD G23773107	14.43	64,491.40	61,486.23	0.02	-3,005.17
4,221.000	EATON CORP PLC G29183103	87.48	222,770.14	369,253.08	0.11	146,482.94
50.000	ENSTAR GROUP LTD G3075P101	152.77	5,024.00	7,638.50	0.00	2,614.50
1,960.000	ESSENT GROUP LTD G3198U102	36.27	54,196.45	71,089.20	0.02	16,892.75
11,610.000	FRONTLINE LTD/BERMUDA G3682E192	6.98	53,004.65	81,037.80	0.02	28,033.15
3,425.000	FRUIT OF THE LOOM INC CL A G3682L105	0.00	29,060.51	0.00	0.00	-29,060.51
1,895.000	GENPACT LTD G3922B107	36.52	52,368.15	69,205.40	0.02	16,837.25
9,056.000	GREENLIGHT CAPITAL RE LTD G4095J109	6.52	60,110.58	59,045.12	0.02	-1,065.46

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245.000 HELEN OF TROY LTD G4388N106	188.56	7,935.55	46,197.20	0.01	38,261.65
1,732.000 HERBALIFE NUTRITION LTD G4412G101	44.98	20,641.11	77,905.36	0.02	57,264.25
3,184.000 JANUS HENDERSON GROUP PLC G4474Y214	21.16	61,217.40	67,373.44	0.02	6,156.04
4,386.000 HORIZON THERAPEUTICS PLC G46188101	55.58	10,570.26	243,773.88	0.08	233,203.62
3,806.000 IHS MARKIT LTD G47567105	75.50	256,418.32	287,353.00	0.09	30,934.68
1,804.000 JAMES RIVER GROUP HOLDINGS LTD G5005R107	45.00	58,680.10	81,180.00	0.03	22,499.90
6,345.000 JOHNSON CONTROLS INTERNATIONAL G51502105	34.14	180,585.25	216,618.30	0.07	36,033.05
5,593.000 LINDE PLC G5494J103	212.11	713,262.74	1,186,331.23	0.37	473,068.49
6,982.000 MARVELL TECHNOLOGY GROUP LTD G5876H105	35.06	127,792.86	244,788.92	0.08	116,996.06
13,510.000 MEDTRONIC PLC G5960L103	91.70	1,020,437.49	1,238,867.00	0.38	218,429.51

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,347.000 APTIV PLC G6095L109	77.92	109,495.34	182,878.24	0.06	73,382.90
4,929.000 NORWEGIAN CRUISE LINE HOLDINGS G66721104	16.43	59,603.01	80,983.47	0.02	21,380.46
1,880.000 NVENT ELECTRIC PLC G6700G107	18.73	22,866.48	35,212.40	0.01	12,345.92
600.000 RENAISSANCERE HOLDINGS LTD G7496G103	171.03	41,926.25	102,618.00	0.03	60,691.75
3,551.000 PENTAIR PLC G7S00T104	37.99	96,051.70	134,902.49	0.04	38,850.79
3,291.000 SENSATA TECHNOLOGIES HOLDING P G8060N102	37.23	107,283.69	122,523.93	0.04	15,240.24
374.000 STERIS PLC G8473T100	153.44	54,633.48	57,386.56	0.02	2,753.08
1,733.000 STONECO LTD G85158106	38.76	64,879.85	67,171.08	0.02	2,291.23
8,130.000 THIRD POINT REINSURANCE LTD G8827U100	7.51	59,882.45	61,056.30	0.02	1,173.85
2,642.000 TRANE TECHNOLOGIES PLC G8994E103	88.98	59,692.74	235,085.16	0.07	175,392.42

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
62.000 WHITE MOUNTAINS INSURANCE GROU G9618E107	887.97	28,722.62	55,054.14	0.02	26,331.52
1,358.000 WILLIS TOWERS WATSON PLC G96629103	196.95	226,143.02	267,458.10	0.08	41,315.08
1,327.000 PERRIGO CO PLC G97822103	55.27	69,133.47	73,343.29	0.02	4,209.82
2,599.000 CHUBB LTD H1467J104	126.62	147,505.82	329,085.38	0.10	181,579.56
1,632.000 GARMIN LTD H2906T109	97.50	88,738.94	159,120.00	0.05	70,381.06
1,371.000 SPOTIFY TECHNOLOGY SA L8681T102	258.19	239,977.98	353,978.49	0.11	114,000.51
3,231.000 TRINSEO SA L9340P101	22.16	54,398.88	71,598.96	0.02	17,200.08
1,038.000 ELASTIC NV N14506104	92.21	58,693.21	95,713.98	0.03	37,020.77
2,231.000 LYONDELLBASELL INDUSTRIES NV N53745100	65.72	93,673.60	146,621.32	0.05	52,947.72
5,414.000 MYLAN NV N59465109	16.08	87,723.71	87,057.12	0.03	-666.59

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PARAMETRIC US MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
671.000 NXP SEMICONDUCTORS NV N6596X109	114.04	54,599.27	76,520.84	0.02	21,921.57
2,679.000 QIAGEN NV N72482123	42.81	49,107.62	114,687.99	0.04	65,580.37
1,810.000 ROYAL CARIBBEAN CRUISES LTD V7780T103	50.30	76,305.55	91,043.00	0.03	14,737.45
TOTAL EQUITY U.S. DOLLAR		**153,444,841.60**	**323,769,428.95**	**99.82**	**170,324,587.35**
PREFERRED SECURITIES					
385.000 GCI LIBERTY INC 36164V503 PFD 7.000% CUMULATIVE	26.21	2,789.59	10,090.85	0.00	7,301.26
TOTAL ASSETS U.S. DOLLAR		**154,017,581.32**	**324,349,469.93**	**100.00**	**170,331,888.61**
TOTAL ASSETS		**154,017,581.32**	**324,349,469.93**	**100.00**	**170,331,888.61**

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6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
350.280 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	350.28	350.28	4,433.92	0.00
CASH		-342.38	-342.38	-4,333.92	0.00
TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**7.90**	**7.90**	**100.00**	**0.00**
TOTAL ASSETS U.S. DOLLAR		**7.90**	**7.90**	**100.00**	**0.00**
TOTAL ASSETS		**7.90**	**7.90**	**100.00**	**0.00**

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PARAMETRIC EAFE MON - [redacted]

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
AUSTRALIAN DOLLAR						
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		340.07	341.87	0.00	1.80
EQUITY						
2,716.000 AA6041997	RAMSAY HEALTH CARE LTD	45.80	79,274.97	124,390.14	0.12	45,115.17
10,164.000 AA6065582	AUSTRALIA & NEW ZEALAND BANKIN	12.83	122,147.34	130,441.12	0.13	8,293.78
15,436.000 AA6076142	WESTPAC BANKING CORP	12.36	194,918.18	190,766.96	0.19	-4,151.22
21,926.000 AA6086257	FORTESCUE METALS GROUP LTD	9.54	59,360.99	209,080.31	0.21	149,719.32
51,994.000 AA6087289	TELSTRA CORP LTD	2.16	106,779.58	112,047.33	0.11	5,267.75
12,665.000 AA6091281	BENDIGO & ADELAIDE BANK LTD	4.83	51,125.56	61,126.17	0.06	10,000.61
1,636.000 AA6129222	ASX LTD	58.78	47,491.01	96,170.84	0.10	48,679.83
23,529.000 AA6144692	BHP GROUP LTD	24.66	492,075.31	580,273.85	0.58	88,198.54

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PARAMETRIC EAFE MON - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
48,452.000 MIRVAC GROUP AA6161977	1.49	70,786.41	72,389.47	0.07	1,603.06
8,784.000 COMPUTERSHARE LTD AA6180415	9.12	64,596.18	80,133.14	0.08	15,536.96
3,688.000 CSL LTD AA6185497	197.60	201,622.34	728,746.96	0.72	527,124.62
1,185.000 REA GROUP LTD AA6198573	74.28	49,916.32	88,016.33	0.09	38,100.01
28,117.000 TRANSURBAN GROUP AA6200882	9.73	196,368.91	273,536.38	0.27	77,167.47
593.000 COCHLEAR LTD AA6211798	130.08	56,328.89	77,136.43	0.08	20,807.54
21,557.000 ORIGIN ENERGY LTD AA6214867	4.02	72,558.77	86,677.25	0.09	14,118.48
10,306.000 COMMONWEALTH BANK OF AUSTRALIA AA6215039	47.80	449,171.30	492,582.18	0.49	43,410.88
26,447.000 BORAL LTD AA6218678	2.61	47,592.35	69,011.20	0.07	21,418.85
2,295.000 RIO TINTO LTD AA6220104	67.45	104,527.12	154,787.33	0.15	50,260.21

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
7,658.000 APA GROUP AA6247305	7.66	45,347.73	58,683.29	0.06	13,335.56
6,916.000 ARISTOCRAT LEISURE LTD AA6253980	17.56	41,837.62	121,422.48	0.12	79,584.86
14,862.000 INSURANCE AUSTRALIA GROUP LTD AA6271024	3.97	55,534.78	59,041.45	0.06	3,506.67
4,083.000 ORICA LTD AA6458001	11.46	43,443.81	46,777.46	0.05	3,333.65
5,935.000 LENDLEASE CORP LTD AA6512005	8.52	53,075.13	50,546.88	0.05	-2,528.25
8,228.000 WORLEY LTD AA6562471	6.00	46,088.88	49,398.61	0.05	3,309.73
12,715.000 NATIONAL AUSTRALIA BANK LTD AA6624602	12.54	160,590.49	159,502.94	0.16	-1,087.55
4,346.000 NEWCREST MINING LTD AA6637109	21.71	43,111.85	94,344.73	0.09	51,232.88
38,726.000 OIL SEARCH LTD AA6657602	2.18	67,958.06	84,521.24	0.08	16,563.18
54,008.000 AMP LTD AA6709957	1.28	48,752.47	68,977.26	0.07	20,224.79

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
5,315.000 NORTHERN STAR RESOURCES LTD AA6717455	9.20	48,949.99	48,889.28	0.05	-60.71
19,021.000 SANTOS LTD AA6776709	3.65	55,629.83	69,408.58	0.07	13,778.75
2,736.000 SONIC HEALTHCARE LTD AA6821125	20.95	39,548.35	57,322.09	0.06	17,773.74
20,172.000 STOCKLAND AA6850850	2.28	50,830.44	45,970.68	0.05	-4,859.76
29,588.000 TABCORP HOLDINGS LTD AA6873266	2.33	56,992.27	68,855.12	0.07	11,862.85
4,881.000 WESFARMERS LTD AA6948837	30.87	114,003.30	150,654.29	0.15	36,650.99
8,941.000 WOODSIDE PETROLEUM LTD AA6979725	14.91	105,751.36	133,274.77	0.13	27,523.41
10,144.000 WOOLWORTHS GROUP LTD AA6981234	25.67	211,379.83	260,368.89	0.26	48,989.06
1,413.000 MAGELLAN FINANCIAL GROUP LTD AAB015YX4	39.94	43,572.89	56,435.06	0.06	12,862.17
16,185.000 DEXUS AAB033YN9	6.33	85,166.32	102,519.03	0.10	17,352.71

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
15,221.000 GOODMAN GROUP AAB03FYZ5	10.22	72,465.09	155,622.93	0.15	83,157.84
4,318.000 SEEK LTD AAB0767Y4	15.07	45,159.95	65,077.72	0.06	19,917.77
11,052.000 BRAMBLES LTD AAB1FJ0C0	7.48	75,682.93	82,713.11	0.08	7,030.18
3,207.000 MACQUARIE GROUP LTD AAB28YTC2	81.66	186,692.65	261,871.11	0.26	75,178.46
7,564.000 CROWN RESORTS LTD AAB29LCJ2	6.66	46,230.27	50,359.56	0.05	4,129.29
3,973.000 JAMES HARDIE INDUSTRIES PLC AAB60QWJ9	18.95	30,109.01	75,278.50	0.07	45,169.49
6,624.000 TREASURY WINE ESTATES LTD AAB61JC64	7.22	38,097.43	47,795.34	0.05	9,697.91
15,914.000 AURIZON HOLDINGS LTD AAB87CVM3	3.39	41,792.45	53,907.40	0.05	12,114.95
1,404.000 AFTERPAY LTD AABF5L8B9	41.99	54,337.09	58,956.23	0.06	4,619.14
346.000 ONEMARKET LTD AABFM70D5	0.00	399.03	0.00	0.00	-399.03

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45,166.000 SCENTRE GROUP AABLZH0Z7	1.49	71,441.53	67,480.04	0.07	-3,961.49
2,617.000 AMPOL LTD AABM91204	20.19	51,429.55	52,828.91	0.05	1,399.36
4,034.000 AGL ENERGY LTD AABSS7GP7	11.74	45,267.25	47,354.82	0.05	2,087.57
37,883.000 SOUTH32 LTD AABWSW5D2	1.40	45,861.07	53,208.19	0.05	7,347.12
3,009.000 CIMIC GROUP LTD AABX17Q17	16.61	45,346.54	49,969.32	0.05	4,622.78
9,237.000 COLES GROUP LTD AABYWR0T4	11.82	84,664.13	109,195.61	0.11	24,531.48
TOTAL EQUITY AUSTRALIAN DOLLAR		**4,819,182.90**	**6,645,846.31**	**6.60**	**1,826,663.41**
TOTAL ASSETS AUSTRALIAN DOLLAR		**4,819,522.97**	**6,646,188.18**	**6.60**	**1,826,665.21**
DANISH KRONE					
CASH & CASH EQUIVALENTS					
NON-BASE CURRENCY		656.66	657.87	0.00	1.21
EQUITY					
831.000 CARLSBERG AS SD4169217	132.10	70,566.71	109,773.97	0.11	39,207.26

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
93.000 AP MOLLER - MAERSK A/S SD4253045	1,164.57	86,101.86	108,304.61	0.11	22,202.75
4,042.000 DANSKE BANK A/S SD4588820	13.30	54,313.98	53,771.92	0.05	-542.06
449.000 GENMAB A/S SD4595734	334.54	65,888.53	150,209.09	0.15	84,320.56
1,577.000 VESTAS WIND SYSTEMS A/S SD5964657	101.78	88,890.51	160,505.40	0.16	71,614.89
1,503.000 DSV PANALPINA A/S SDB1WT5G0	122.03	56,099.94	183,414.49	0.18	127,314.55
1,372.000 PANDORA A/S SDB44XTX3	54.30	42,831.23	74,492.97	0.07	31,661.74
667.000 CHR HANSEN HOLDING A/S SDB573M10	103.07	40,486.53	68,750.97	0.07	28,264.44
1,000.000 NOVOZYMES A/S SDB798FW3	57.79	26,215.68	57,791.27	0.06	31,575.59
1,081.000 COLOPLAST A/S SDB8FMRX8	154.91	47,921.02	167,461.78	0.17	119,540.76
13,465.000 NOVO NORDISK A/S SDBHC8X98	64.71	292,648.20	871,295.14	0.86	578,646.94

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,146.000 ISS A/S SDBKJ9RT5	15.82	42,090.36	49,778.86	0.05	7,688.50
1,523.000 TRYG A/S SDBXDZ973	28.93	30,307.61	44,065.43	0.04	13,757.82
1,251.000 ORSTED A/S SDBYT16L1	115.34	81,338.30	144,292.14	0.14	62,953.84
TOTAL EQUITY DANISH KRONE		**1,025,700.46**	**2,243,908.04**	**2.23**	**1,218,207.58**
TOTAL ASSETS DANISH KRONE		**1,026,357.12**	**2,244,565.91**	**2.23**	**1,218,208.79**
EURO CURRENCY UNIT					
CASH & CASH EQUIVALENTS					
NON-BASE CURRENCY		56,498.51	56,283.37	0.06	-215.14
EQUITY					
1,342.000 OMV AG EA4651454	33.42	40,323.59	44,856.27	0.04	4,532.68
1,038.000 VERBUND AG EA4661602	44.77	37,609.28	46,469.97	0.05	8,860.69
2,604.000 VOESTALPINE AG EA4943406	21.50	37,647.34	55,993.05	0.06	18,345.71
2,773.000 ERSTE GROUP BANK AG EA5289833	23.53	51,800.71	65,248.67	0.06	13,447.96

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,410.000 ANDRITZ AG EAB1WVF67	36.39	40,144.84	51,309.98	0.05	11,165.14
2,054.000 KBC GROUP NV EB4497740	57.35	109,637.05	117,792.87	0.12	8,155.82
753.000 SOLVAY SA EB4821105	80.04	49,072.72	60,266.86	0.06	11,194.14
974.000 UCB SA EB5596995	115.80	61,356.83	112,786.05	0.11	51,429.22
653.000 COLRUYT SA EB5806220	55.00	31,337.60	35,915.43	0.04	4,577.83
768.000 GROUPE BRUXELLES LAMBERT SA EB7097323	83.88	52,701.17	64,417.41	0.06	11,716.24
1,238.000 TELENET GROUP HOLDING NV EBB0LKSK8	41.15	38,926.24	50,946.44	0.05	12,020.20
2,342.000 AGEAS SA/NV EBB86S2N3	35.42	79,256.71	82,963.36	0.08	3,706.65
1,622.000 UMICORE SA EBBF44467	47.07	35,842.13	76,349.51	0.08	40,507.38
6,180.000 ANHEUSER-BUSCH INBEV SA/NV EBBYYHL24	49.27	297,402.92	304,469.90	0.30	7,066.98

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,476.000 ADIDAS AG ED4031974	262.37	88,150.45	387,254.93	0.38	299,104.48
2,874.000 FRESENIUS SE & CO KGAA ED4352099	49.55	80,610.17	142,416.41	0.14	61,806.24
1,307.000 UNITED INTERNET AG ED4354137	42.35	20,278.07	55,356.66	0.05	35,078.59
522.000 HANNOVER RUECK SE ED4511801	172.29	37,410.72	89,936.01	0.09	52,525.29
1,949.000 GEA GROUP AG ED4557101	31.62	38,268.91	61,620.89	0.06	23,351.98
1,092.000 CONTINENTAL AG ED4598584	97.89	86,931.46	106,899.98	0.11	19,968.52
5,965.000 DEUTSCHE POST AG ED4617855	36.56	137,466.67	218,071.65	0.22	80,604.98
1,200.000 MERCK KGAA ED4741846	116.02	79,217.07	139,225.67	0.14	60,008.60
4,824.000 RWE AG ED4768963	34.94	92,645.26	168,556.33	0.17	75,911.07
8,121.000 SAP SE ED4846280	139.63	545,975.95	1,133,935.29	1.13	587,959.34

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
12,141.000 E.ON SE ED4942907	11.25	101,283.67	136,566.19	0.14	35,282.52
646.000 HENKEL AG & CO KGAA ED5002461	83.28	30,417.97	53,799.90	0.05	23,381.93
682.000 PUMA SE ED5064727	77.30	36,400.40	52,715.31	0.05	16,314.91
6,856.000 BAYER AG ED5069213	73.89	469,264.67	506,603.82	0.50	37,339.15
4,432.000 BASF SE ED5086571	56.02	228,515.11	248,292.70	0.25	19,777.59
926.000 BEIERSDORF AG ED5107401	113.55	75,337.25	105,147.73	0.10	29,810.48
579.000 HOCHTIEF AG ED5108664	88.67	42,963.79	51,341.49	0.05	8,377.70
1,051.000 HEIDELBERGCEMENT AG ED5120677	53.39	50,589.74	56,117.67	0.06	5,527.93
2,255.000 FRESENIUS MEDICAL CARE AG & CO ED5129074	85.70	140,751.27	193,245.26	0.19	52,493.99
3,266.000 ALLIANZ SE ED5231482	204.14	451,301.16	666,733.47	0.66	215,432.31

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,345.000 MUENCHENER RUECKVERSICHERUNGS- ED5294126	259.90	232,061.63	349,561.34	0.35	117,499.71
460.000 VOLKSWAGEN AG ED5497109	160.95	56,612.24	74,035.80	0.07	17,423.56
4,191.000 DAIMLER AG ED5529026	40.60	122,864.35	170,138.92	0.17	47,274.57
6,299.000 SIEMENS AG ED5727976	117.66	609,641.18	741,147.86	0.74	131,506.68
13,606.000 DEUTSCHE BANK AG ED5750358	9.51	90,510.11	129,343.28	0.13	38,833.17
3,642.000 BAYERISCHE MOTOREN WERKE AG ED5756025	63.82	189,155.04	232,422.91	0.23	43,267.87
26,108.000 DEUTSCHE TELEKOM AG ED5842353	16.79	388,513.05	438,235.23	0.44	49,722.18
9,557.000 INFINEON TECHNOLOGIES AG ED5889503	23.45	97,495.00	224,071.10	0.22	126,576.10
461.000 CARL ZEISS MEDITEC AG ED5922965	97.49	39,074.56	44,942.62	0.04	5,868.06
1,439.000 DEUTSCHE BOERSE AG ED7021964	180.88	156,415.66	260,291.08	0.26	103,875.42

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
780.000 WIRECARD AG ED7508929	6.44	87,213.99	5,019.81	0.00	-82,194.18
894.000 LANXESS AG EDB05M8B0	52.74	41,428.66	47,152.35	0.05	5,723.69
2,898.000 DEUTSCHE WOHNEN SE EDB0YZ0Z4	44.87	70,521.67	130,032.80	0.13	59,511.13
710.000 SYMRISE AG EDB1JB4K1	116.25	47,610.78	82,534.68	0.08	34,923.90
1,352.000 BRENNTAG AG EDB4YVF55	52.53	46,833.11	71,020.19	0.07	24,187.08
2,411.000 EVONIK INDUSTRIES AG EDB5ZQ9D2	25.39	49,652.57	61,225.95	0.06	11,573.38
20,236.000 TELEFONICA DEUTSCHLAND HOLDING EDB7VG6L9	2.95	51,372.44	59,706.62	0.06	8,334.18
13,044.000 COMMERZBANK AG EDB90LKT5	4.46	46,029.71	58,118.01	0.06	12,088.30
899.000 KION GROUP AG EDBB22L93	61.55	38,503.48	55,332.21	0.05	16,828.73
3,666.000 VONOVIA SE EDBBJPFY6	61.30	148,860.20	224,731.40	0.22	75,871.20

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
517.000 KNORR-BREMSE AG EDBD2P9X9	101.34	45,202.56	52,393.72	0.05	7,191.16
1,173.000 SIEMENS HEALTHINEERS AG EDBD594Y5	47.90	46,704.53	56,189.45	0.06	9,484.92
4,421.000 METRO AG EDBD6QT86	9.45	37,438.28	41,789.20	0.04	4,350.92
11,899.000 AROUNDTOWN SA EDBF0CK46	5.73	64,317.12	68,131.51	0.07	3,814.39
1,041.000 TEAMVIEWER AG EDBJ7WGS9	54.59	53,101.44	56,823.08	0.06	3,721.64
1,132.000 ZALANDO SE EDBQV0SV6	70.51	48,293.28	79,818.86	0.08	31,525.58
1,719.000 QIAGEN NV EDBYXS699	43.06	51,433.47	74,022.84	0.07	22,589.37
2,098.000 UNIPER SE EDBZ6CZ40	32.23	57,222.84	67,627.78	0.07	10,404.94
1,233.000 DELIVERY HERO SE EDBZCNB45	102.16	40,736.89	125,965.41	0.13	85,228.52
2,185.000 ENDESA SA EE5271783	24.63	41,212.07	53,818.03	0.05	12,605.96

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
33,181.000 BANCO BILBAO VIZCAYA ARGENTARI EE5501908	3.44	98,484.29	114,186.82	0.11	15,702.53
3,731.000 NATURGY ENERGY GROUP SA EE5650424	18.60	67,784.67	69,415.19	0.07	1,630.52
12,925.000 REPSOL SA EE5669358	8.74	104,489.93	113,027.13	0.11	8,537.20
67,165.000 BANCO SANTANDER SA EE5705947	2.44	173,708.17	164,036.38	0.16	-9,671.79
32,520.000 TELEFONICA SA EE5732529	4.77	152,317.42	155,120.99	0.15	2,803.57
1,495.000 ENAGAS SA EE7383073	24.43	32,699.24	36,520.63	0.04	3,821.39
2,782.000 SIEMENS GAMESA RENEWABLE ENERG EEB01CP25	17.72	41,444.20	49,306.24	0.05	7,862.04
1,852.000 ACS ACTIVIDADES DE CONSTRUCCIO EEB01FLQ9	25.20	42,686.61	46,676.86	0.05	3,990.25
5,722.000 FERROVIAL SA EEB038516	26.62	88,601.07	152,311.94	0.15	63,710.87
23,524.000 MAPFRE SA EEB1G40S5	1.78	38,065.45	41,850.84	0.04	3,785.39

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
91,138.000 BANCO DE SABADELL SA EEB1X8QN0	0.35	45,983.79	31,639.99	0.03	-14,343.80
23,832.000 CAIXABANK SA EEB283W91	2.13	52,303.06	50,870.52	0.05	-1,432.54
53,713.000 IBERDROLA SA EEB288C92	11.59	370,627.81	622,582.44	0.62	251,954.63
3,878.000 AMADEUS IT GROUP SA EEB3MSM24	52.09	136,775.09	202,011.60	0.20	65,236.51
10,470.000 INTERNATIONAL CONSOLIDATED AIR EEB5282K7	2.75	58,061.17	28,763.44	0.03	-29,297.73
2,659.000 RED ELECTRICA CORP SA EEBD6FXN0	18.65	38,336.60	49,590.11	0.05	11,253.51
1,852.000 ACS ACTIVIDADES DE CONSTRUCCIO EEBLB2XX3 RTS	1.56	2,923.86	2,888.18	0.00	-35.68
12,925.000 REPSOL SA EEBMVLS21 RTS	0.49	6,827.95	6,290.09	0.01	-537.86
32,520.000 TELEFONICA SA EEBMX0BW7 RTS	0.20	6,934.16	6,395.50	0.01	-538.66
6,777.000 INDUSTRIA DE DISENO TEXTIL SA EEBP9DL99	26.47	107,105.09	179,405.12	0.18	72,300.03

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428.000 AENA SME SA EEBVRZ8L5	133.32	36,615.36	57,060.06	0.06	20,444.70
1,093.000 CELLNEX TELECOM SA EEBX90C09	60.92	57,110.89	66,585.18	0.07	9,474.29
3,878.000 GRIFOLS SA EEBYY3DX0	30.36	40,158.90	117,731.21	0.12	77,572.31
2,158.000 BOUYGUES SA EF4002129	34.15	63,997.58	73,706.47	0.07	9,708.89
4,276.000 AIRBUS SE EF4012250	71.34	178,164.03	305,060.48	0.30	126,896.45
7,285.000 VEOLIA ENVIRONNEMENT SA EF4031870	22.49	136,995.22	163,806.60	0.16	26,811.38
2,094.000 L'OREAL SA EF4057800	320.88	345,218.41	671,931.00	0.67	326,712.59
2,173.000 LVMH MOET HENNESSY LOUIS VUITT EF4061414	438.59	355,119.30	953,056.23	0.95	597,936.93
791.000 THALES SA EF4162790	80.73	40,323.43	63,859.03	0.06	23,535.60
1,534.000 CAPGEMINI SE EF4163434	114.51	99,143.08	175,650.89	0.17	76,507.81

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759.000 INGENICO GROUP SA EF4196897	159.49	45,395.26	121,050.86	0.12	75,655.60
1,487.000 PUBLICIS GROUPE SA EF4380426	32.36	41,554.61	48,116.27	0.05	6,561.66
17,589.000 BOLLORE SA EF4572709	3.14	48,552.15	55,235.21	0.05	6,683.06
1,296.000 CIE GENERALE DES ETABLISSEMENT EF4588366	103.71	107,511.74	134,410.33	0.13	26,898.59
1,547.000 PERNOD RICARD SA EF4682326	157.30	158,269.49	243,338.70	0.24	85,069.21
4,252.000 RENAULT SA EF4712792	25.36	79,131.81	107,833.81	0.11	28,702.00
209.000 REMY COINTREAU SA EF4741718	136.13	20,128.29	28,450.29	0.03	8,322.00
361.000 SEB SA EF4792133	165.22	40,144.23	59,642.75	0.06	19,498.52
4,603.000 SCHNEIDER ELECTRIC SE EF4834109	111.06	293,557.53	511,195.70	0.51	217,638.17
2,671.000 VIVENDI SA EF4834778	25.65	64,586.88	68,518.48	0.07	3,931.60

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16,742.000 ORANGE SA EF5176179	11.96	191,193.19	200,166.21	0.20	8,973.02
271.000 HERMES INTERNATIONAL EF5253978	835.40	94,492.49	226,393.12	0.22	131,900.63
1,153.000 DASSAULT SYSTEMES SE EF5330040	172.52	89,013.94	198,910.76	0.20	109,896.82
543.000 KERING SA EF5505070	543.89	88,402.17	295,329.77	0.29	206,927.60
4,700.000 CNP ASSURANCES EF5543980	11.51	47,228.51	54,107.75	0.05	6,879.24
851.000 ATOS SE EF5654787	85.25	47,815.27	72,545.27	0.07	24,730.00
8,804.000 SANOFI EF5671732	101.81	698,237.72	896,366.47	0.89	198,128.75
1,894.000 ACCOR SA EF5852845	27.19	47,999.87	51,500.63	0.05	3,500.76
10,953.000 NOKIA OYJ EF5946456	4.35	79,218.78	47,626.66	0.05	-31,592.12
6,891.000 STMICROELECTRONICS NV EF5962339	27.18	54,202.77	187,298.96	0.19	133,096.19

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7,397.000 SOCIETE GENERALE SA EF5966512	16.62	107,992.15	122,957.52	0.12	14,965.37
116.000 EUROFINS SCIENTIFIC SE EF5972643	627.39	42,413.41	72,777.42	0.07	30,364.01
436.000 TELEPERFORMANCE EF5999331	253.72	70,559.78	110,621.74	0.11	40,061.96
1,016.000 EURAZEO SE EF7042395	51.24	49,964.73	52,057.91	0.05	2,093.18
645.000 SODEXO SA EF7062716	67.61	40,853.45	43,610.79	0.04	2,757.34
9,538.000 AXA SA EF7088422	20.90	165,759.87	199,383.00	0.20	33,623.13
2,028.000 JCDECAUX SA EF7136668	18.59	39,262.92	37,696.73	0.04	-1,566.19
2,245.000 ESSILORLUXOTTICA SA EF7212477	128.32	213,069.57	288,078.15	0.29	75,008.58
18,528.000 CREDIT AGRICOLE SA EF7262613	9.47	139,451.38	175,384.34	0.17	35,932.96
5,262.000 BNP PARIBAS SA EF7309687	39.73	159,878.73	209,037.24	0.21	49,158.51

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Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

PARAMETRIC EAFE MON - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,884.000 CIE DE SAINT-GOBAIN EF7380480	36.00	62,631.50	67,818.27	0.07	5,186.77
2,137.000 KLEPIERRE SA EF7582556	19.92	38,644.63	42,567.05	0.04	3,922.42
346.000 GECINA SA EF7742465	123.55	41,952.93	42,747.09	0.04	794.16
1,960.000 SAFRAN SA EFB058TZ0	100.21	101,919.36	196,406.59	0.19	94,487.23
12,633.000 ENGIE SA EFB0C2CQ3	12.35	155,486.61	156,076.29	0.15	589.68
1,104.000 ALSTOM SA EFB0DJ8Q0	46.51	44,321.82	51,346.64	0.05	7,024.82
4,159.000 EUTELSAT COMMUNICATIONS SA EFB0M7KJ8	9.22	40,542.10	38,350.39	0.04	-2,191.71
5,425.000 ELECTRICITE DE FRANCE SA EFB0NJJ12	9.22	50,446.40	50,024.26	0.05	-422.14
845.000 IPSEN SA EFB0R7JF3	84.97	44,162.72	71,796.52	0.07	27,633.80
570.000 ARKEMA SA EFB0Z5YZ7	95.62	39,021.79	54,506.24	0.05	15,484.45

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Asset Detail - By Currency

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PARAMETRIC EAFE MON - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,180.000 LEGRAND SA EFB11ZRK7	75.95	99,822.06	165,565.34	0.16	65,743.28
688.000 EIFFAGE SA EFB13X011	91.42	49,963.76	62,899.99	0.06	12,936.23
15,136.000 TOTAL SE EFB15C551	38.16	646,652.25	577,574.95	0.57	-69,077.30
20,240.000 NATIXIS SA EFB1HDJL6	2.61	48,008.36	52,853.19	0.05	4,844.83
599.000 UBISOFT ENTERTAINMENT SA EFB1L3CS5	82.44	44,744.14	49,381.09	0.05	4,636.95
2,323.000 SCOR SE EFB1LB9P7	27.40	55,743.43	63,661.49	0.06	7,918.06
4,244.000 VINCI SA EFB1XH021	92.10	262,963.52	390,865.19	0.39	127,901.67
4,055.000 DANONE SA EFB1Y9TB7	69.14	254,671.13	280,367.22	0.28	25,696.09
3,502.000 AIR LIQUIDE SA EFB1YXBJ6	144.21	312,221.17	505,032.03	0.50	192,810.86
2,450.000 BUREAU VERITAS SA EFB28DTJ8	21.09	38,834.55	51,677.25	0.05	12,842.70

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Asset Detail - By Currency

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PARAMETRIC EAFE MON - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,881.000 GETLINK SE EFB292JQ6	14.42	42,502.50	55,968.86	0.06	13,466.36
1,163.000 EDENRED EFB62G1B5	43.72	29,904.46	50,851.28	0.05	20,946.82
3,623.000 VALEO SA EFBDC5ST5	26.24	53,587.77	95,055.87	0.09	41,468.10
403.000 BIOMERIEUX EFBF0LBX7	137.36	44,693.66	55,356.58	0.05	10,662.92
1,125.000 UNIBAIL-RODAMCO-WESTFIELD EFBF2PQ02	56.34	74,582.35	63,379.35	0.06	-11,203.00
1,053.000 WORLDLINE SA/FRANCE EFBNFWR47	86.57	68,254.58	91,160.74	0.09	22,906.16
243.000 SARTORIUS STEDIM BIOTECH EFBYZ2QP1	252.71	40,182.14	61,408.23	0.06	21,226.09
795.000 AMUNDI SA EFBYZR017	78.28	41,756.16	62,235.43	0.06	20,479.27
93,333.000 INTESA SANPAOLO SPA EI4076838	1.91	142,560.53	178,583.21	0.18	36,022.68
9,348.000 MEDIOBANCA BANCA DI CREDITO FI EI4574816	7.18	52,889.36	67,089.93	0.07	14,200.57

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
64,269.000 ENEL SPA EI7144567	8.62	350,831.24	554,226.66	0.55	203,395.42
26,815.000 ENI SPA EI7145051	9.54	230,676.01	255,695.60	0.25	25,019.59
21,839.000 SNAM SPA EI7251479	4.87	94,638.83	106,306.41	0.11	11,667.58
111,157.000 TELECOM ITALIA SPA/MILANO EI7634393	0.39	42,902.23	43,658.64	0.04	756.41
4,519.000 ATLANTIA SPA EI7667161	16.06	62,599.89	72,579.86	0.07	9,979.97
24,089.000 TERNA RETE ELETTRICA NAZIONALE EIB01BN53	6.87	118,414.90	165,525.92	0.16	47,111.02
2,498.000 RECORDATI SPA EIB07DRZ3	49.92	84,137.64	124,710.20	0.12	40,572.56
5,283.000 LEONARDO SPA EIB0DJNG9	6.63	33,713.05	35,008.25	0.03	1,295.20
2,469.000 PRYSMIAN SPA EIB1W4V62	23.16	38,238.47	57,180.44	0.06	18,941.97
983.000 FERRARI NV EIBD6G500	170.55	81,942.24	167,650.97	0.17	85,708.73

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PARAMETRIC EAFE MON - [redacted]

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
8,068.000	CNH INDUSTRIAL NV EIBDSV2V8	6.99	48,989.26	56,435.48	0.06	7,446.22
1,254.000	MONCLER SPA EIBGLP233	38.23	45,482.38	47,942.96	0.05	2,460.58
8,757.000	FIAT CHRYSLER AUTOMOBILES NV EIBRJFWP2	10.05	75,514.03	87,968.04	0.09	12,454.01
20,677.000	UNICREDIT SPA EIBYMXPS6	9.20	185,532.33	190,152.98	0.19	4,620.65
898.000	EXOR NV EIBYSLCX9	57.10	39,394.04	51,276.65	0.05	11,882.61
7,649.000	POSTE ITALIANE SPA EIBYYN706	8.69	55,459.62	66,494.14	0.07	11,034.52
7,139.000	DAVIDE CAMPARI-MILANO SPA EIBZ4CMZ6	8.42	45,612.56	60,136.26	0.06	14,523.70
2,521.000	WOLTERS KLUWER NV EN5671511	78.08	68,913.72	196,843.18	0.20	127,929.46
1,022.000	KONINKLIJKE VOPAK NV EN5809426	52.88	47,569.43	54,041.22	0.05	6,471.79
48,676.000	AEGON NV EN5927376	2.98	96,790.32	145,040.70	0.14	48,250.38

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
30,200.000 KONINKLIJKE KPN NV EN5956078	2.65	71,654.81	80,049.15	0.08	8,394.34
5,762.000 KONINKLIJKE PHILIPS NV EN5986620	46.63	200,506.83	268,700.43	0.27	68,193.60
2,165.000 HEINEKEN NV EN7792554	92.17	139,355.28	199,538.72	0.20	60,183.44
673.000 HEINEKEN HOLDING NV ENB0CCH48	81.82	37,409.14	55,065.85	0.05	17,656.71
1,510.000 KONINKLIJKE DSM NV ENB0HZL96	138.37	84,584.43	208,941.84	0.21	124,357.41
10,329.000 UNILEVER NV ENB1527V7	53.07	344,588.49	548,148.02	0.54	203,559.53
3,158.000 ASML HOLDING NV ENB929F49	367.16	297,039.84	1,159,484.13	1.15	862,444.29
9,434.000 KONINKLIJKE AHOLD DELHAIZE NV ENBD0Q396	27.25	162,312.00	257,054.04	0.26	94,742.04
1,612.000 AKZO NOBEL NV ENBJ2KSG1	89.56	107,894.37	144,370.69	0.14	36,476.32
4,955.000 PROSUS NV ENBJDS7L4	92.93	352,884.10	460,465.33	0.46	107,581.23

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,538.000 NN GROUP NV ENBNG8PQ5	33.58	44,788.48	51,649.40	0.05	6,860.92
5,910.000 ARCELORMITTAL SA ENBYPBS65	10.52	49,981.90	62,196.34	0.06	12,214.44
5,794.000 ABN AMRO BANK NV ENBYQP139	8.61	53,273.64	49,886.73	0.05	-3,386.91
5,536.000 RELX PLC ENBYWLC62	23.14	44,121.76	128,085.82	0.13	83,964.06
125.000 ADYEN NV ENBZ1HM46	1,455.04	121,142.74	181,880.10	0.18	60,737.36
23,808.000 ING GROEP NV ENBZ57394	6.96	126,209.46	165,734.24	0.16	39,524.78
5,152.000 BANCO ESPIRITO SANTO SA EP4058061	0.00	13,545.89	0.00	0.00	-13,545.89
23,100.000 EDP - ENERGIAS DE PORTUGAL SA EP4103594	4.77	75,006.36	110,265.25	0.11	35,258.89
5,380.000 GALP ENERGIA SGPS SA EPB1FW752	11.56	61,480.30	62,208.02	0.06	727.72
6,118.000 CRH PLC EZ4182240	34.26	153,050.40	209,578.67	0.21	56,528.27

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
954.000 DCC ORD EURO0.25 EZ4189476	83.16	52,473.12	79,332.76	0.08	26,859.64
1,028.000 KINGSPAN GROUP PLC EZ4491237	64.41	41,080.52	66,216.21	0.07	25,135.69
1,480.000 KERRY GROUP PLC EZ4519573	123.88	82,522.67	183,347.50	0.18	100,824.83
1,553.000 SMURFIT KAPPA GROUP PLC EZB1RR824	33.42	44,269.08	51,908.94	0.05	7,639.86
23,819.000 BANK OF IRELAND GROUP PLC EZBD1RP68	2.05	35,696.41	48,822.97	0.05	13,126.56
912.000 FLUTTER ENTERTAINMENT PLC EZBWT6H87	131.41	96,108.85	119,844.60	0.12	23,735.75
2,731.000 RYANAIR HOLDINGS PLC EZBYTBXV3	11.97	15,228.34	32,682.33	0.03	17,453.99
4,457.000 UPM-KYMMENE OYJ SF5051252	28.89	68,716.82	128,751.22	0.13	60,034.40
7,104.000 STORA ENSO OYJ SF5072670	11.94	65,051.68	84,815.26	0.08	19,763.58
3,097.000 SAMPO OYJ SF5226037	34.39	89,633.88	106,508.47	0.11	16,874.59

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PARAMETRIC EAFE MON - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,165.000 FORTUM OYJ SF5579559	18.99	46,609.44	60,093.39	0.06	13,483.95
2,001.000 ELISA OYJ SF5701518	60.81	53,795.27	121,675.49	0.12	67,880.22
1,319.000 NELES OYJ SF5713422	32.76	32,659.51	43,213.45	0.04	10,553.94
32,672.000 NOKIA OYJ SF5902942	4.37	157,952.07	142,690.67	0.14	-15,261.40
3,450.000 NESTE OYJ SFB06YV43	39.10	20,342.14	134,884.14	0.13	114,542.00
2,484.000 KONE OYJ SFB09M9D1	68.76	81,361.85	170,797.96	0.17	89,436.11
1,226.000 ORION OYJ SFB17NY41	48.36	33,371.48	59,292.84	0.06	25,921.36
236.000 NORDEA BANK ABP SFBFM0SV0	6.91	1,495.38	1,629.61	0.00	134.23
TOTAL EQUITY EURO CURRENCY UNIT		**21,707,937.98**	**31,901,538.87**	**31.67**	**10,193,600.89**
PREFERRED SECURITIES					
1,176.000 FUCHS PETROLUB SE ED4354350	40.14	41,526.97	47,206.26	0.05	5,679.29

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Asset Detail - By Currency

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PARAMETRIC EAFE MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
886.000 HENKEL AG & CO KGAA ED5076705	93.09	48,780.90	82,474.79	0.08	33,693.89
1,773.000 VOLKSWAGEN AG ED5497166	151.56	197,684.43	268,712.09	0.27	71,027.66
194.000 BAYERISCHE MOTOREN WERKE AG ED5756033	48.50	6,992.01	9,408.54	0.01	2,416.53
310.000 SARTORIUS AG ED5843328	328.63	51,352.69	101,876.44	0.10	50,523.75
1,078.000 PORSCHE AUTOMOBIL HOLDING SE ED7101063	57.46	48,369.05	61,942.26	0.06	13,573.21
TOTAL PREFERRED SECURITIES EURO CURRENCY UNIT		**394,706.05**	**571,620.38**	**0.57**	**176,914.33**
TOTAL ASSETS EURO CURRENCY UNIT		**22,159,142.54**	**32,529,442.62**	**32.29**	**10,370,300.08**
HONG KONG DOLLAR					
CASH & CASH EQUIVALENTS					
NON-BASE CURRENCY		17,472.23	17,471.61	0.02	-0.62
EQUITY					
21,000.000 HANG LUNG PROPERTIES LTD FH6030503 HK/00101	2.37	44,831.29	49,746.79	0.05	4,915.50
22,000.000 BANK OF EAST ASIA LTD/THE FH6075649 HK/00023	2.28	45,934.99	50,242.24	0.05	4,307.25

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PARAMETRIC EAFE MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
14,000.000 CLP HOLDINGS LTD FH6097015 HK/00002	9.81	106,086.65	137,282.35	0.14	31,195.70
9,300.000 HONG KONG EXCHANGES & CLEARING FH6267352 HK/00388	42.58	196,555.47	395,977.01	0.39	199,421.54
13,500.000 MTR CORP LTD FH6290057 HK/00066	5.18	55,240.98	69,934.65	0.07	14,693.67
5,600.000 HANG SENG BANK LTD FH6408378 HK/00011	16.79	82,409.65	94,002.28	0.09	11,592.63
13,061.000 HENDERSON LAND DEVELOPMENT CO FH6420530 HK/00012	3.79	47,735.53	49,544.66	0.05	1,809.13
66,402.000 HONG KONG & CHINA GAS CO LTD FH6436551 HK/00003	1.55	72,758.85	102,810.03	0.10	30,051.18
7,000.000 HYSAN DEVELOPMENT CO LTD FH6449620 HK/00014	3.21	20,761.01	22,443.86	0.02	1,682.85
18,000.000 GALAXY ENTERTAINMENT GROUP LTD FH6465873 HK/00027	6.81	43,931.60	122,509.02	0.12	78,577.42
62,000.000 BOC HONG KONG HOLDINGS LTD FH6536111 HK/02388	3.18	179,191.28	197,188.55	0.20	17,997.27
36,000.000 SINO LAND CO LTD FH6810425 HK/00083	1.26	43,298.84	45,287.69	0.04	1,988.85

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
9,500.000 SUN HUNG KAI PROPERTIES LTD FH6859927 HK/00016	12.77	123,214.61	121,286.51	0.12	-1,928.10
17,000.000 WHEELOCK & CO LTD FH6981481 HK/00020	8.36	77,611.71	142,111.75	0.14	64,500.04
10,000.000 TECHTRONIC INDUSTRIES CO LTD FHB0190C9 HK/00669	9.78	31,371.90	97,800.77	0.10	66,428.87
17,000.000 LINK REIT FHB0PB4M2 HK/00823	8.17	77,473.16	138,953.22	0.14	61,480.06
101,600.000 AIA GROUP LTD FHB4TX8S5 HK/01299	9.33	493,010.07	947,774.64	0.94	454,764.57
29,000.000 HKT TRUST & HKT LTD FHB4TXDZ3 HK/06823	1.46	43,097.69	42,431.08	0.04	-666.61
18,800.000 SANDS CHINA LTD FHB5B23W5 HK/01928	3.92	39,147.67	73,740.23	0.07	34,592.56
88,500.000 WH GROUP LTD FHBLLHKZ0 HK/00288	0.86	68,486.18	75,820.11	0.08	7,333.93
14,000.000 NEW WORLD DEVELOPMENT CO LTD FHBMX0K58 HK/02909	4.75	67,017.20	66,473.56	0.07	-543.64
8,500.000 CK INFRASTRUCTURE HOLDINGS LTD FHBYVS6J9 HK/01038	5.15	43,533.33	43,758.75	0.04	225.42

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21,576.000 CK ASSET HOLDINGS LTD FHBYZQ071 HK/01113	5.96	106,555.63	128,613.33	0.13	22,057.70
TOTAL EQUITY HONG KONG DOLLAR		**2,109,255.29**	**3,215,733.08**	**3.19**	**1,106,477.79**
TOTAL ASSETS HONG KONG DOLLAR		**2,126,727.52**	**3,233,204.69**	**3.21**	**1,106,477.17**
ISRAELI SHEKEL					
CASH & CASH EQUIVALENTS					
NON-BASE CURRENCY		350.89	349.72	0.00	-1.17
EQUITY					
14,188.000 BANK HAPOALIM BM FZ6075805	5.95	65,538.18	84,366.73	0.08	18,828.55
12,591.000 BANK LEUMI LE-ISRAEL BM FZ6076423	5.00	63,808.58	62,974.10	0.06	-834.48
18,672.000 ISRAEL DISCOUNT BANK LTD FZ6451279	3.03	56,454.79	56,648.03	0.06	193.24
503.000 NICE LTD FZ6647132	186.34	31,072.99	93,727.07	0.09	62,654.08
2,496.000 MIZRAHI TEFAHOT BANK LTD FZ6916701	18.67	45,083.80	46,603.25	0.05	1,519.45
647.000 ISRACARD LTD FZBJ0CJC2	2.27	2,113.45	1,469.74	0.00	-643.71
TOTAL EQUITY ISRAELI SHEKEL		**264,071.79**	**345,788.92**	**0.34**	**81,717.13**

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
	TOTAL ASSETS ISRAELI SHEKEL		**264,422.68**	**346,138.64**	**0.34**	**81,715.96**
JAPANESE YEN						
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		157,710.84	156,778.91	0.16	-931.93
EQUITY						
4,000.000 FJ6010907	AJINOMOTO CO INC	16.61	39,692.08	66,441.12	0.07	26,749.04
4,600.000 FJ6021508	ALPS ALPINE CO LTD	12.79	48,518.09	58,840.43	0.06	10,322.34
3,000.000 FJ6022100	AMADA CO LTD	8.17	25,712.53	24,498.31	0.02	-1,214.22
2,500.000 FJ6054400	ASAHI GROUP HOLDINGS LTD	35.00	54,152.77	87,500.58	0.09	33,347.81
10,000.000 FJ6054608	ASAHI KASEI CORP	8.12	59,359.69	81,160.49	0.08	21,800.80
1,700.000 FJ6075751	BANK OF KYOTO LTD/THE	35.41	49,168.20	60,193.72	0.06	11,025.52
19,100.000 FJ6084845	Z HOLDINGS CORP	4.88	47,850.23	93,123.23	0.09	45,273.00

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700.000 TREND MICRO INC/JAPAN FJ6125283	55.80	27,476.99	39,060.11	0.04	11,583.12
5,500.000 NTT DATA CORP FJ6125630	11.11	43,186.71	61,125.27	0.06	17,938.56
12,000.000 NTT DOCOMO INC FJ6129277	26.71	208,200.62	320,563.56	0.32	112,362.94
4,700.000 BRIDGESTONE CORP FJ6132107	32.15	101,168.49	151,126.66	0.15	49,958.17
500.000 OBIC CO LTD FJ6136744	174.91	46,581.52	87,454.23	0.09	40,872.71
1,700.000 BROTHER INDUSTRIES LTD FJ6146503	18.00	20,615.81	30,601.10	0.03	9,985.29
2,100.000 USS CO LTD FJ6171493	15.97	31,071.72	33,538.49	0.03	2,466.77
2,400.000 CANON INC FJ6172327	19.78	59,324.43	47,483.89	0.05	-11,840.54
2,600.000 CASIO COMPUTER CO LTD FJ6178969	17.33	19,654.39	45,066.51	0.04	25,412.12
1,200.000 CENTRAL JAPAN RAILWAY CO FJ6183555	154.70	127,309.64	185,642.12	0.18	58,332.48

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400.000 KOSE CORP FJ6194461	120.13	51,057.84	48,051.16	0.05	-3,006.68
3,800.000 CHUGOKU ELECTRIC POWER CO INC/ FJ6195906	13.36	46,028.95	50,755.90	0.05	4,726.95
5,400.000 CHUGAI PHARMACEUTICAL CO LTD FJ6196409	53.44	41,239.93	288,557.25	0.29	247,317.32
1,200.000 CYBERAGENT INC FJ6220506	49.03	43,170.70	58,840.43	0.06	15,669.73
8,400.000 RAKUTEN INC FJ6229598	8.79	59,003.33	73,811.93	0.07	14,808.60
14,300.000 KDDI CORP FJ6248994	29.98	205,961.83	428,661.99	0.43	222,700.16
1,100.000 DAIFUKU CO LTD FJ6250024	87.32	54,023.22	96,046.71	0.10	42,023.49
700.000 DAITO TRUST CONSTRUCTION CO LT FJ6250503	91.85	43,249.35	64,293.46	0.06	21,044.11
1,800.000 DAIKIN INDUSTRIES LTD FJ6250727	160.68	97,688.31	289,224.63	0.29	191,536.32
3,200.000 SUMITOMO DAINIPPON PHARMA CO L FJ6250867	13.81	41,140.91	44,195.21	0.04	3,054.30

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2,200.000 DAI NIPPON PRINTING CO LTD FJ6250909	22.89	46,066.20	50,348.05	0.05	4,281.85
4,700.000 DAIWA HOUSE INDUSTRY CO LTD FJ6251360	23.56	74,406.18	110,741.99	0.11	36,335.81
15,700.000 DAIWA SECURITIES GROUP INC FJ6251444	4.17	66,061.81	65,442.74	0.06	-619.07
5,600.000 MITSUBISHI UFJ LEASE & FINANCE FJ6268976	4.73	20,212.29	26,472.63	0.03	6,260.34
4,000.000 PAN PACIFIC INTERNATIONAL HOLD FJ6269867	21.96	33,841.50	87,834.27	0.09	53,992.77
400.000 DISCO CORP FJ6270949	241.83	53,557.15	96,732.63	0.10	43,175.48
2,100.000 EAST JAPAN RAILWAY CO FJ6298544	69.28	147,746.28	145,482.69	0.14	-2,263.59
1,800.000 EISAI CO LTD FJ6307204	79.21	81,790.87	142,585.16	0.14	60,794.29
900.000 SQUARE ENIX HOLDINGS CO LTD FJ6309267	50.42	39,056.83	45,381.66	0.05	6,324.83
2,800.000 SBI HOLDINGS INC/JAPAN FJ6309465	21.58	45,014.35	60,419.89	0.06	15,405.54

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500.000 FAST RETAILING CO LTD FJ6332434	571.91	141,532.31	285,952.63	0.28	144,420.32
57,100.000 MITSUBISHI UFJ FINANCIAL GROUP FJ6335171	3.91	241,615.49	223,139.08	0.22	-18,476.41
4,000.000 SUBARU CORP FJ6356409	20.78	20,527.45	83,107.01	0.08	62,579.56
3,300.000 FUJIFILM HOLDINGS CORP FJ6356524	42.73	113,599.80	141,011.26	0.14	27,411.46
1,300.000 FANUC CORP FJ6356938	178.52	164,967.56	232,080.45	0.23	67,112.89
1,700.000 FUJITSU LTD FJ6356946	116.98	120,394.39	198,859.89	0.20	78,465.50
800.000 MCDONALD'S HOLDINGS CO JAPAN L FJ6371861	53.95	19,916.46	43,157.06	0.04	23,240.60
3,267.000 NOMURA RESEARCH INSTITUTE LTD FJ6390929	27.13	20,506.15	88,636.13	0.09	68,129.98
8.000 NIPPON BUILDING FUND INC FJ6396801	5,691.25	39,215.59	45,529.96	0.05	6,314.37
11.000 JAPAN REAL ESTATE INVESTMENT C FJ6397585	5,125.83	48,152.48	56,384.11	0.06	8,231.63

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1,200.000 HAMAMATSU PHOTONICS KK FJ6405875	43.29	22,620.21	51,944.20	0.05	29,323.99
1,900.000 HANKYU HANSHIN HOLDINGS INC FJ6408663	33.79	53,637.85	64,193.35	0.06	10,555.50
2,600.000 DENTSU GROUP INC FJ6416286	23.68	48,071.32	61,574.82	0.06	13,503.50
300.000 HIKARI TSUSHIN INC FJ6416328	227.56	47,173.28	68,267.14	0.07	21,093.86
32,500.000 RESONA HOLDINGS INC FJ6421559	3.41	109,894.65	110,798.53	0.11	903.88
600.000 HISAMITSU PHARMACEUTICAL CO IN FJ6428901	53.85	22,518.43	32,312.18	0.03	9,793.75
7,500.000 HITACHI LTD FJ6429107	31.54	171,940.47	236,571.34	0.23	64,630.87
6,100.000 SUMITOMO MITSUI TRUST HOLDINGS FJ6431897	28.04	172,888.87	171,038.60	0.17	-1,850.27
6,800.000 HONDA MOTOR CO LTD FJ6435146	25.54	169,904.60	173,679.38	0.17	3,774.78
3,100.000 HOYA CORP FJ6441508	95.10	101,000.41	294,813.92	0.29	193,813.51

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3,700.000 IHI CORP FJ6466984	14.44	45,286.18	53,432.82	0.05	8,146.64
6,600.000 ISUZU MOTORS LTD FJ6467107	9.02	41,798.39	59,542.85	0.06	17,744.46
11,000.000 ITOCHU CORP FJ6467800	21.52	101,586.04	236,701.11	0.23	135,115.07
2,900.000 JSR CORP FJ6470986	19.28	46,240.04	55,911.39	0.06	9,671.35
11,400.000 JAPAN TOBACCO INC FJ6474533	18.55	219,436.23	211,494.64	0.21	-7,941.59
8,600.000 AEON CO LTD FJ6480043	23.22	127,082.67	199,684.85	0.20	72,602.18
5,500.000 KAJIMA CORP FJ6481322	11.90	32,922.34	65,458.59	0.06	32,536.25
5,100.000 KANSAI ELECTRIC POWER CO INC/T FJ6483484	9.69	51,597.94	49,399.82	0.05	-2,198.12
3,400.000 KAO CORP FJ6483807	79.16	101,833.71	269,138.43	0.27	167,304.72
1,000.000 KEIHAN HOLDINGS CO LTD FJ6487238	44.54	46,005.32	44,538.16	0.04	-1,467.16

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800.000 KEIO CORP FJ6487360	57.10	30,938.55	45,678.27	0.05	14,739.72
1,400.000 KEISEI ELECTRIC RAILWAY CO LTD FJ6487428	31.28	39,762.49	43,796.63	0.04	4,034.14
2,000.000 KIKKOMAN CORP FJ6490802	48.11	23,529.90	96,213.56	0.10	72,683.66
1,480.000 KEYENCE CORP FJ6490992	417.39	157,694.94	617,735.54	0.61	460,040.60
1,400.000 KINTETSU GROUP HOLDINGS CO LTD FJ6492964	44.91	45,803.55	62,872.50	0.06	17,068.95
6,500.000 KIRIN HOLDINGS CO LTD FJ6493749	21.08	93,773.40	137,037.12	0.14	43,263.72
1,000.000 KOITO MANUFACTURING CO LTD FJ6496320	40.23	31,821.93	40,228.02	0.04	8,406.09
5,200.000 KOMATSU LTD FJ6496585	20.42	94,689.54	106,207.53	0.11	11,517.99
1,300.000 KONAMI HOLDINGS CORP FJ6496684	33.28	29,410.86	43,259.03	0.04	13,848.17
7,100.000 KUBOTA CORP FJ6497500	14.90	69,073.05	105,823.79	0.11	36,750.74

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2,600.000 KYOCERA CORP FJ6499266	54.36	128,651.46	141,344.95	0.14	12,693.49
2,000.000 KYOWA KIRIN CO LTD FJ6499555	26.22	21,017.20	52,444.73	0.05	31,427.53
6,700.000 KYUSHU ELECTRIC POWER CO INC FJ6499803	8.39	47,953.56	56,203.36	0.06	8,249.80
5,300.000 TOKIO MARINE HOLDINGS INC FJ6513124	43.55	157,230.73	230,795.75	0.23	73,565.02
2,000.000 LION CORP FJ6518800	23.98	40,593.23	47,958.47	0.05	7,365.24
32.000 ORIX JREIT INC FJ6527777	1,310.65	40,995.64	41,940.95	0.04	945.31
15.000 JAPAN PRIME REALTY INVESTMENT FJ6528171	2,929.04	44,638.98	43,935.67	0.04	-703.31
6,900.000 JFE HOLDINGS INC FJ6543790	7.16	45,858.68	49,374.80	0.05	3,516.12
2,000.000 MAKITA CORP FJ6555802	36.29	41,530.35	72,577.28	0.07	31,046.93
6,300.000 SUMITOMO MITSUI FINANCIAL GROU FJ6563020	28.10	163,156.17	177,055.19	0.18	13,899.02

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2,200.000 MARUI GROUP CO LTD FJ6569522	18.04	31,250.19	39,683.00	0.04	8,432.81
16,500.000 PANASONIC CORP FJ6572708	8.71	127,227.55	143,703.01	0.14	16,475.46
302,780.000 MIZUHO FINANCIAL GROUP INC FJ6591013	1.23	372,736.33	371,020.21	0.37	-1,716.12
2,000.000 MISUMI GROUP INC FJ6595170	24.97	42,660.29	49,942.07	0.05	7,281.78
3,100.000 MITSUBISHI ESTATE CO LTD FJ6596723	14.85	49,246.85	46,046.72	0.05	-3,200.13
9,600.000 MITSUBISHI CORP FJ6596780	21.04	196,802.89	201,992.86	0.20	5,189.97
3,400.000 MITSUBISHI GAS CHEMICAL CO INC FJ6596921	15.11	40,546.54	51,369.51	0.05	10,822.97
15,900.000 MITSUBISHI ELECTRIC CORP FJ6597044	12.97	160,273.01	206,257.12	0.20	45,984.11
3,400.000 MITSUBISHI HEAVY INDUSTRIES LT FJ6597069	23.57	85,004.56	80,142.74	0.08	-4,861.82
11,500.000 MITSUI & CO LTD FJ6597309	14.78	158,070.39	169,965.70	0.17	11,895.31

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2,100.000 MITSUI CHEMICALS INC FJ6597366	20.83	38,272.08	43,738.24	0.04	5,466.16
2,500.000 MITSUI OSK LINES LTD FJ6597580	17.69	41,277.25	44,213.75	0.04	2,936.50
9,600.000 MITSUI FUDOSAN CO LTD FJ6597606	17.70	171,645.98	169,914.26	0.17	-1,731.72
4,400.000 MURATA MANUFACTURING CO LTD FJ6610409	58.54	111,019.20	257,592.80	0.26	146,573.60
2,600.000 SEIKO EPSON CORP FJ6616505	11.43	20,581.74	29,714.97	0.03	9,133.23
1,700.000 NGK SPARK PLUG CO LTD FJ6619608	14.31	23,317.61	24,329.61	0.02	1,012.00
1,600.000 NAGOYA RAILROAD CO LTD FJ6619863	28.22	31,311.00	45,159.20	0.04	13,848.20
9,400.000 RENESAS ELECTRONICS CORP FJ6635679	5.11	41,754.13	48,008.53	0.05	6,254.40
1,000.000 NINTENDO CO LTD FJ6639556	445.01	188,990.24	445,010.88	0.44	256,020.64
3,700.000 DENSO CORP FJ6640380	38.98	115,034.17	144,213.74	0.14	29,179.57

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1,700.000 NEC CORP FJ6640406	47.92	56,530.35	81,466.37	0.08	24,936.02
1,100.000 NIPPON PAINT HOLDINGS CO LTD FJ6640505	72.67	52,548.92	79,936.97	0.08	27,388.05
3,700.000 NIDEC CORP FJ6640687	66.70	132,803.99	246,792.41	0.24	113,988.42
1,400.000 NH FOODS LTD FJ6640760	40.09	45,419.11	56,124.58	0.06	10,705.47
1,815.000 NISSHIN SEIFUN GROUP INC FJ6640968	14.91	19,611.80	27,068.96	0.03	7,457.16
14,800.000 NIPPON TELEGRAPH & TELEPHONE C FJ6641370	23.32	210,736.08	345,084.11	0.34	134,348.03
6,700.000 NSK LTD FJ6641545	7.41	42,561.95	49,620.43	0.05	7,058.48
1,000.000 NISSAN CHEMICAL CORP FJ6641586	51.17	14,192.47	51,165.59	0.05	36,973.12
500.000 NISSIN FOODS HOLDINGS CO LTD FJ6641768	88.52	16,662.57	44,260.09	0.04	27,597.52
1,500.000 NITTO DENKO CORP FJ6641800	56.54	62,658.07	84,812.53	0.08	22,154.46

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600.000 NIPPON EXPRESS CO LTD FJ6642121	51.72	27,687.71	31,033.04	0.03	3,345.33
1,500.000 YAMAHA CORP FJ6642386	46.99	19,691.64	70,491.73	0.07	50,800.09
3,000.000 MINEBEA MITSUMI INC FJ6642402	18.10	18,493.86	54,307.83	0.05	35,813.97
30,200.000 NISSAN MOTOR CO LTD FJ6642865	3.70	102,038.42	111,747.14	0.11	9,708.72
28,400.000 NOMURA HOLDINGS INC FJ6643103	4.47	111,639.19	126,988.55	0.13	15,349.36
600.000 NITORI HOLDINGS CO LTD FJ6644804	195.81	31,302.37	117,486.21	0.12	86,183.84
1,500.000 ORIENTAL LAND CO LTD/JAPAN FJ6648896	131.99	92,280.03	197,988.60	0.20	105,708.57
3,500.000 ODAKYU ELECTRIC RAILWAY CO LTD FJ6656105	24.57	58,892.57	86,003.61	0.09	27,111.04
5,100.000 OBAYASHI CORP FJ6656402	9.34	27,081.20	47,650.74	0.05	20,569.54
8,000.000 OLYMPUS CORP FJ6658804	19.24	82,907.84	153,904.62	0.15	70,996.78

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2,100.000 OMRON CORP FJ6659422	66.92	60,109.79	140,538.53	0.14	80,428.74
2,600.000 ONO PHARMACEUTICAL CO LTD FJ6660107	29.08	28,035.80	75,600.87	0.08	47,565.07
11,700.000 ORIX CORP FJ6661147	12.31	131,606.74	144,074.24	0.14	12,467.50
3,700.000 OSAKA GAS CO LTD FJ6661766	19.72	60,214.94	72,981.41	0.07	12,766.47
2,500.000 ALFRESA HOLDINGS CORP FJ6687217	20.86	43,738.74	52,162.02	0.05	8,423.28
1,900.000 NABTESCO CORP FJ6687571	30.77	47,254.96	58,469.67	0.06	11,214.71
1,400.000 PIGEON CORP FJ6688082	38.65	45,461.78	54,113.18	0.05	8,651.40
4,400.000 JAPAN EXCHANGE GROUP INC FJ6743887	23.10	54,988.18	101,634.15	0.10	46,645.97
5,500.000 T&D HOLDINGS INC FJ6744299	8.54	43,009.75	46,952.77	0.05	3,943.02
800.000 ROHM CO LTD FJ6747201	66.18	45,098.23	52,945.26	0.05	7,847.03

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500.000 SMC CORP/JAPAN FJ6763968	511.47	101,537.22	255,735.27	0.25	154,198.05
12,600.000 SOFTBANK GROUP CORP FJ6770625	50.52	215,505.97	636,511.09	0.63	421,005.12
2,500.000 SANTEN PHARMACEUTICAL CO LTD FJ6776606	18.38	21,057.94	45,951.71	0.05	24,893.77
1,500.000 SECOM CO LTD FJ6791597	87.34	82,947.83	131,014.50	0.13	48,066.67
4,700.000 SEKISUI CHEMICAL CO LTD FJ6793825	14.29	44,478.87	67,177.09	0.07	22,698.22
9,100.000 SEKISUI HOUSE LTD FJ6793908	19.02	124,470.53	173,126.47	0.17	48,655.94
5,000.000 SHARP CORP/JAPAN FJ6800604	10.62	52,721.89	53,112.11	0.05	390.22
3,000.000 SHIMADZU CORP FJ6804366	26.58	42,980.61	79,751.59	0.08	36,770.98
4,000.000 SHIMIZU CORP FJ6804408	8.20	16,694.52	32,812.72	0.03	16,118.20
3,000.000 SHIN-ETSU CHEMICAL CO LTD FJ6804580	116.74	173,813.90	350,234.04	0.35	176,420.14

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PARETRIC EAFE MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,300.000 SHIONOGI & CO LTD FJ6804689	62.57	63,738.70	143,903.23	0.14	80,164.53
500.000 SHIMANO INC FJ6804820	192.33	31,981.37	96,167.21	0.10	64,185.84
3,000.000 SHISEIDO CO LTD FJ6805264	63.35	69,936.18	190,063.49	0.19	120,127.31
5,000.000 HULIC CO LTD FJ6805314	9.38	50,740.21	46,901.79	0.05	-3,838.42
9,700.000 SHIZUOKA BANK LTD/THE FJ6805322	6.42	53,813.79	62,308.01	0.06	8,494.22
2,100.000 SHOWA DENKO KK FJ6805462	22.39	44,923.22	47,027.85	0.05	2,104.63
2,000.000 SUNDRUG CO LTD FJ6817897	33.09	53,103.76	66,181.58	0.07	13,077.82
9,500.000 SONY CORP FJ6821501	68.44	346,576.57	650,210.86	0.65	303,634.29
1,000.000 STANLEY ELECTRIC CO LTD FJ6841103	24.05	19,239.15	24,053.39	0.02	4,814.24
16,300.000 SUMITOMO CHEMICAL CO LTD FJ6858560	2.98	48,301.00	48,649.95	0.05	348.95

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
4,600.000 SUMITOMO ELECTRIC INDUSTRIES L FJ6858701	11.49	48,326.14	52,849.79	0.05	4,523.65
2,200.000 SUMITOMO HEAVY INDUSTRIES LTD FJ6858735	21.74	42,718.17	47,819.44	0.05	5,101.27
2,000.000 SUMITOMO METAL MINING CO LTD FJ6858842	27.89	42,100.90	55,781.62	0.06	13,680.72
3,500.000 SUMITOMO REALTY & DEVELOPMENT FJ6858909	27.46	79,765.85	96,125.50	0.10	16,359.65
8,600.000 SUMITOMO CORP FJ6858941	11.44	95,340.33	98,407.56	0.10	3,067.23
1,700.000 SUZUKI MOTOR CORP FJ6865508	33.90	37,865.04	57,625.25	0.06	19,760.21
950.000 SUZUKEN CO LTD/AICHI JAPAN FJ6865565	37.26	30,882.11	35,398.80	0.04	4,516.69
1,100.000 TDK CORP FJ6869302	98.99	73,365.86	108,893.73	0.11	35,527.87
1,800.000 TAISEI CORP FJ6870102	36.33	19,835.39	65,402.97	0.06	45,567.58
8,066.000 TAKEDA PHARMACEUTICAL CO LTD FJ6870441	35.67	295,178.23	287,694.93	0.29	-7,483.30

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,100.000 ADVANTEST CORP FJ6870490	56.73	44,623.92	62,399.78	0.06	17,775.86
1,300.000 SYSMEX CORP FJ6883808	76.28	51,419.98	99,170.41	0.10	47,750.43
5,400.000 TERUMO CORP FJ6885076	37.83	93,793.85	204,267.50	0.20	110,473.65
1,300.000 TOBU RAILWAY CO LTD FJ6895166	33.04	32,091.25	42,957.78	0.04	10,866.53
1,200.000 TOHO CO LTD/TOKYO FJ6895208	36.10	19,177.40	43,323.91	0.04	24,146.51
4,100.000 TOKYO GAS CO LTD FJ6895448	23.91	89,415.41	98,048.85	0.10	8,633.44
1,200.000 TOKYO ELECTRON LTD FJ6895679	245.08	83,334.53	294,090.92	0.29	210,756.39
4,000.000 TOKYU CORP FJ6896545	14.06	42,690.55	56,245.07	0.06	13,554.52
3,300.000 TOPPAN PRINTING CO LTD FJ6897022	16.66	50,816.19	54,966.86	0.05	4,150.67
10,300.000 TORAY INDUSTRIES INC FJ6897147	4.70	46,427.88	48,452.05	0.05	2,024.17

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2,900.000 TOSHIBA CORP FJ6897212	31.84	74,042.67	92,334.43	0.09	18,291.76
1,000.000 TOTO LTD FJ6897469	38.14	28,117.62	38,142.47	0.04	10,024.85
4,700.000 LIXIL GROUP CORP FJ6900214	13.96	56,859.08	65,608.75	0.07	8,749.67
4,000.000 TOSOH CORP FJ6900289	13.63	50,863.44	54,502.48	0.05	3,639.04
8,300.000 MAZDA MOTOR CORP FJ6900305	5.99	47,854.15	49,699.22	0.05	1,845.07
1,200.000 TOYOTA INDUSTRIES CORP FJ6900545	52.93	41,638.12	63,512.07	0.06	21,873.95
2,000.000 TOYOTA TSUSHO CORP FJ6900586	25.30	40,776.20	50,590.91	0.05	9,814.71
17,620.000 TOYOTA MOTOR CORP FJ6900644	62.68	769,887.94	1,104,383.72	1.10	334,495.78
3,000.000 UNICHARM CORP FJ6911484	40.97	40,677.61	122,908.65	0.12	82,231.04
800.000 WEST JAPAN RAILWAY CO FJ6957990	56.04	27,639.65	44,832.92	0.04	17,193.27

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
8,400.000 YAMADA DENKI CO LTD FJ6985025	4.96	32,761.71	41,655.47	0.04	8,893.76
1,200.000 YAKULT HONSHA CO LTD FJ6985116	58.86	44,359.58	70,630.76	0.07	26,271.18
3,800.000 YAMAHA MOTOR CO LTD FJ6985264	15.65	44,349.31	59,455.90	0.06	15,106.59
14,800.000 ASTELLAS PHARMA INC FJ6985389	16.68	138,723.02	246,861.01	0.25	108,137.99
3,000.000 YAMATO HOLDINGS CO LTD FJ6985561	21.60	44,970.65	64,791.21	0.06	19,820.56
2,000.000 YASKAWA ELECTRIC CORP FJ6986049	34.53	18,589.69	69,055.01	0.07	50,465.32
2,000.000 ASAHI INTECC CO LTD FJB019MQ0	28.41	53,546.15	56,819.76	0.06	3,273.61
3,200.000 M3 INC FJB02K2M5	42.50	32,221.29	135,996.66	0.14	103,775.37
1,600.000 SEGA SAMMY HOLDINGS INC FJB02RK08	11.96	19,317.94	19,131.48	0.02	-186.46
6,000.000 SEVEN & I HOLDINGS CO LTD FJB0FS5D1	32.63	169,684.81	195,764.00	0.19	26,079.19

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
4,400.000 DAIICHI SANKYO CO LTD FJB0J7D93	81.62	80,402.83	359,145.38	0.36	278,742.55
1,600.000 BANDAI NAMCO HOLDINGS INC FJB0JDQD7	52.53	30,521.85	84,045.05	0.08	53,523.20
9,400.000 MITSUBISHI CHEMICAL HOLDINGS C FJB0JQTJ2	5.82	48,701.45	54,665.24	0.05	5,963.79
3,800.000 SUMCO CORP FJB0M0C87	15.28	45,087.30	58,082.22	0.06	12,994.92
19.000 DAIWA HOUSE REIT INVESTMENT CO FJB0Z6WY1	2,354.36	42,791.94	44,732.82	0.04	1,940.88
7,100.000 INPEX CORP FJB10RB16	6.18	46,200.11	43,889.23	0.04	-2,310.88
2,800.000 IDEMITSU KOSAN CO LTD FJB1FF8P7	21.20	62,204.05	59,355.79	0.06	-2,848.26
1,800.000 SONY FINANCIAL HOLDINGS INC FJB249SN4	24.05	29,599.18	43,296.10	0.04	13,696.92
7,800.000 ISETAN MITSUKOSHI HOLDINGS LTD FJB2Q4CL2	5.73	43,716.01	44,680.91	0.04	964.90
3,800.000 MS&AD INSURANCE GROUP HOLDINGS FJB2Q4CS7	27.45	102,736.75	104,294.39	0.10	1,557.64

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
700.000 HOSHIZAKI CORP FJB3FF8W8	85.65	41,665.29	59,952.73	0.06	18,287.44
3,400.000 OTSUKA HOLDINGS CO LTD FJB5LTM91	43.56	100,045.53	148,089.17	0.15	48,043.64
3,900.000 DAI-ICHI LIFE HOLDINGS INC FJB601QS7	11.89	49,136.06	46,379.94	0.05	-2,756.12
1,000.000 MEIJI HOLDINGS CO LTD FJB60DQV4	79.53	19,510.65	79,529.13	0.08	60,018.48
42,915.000 ENEOS HOLDINGS INC FJB627LW8	3.54	154,924.83	151,953.74	0.15	-2,971.09
2,400.000 SOMPO HOLDINGS INC FJB62G7K0	34.36	65,849.08	82,465.59	0.08	16,616.51
3,800.000 NEXON CO LTD FJB63QM79	22.59	64,723.95	85,837.70	0.09	21,113.75
10.000 NIPPON PROLOGIS REIT INC FJB98BC64	3,040.27	20,028.43	30,402.74	0.03	10,374.31
1,100.000 SUNTORY BEVERAGE & FOOD LTD FJBBD7Q83	38.98	39,066.97	42,874.36	0.04	3,807.39
21,200.000 CONCORDIA FINANCIAL GROUP LTD FJBD97JW9	3.20	57,803.29	67,794.41	0.07	9,991.12

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
9,800.000 TOKYU FUDOSAN HOLDINGS CORP FJBDC6LT1	4.67	45,457.72	45,782.08	0.05	324.36
3,900.000 SOFTBANK CORP FJBF5M0K1	12.75	50,006.33	49,705.70	0.05	-300.63
2,200.000 SG HOLDINGS CO LTD FJBFFY883	32.63	44,009.50	71,780.13	0.07	27,770.63
5,850.000 MEBUKI FINANCIAL GROUP INC FJBH0VTS4	2.32	21,665.59	13,556.10	0.01	-8,109.49
3,500.000 SEIBU HOLDINGS INC FJBKY6H33	10.85	42,545.86	37,989.53	0.04	-4,556.33
10,700.000 RECRUIT HOLDINGS CO LTD FJBQRRZ08	34.13	173,155.96	365,179.58	0.36	192,023.62
37.000 NOMURA REAL ESTATE MASTER FUND FJBYSJJF3	1,199.43	48,925.86	44,378.74	0.04	-4,547.12
3,200.000 JAPAN POST INSURANCE CO LTD FJBYT8157	13.10	41,413.57	41,911.29	0.04	497.72
TOTAL EQUITY JAPANESE YEN		**16,510,142.41**	**25,462,805.51**	**25.28**	**8,952,663.10**
TOTAL ASSETS JAPANESE YEN		**16,667,853.25**	**25,619,584.42**	**25.43**	**8,951,731.17**

NEW ZEALAND DOLLAR
CASH & CASH EQUIVALENTS

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
	NON-BASE CURRENCY		234.38	234.62	0.00	0.24
EQUITY						
6,078.000	A2 MILK CO LTD AN6287253	13.00	54,623.43	78,997.67	0.08	24,374.24
4,633.000	FISHER & PAYKEL HEALTHCARE COR AN6340250	22.92	43,639.52	106,176.78	0.11	62,537.26
13,044.000	SPARK NEW ZEALAND LTD AN6881436	2.94	15,274.71	38,290.66	0.04	23,015.95
13,170.000	AUCKLAND INTERNATIONAL AIRPORT ANBKX3XG0	4.23	40,315.81	55,701.69	0.06	15,385.88
9,080.000	MERIDIAN ENERGY LTD ANBWFD052	3.10	18,647.52	28,115.65	0.03	9,468.13
	TOTAL EQUITY NEW ZEALAND DOLLAR		**172,500.99**	**307,282.45**	**0.31**	**134,781.46**
	TOTAL ASSETS NEW ZEALAND DOLLAR		**172,735.37**	**307,517.07**	**0.31**	**134,781.70**
NORWEGIAN KRONE						
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		58.51	57.72	0.00	-0.79
EQUITY						
9,983.000	DNB ASA SN4263307	13.18	138,993.03	131,526.83	0.13	-7,466.20

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,833.000 TELENOR ASA SN4732491	14.52	57,039.68	55,665.32	0.06	-1,374.36
11,789.000 EQUINOR ASA SN7133606	14.16	137,799.08	166,930.38	0.17	29,131.30
2,016.000 YARA INTERNATIONAL ASA SN7751258	34.61	62,384.55	69,777.38	0.07	7,392.83
25,568.000 NORSK HYDRO ASA SNB11HK30	2.75	52,802.29	70,420.00	0.07	17,617.71
5,471.000 ORKLA ASA SNB1VQF41	8.74	42,493.52	47,808.16	0.05	5,314.64
2,901.000 GJENSIDIGE FORSIKRING ASA SNB4PH0C0	18.36	44,781.04	53,256.67	0.05	8,475.63
1,893.000 ADEVINTA ASA SNBJ0DP44	10.04	18,231.10	19,014.38	0.02	783.28
TOTAL EQUITY NORWEGIAN KRONE		**554,524.29**	**614,399.12**	**0.61**	**59,874.83**
TOTAL ASSETS NORWEGIAN KRONE		**554,582.80**	**614,456.84**	**0.61**	**59,874.04**
POUND STERLING					
CASH & CASH EQUIVALENTS					
NON-BASE CURRENCY		25,740.43	25,705.29	0.03	-35.14
EQUITY					

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3,073.000 BARRICK GOLD CORP EX0028368	25.45	37,839.64	78,218.18	0.08	40,378.54
4,900.000 ANTOFAGASTA PLC EX0045610	11.58	37,817.64	56,766.43	0.06	18,948.79
4,905.000 ASHTEAD GROUP PLC EX0053671	33.60	88,680.73	164,788.20	0.16	76,107.47
9,949.000 BRITISH LAND CO PLC/THE EX0136708	4.77	48,015.09	47,500.10	0.05	-514.99
43,978.000 AVIVA PLC EX0216237	3.38	135,830.42	148,672.10	0.15	12,841.68
22,175.000 DIAGEO PLC EX0237407	33.13	536,199.60	734,715.72	0.73	198,516.12
1,350.000 SCHRODERS PLC EX0240542	36.44	34,539.74	49,191.09	0.05	14,651.35
20,730.000 BAE SYSTEMS PLC EX0263494	5.97	120,560.51	123,818.02	0.12	3,257.51
17,569.000 BRITISH AMERICAN TOBACCO PLC EX0287584	38.36	612,172.81	673,932.83	0.67	61,760.02
1,817.000 HALMA PLC EX0405202	28.46	42,408.28	51,704.31	0.05	9,296.03

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20,692.000 STANDARD CHARTERED PLC EX0408289	5.44	104,406.11	112,520.52	0.11	8,114.41
2,674.000 IMPERIAL BRANDS PLC EX0454499	19.01	49,276.94	50,831.95	0.05	1,555.01
124,167.000 HSBC HOLDINGS PLC EX0540529	4.68	989,714.31	580,850.94	0.58	-408,863.37
45,420.000 LEGAL & GENERAL GROUP PLC EX0560394	2.73	78,466.45	123,971.18	0.12	45,504.73
15,979.000 MEGGITT PLC EX0575806	3.64	49,347.12	58,105.57	0.06	8,758.45
39,875.000 WM MORRISON SUPERMARKETS PLC EX0604317	2.35	90,254.16	93,883.12	0.09	3,628.96
1,847.000 ASSOCIATED BRITISH FOODS PLC EX0673122	23.66	28,823.77	43,703.23	0.04	14,879.46
2,595.000 PERSIMMON PLC EX0682537	28.25	61,339.52	73,297.89	0.07	11,958.37
21,073.000 PRUDENTIAL PLC EX0709959	15.06	203,097.40	317,270.58	0.31	114,173.18
8,792.000 RIO TINTO PLC EX0718877	56.21	373,075.35	494,175.85	0.49	121,100.50

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5,722.000 ST JAMES'S PLACE PLC EX0766934	11.77	56,229.05	67,363.95	0.07	11,134.90
9,726.000 SSE PLC EX0790876	16.86	135,367.42	163,978.05	0.16	28,610.63
118,149.000 BP PLC EX0798051	3.80	610,412.10	448,465.63	0.45	-161,946.47
164,801.000 LLOYDS BANKING GROUP PLC EX0870611	0.39	73,799.84	63,481.06	0.06	-10,318.78
41,222.000 TAYLOR WIMPEY PLC EX0878234	1.76	69,684.44	72,631.74	0.07	2,947.30
62,957.000 TESCO PLC EX0884703	2.82	155,355.70	177,438.24	0.18	22,082.54
6,546.000 SMITH & NEPHEW PLC EX0922321	18.60	86,399.21	121,768.42	0.12	35,369.21
34,845.000 GLAXOSMITHKLINE PLC EX0925282	20.22	675,495.86	704,629.65	0.70	29,133.79
3,855.000 WEIR GROUP PLC/THE EX0946585	13.14	39,482.16	50,657.04	0.05	11,174.88
10,721.000 ASTRAZENECA PLC EX0989528	104.05	622,041.13	1,115,518.72	1.11	493,477.59

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Report ID : IACS0005
Base Currency : USD
Status : FINAL

PARAMETRIC EAFE MON - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
34,452.000 BT GROUP PLC EX3091355	1.41	49,199.42	48,549.83	0.05	-649.59
41,081.000 MARKS & SPENCER GROUP PLC EX3127480	1.22	47,783.94	50,252.09	0.05	2,468.15
211,809.000 BARCLAYS PLC EX3134866	1.41	294,674.44	299,449.96	0.30	4,775.52
1,582.000 INTERTEK GROUP PLC EX3163832	67.22	53,999.85	106,336.72	0.11	52,336.87
2,455.000 BURBERRY GROUP PLC EX3174300	19.76	31,201.07	48,519.21	0.05	17,318.14
1,444.000 NEXT PLC EX3208983	60.47	59,994.41	87,319.06	0.09	27,324.65
20,663.000 KINGFISHER PLC EX3319525	2.73	36,416.03	56,372.89	0.06	19,956.86
57,931.000 ITV PLC EX3398644	0.92	49,813.35	53,455.60	0.05	3,642.25
30,387.000 J SAINSBURY PLC EXB019KW9	2.58	73,651.75	78,358.87	0.08	4,707.12
26,406.000 G4S PLC EXB01FLG9	1.41	31,482.41	37,178.76	0.04	5,696.35

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PARAMETRIC EAFE MON - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,734.000 ADMIRAL GROUP PLC EXB02J636	28.41	39,593.96	49,256.77	0.05	9,662.81
1,003.000 BERKELEY GROUP HOLDINGS PLC EXB02L3W0	51.46	42,573.68	51,617.13	0.05	9,043.45
93,467.000 CENTRICA PLC EXB033F22	0.48	45,023.06	44,509.01	0.04	-514.05
24,022.000 ROYAL DUTCH SHELL PLC EXB03MLX5 A SHS	15.90	546,374.16	382,001.98	0.38	-164,372.18
26,227.000 ROYAL DUTCH SHELL PLC EXB03MM48 B SHS	15.12	636,296.14	396,650.43	0.39	-239,645.71
2,253.000 BUNZL PLC EXB0744B8	26.76	29,835.46	60,297.26	0.06	30,461.80
11,576.000 RENTOKIL INITIAL PLC EXB082RF7	6.30	54,972.08	72,889.65	0.07	17,917.57
2,576.000 LONDON STOCK EXCHANGE GROUP PL EXB0SWJX9	103.27	96,010.84	266,027.25	0.26	170,016.41
10,107.000 UNILEVER PLC EXB10RZP7	53.81	360,980.37	543,861.51	0.54	182,881.14
12,359.000 TUI AG EXB11LJN2	4.71	44,001.84	58,166.40	0.06	14,164.56

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
7,315.000 EXPERIAN PLC EXB19NLV9	34.83	98,397.69	254,792.89	0.25	156,395.20
2,661.000 MONDI PLC EXB1CRLC8	18.66	42,669.10	49,664.21	0.05	6,995.11
1,831.000 SEVERN TRENT PLC EXB1FH8J7	30.63	38,538.51	56,084.49	0.06	17,545.98
1,189.000 WHITBREAD PLC EXB1KJJ48	27.46	30,420.21	32,644.03	0.03	2,223.82
2,591.000 HARGREAVES LANSDOWN PLC EXB1VZ0M0	20.12	41,411.97	52,135.45	0.05	10,723.48
6,981.000 ANGLO AMERICAN PLC EXB1XZS89	23.10	98,170.14	161,249.27	0.16	63,079.13
9,544.000 3I GROUP PLC EXB1YW440	10.29	59,748.47	98,184.90	0.10	38,436.43
6,008.000 RECKITT BENCKISER GROUP PLC EXB24CGK6	91.83	397,056.64	551,713.39	0.55	154,656.75
10,749.000 RELX PLC EXB2B0DG6	23.11	146,774.10	248,363.38	0.25	101,589.28
5,826.000 UNITED UTILITIES GROUP PLC EXB39J2M5	11.25	53,756.96	65,521.71	0.07	11,764.75

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,584.000 OCADO GROUP PLC EXB3MBS72	25.06	52,885.08	89,807.76	0.09	36,922.68
68,816.000 GLENCORE PLC EXB4T3BW4	2.12	116,996.49	145,586.74	0.14	28,590.25
6,683.000 GVC HOLDINGS PLC EXB5VQMV7	9.15	50,498.27	61,155.16	0.06	10,656.89
12,612.000 SEGRO PLC EXB5ZN1N1	11.06	74,869.22	139,471.32	0.14	64,602.10
12,129.000 ROLLS-ROYCE HOLDINGS PLC EXB63H842	3.53	51,530.50	42,771.74	0.04	-8,758.76
14,217.000 EVRAZ PLC EXB71N6K5	3.56	47,509.66	50,661.86	0.05	3,152.20
91,619.000 NATWEST GROUP PLC EXB7T7729	1.50	144,199.60	137,656.59	0.14	-6,543.01
11,757.000 SAGE GROUP PLC/THE EXB8C3BL7	8.30	64,199.40	97,592.05	0.10	33,392.65
15,086.000 WPP PLC EXB8KF9B6	7.79	104,444.10	117,582.77	0.12	13,138.67
1,734.000 COCA-COLA HBC AG EXB9895B6	25.06	41,822.89	43,450.52	0.04	1,627.63

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
8,347.000 COMPASS GROUP PLC EXBD6K458	13.74	75,332.30	114,686.71	0.11	39,354.41
24,935.000 NATIONAL GRID PLC EXBDR05C3	12.22	265,244.26	304,769.41	0.30	39,525.15
16,694.000 BHP GROUP PLC EXBH0P3Z9	20.44	300,286.20	341,254.85	0.34	40,968.65
110,425.000 VODAFONE GROUP PLC EXBH4HKS0	1.59	180,818.74	175,818.05	0.17	-5,000.69
1,539.000 INTERCONTINENTAL HOTELS GROUP EXBHJYC07	44.07	52,832.40	67,829.66	0.07	14,997.26
1,334.000 CRODA INTERNATIONAL PLC EXBJFFLV0	64.94	57,394.41	86,634.14	0.09	29,239.73
1,900.000 FERGUSON PLC EXBJVNSS5	81.70	77,594.68	155,225.96	0.15	77,631.28
23,614.000 M&G PLC EXBKFB1C0	2.07	33,708.10	48,886.84	0.05	15,178.74
8,624.000 INFORMA PLC EXBMJ6DW6	5.81	53,912.79	50,124.96	0.05	-3,787.83
7,495.000 AUTO TRADER GROUP PLC EXBVYVFW2	6.50	51,240.16	48,748.97	0.05	-2,491.19

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PARAMETRIC EAFE MON - [redacted] | **6/30/2020**

Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
422.000	SPIRAX-SARCO ENGINEERING PLC EXBWFGQN2	123.26	41,376.96	52,017.18	0.05	10,640.22
33,509.000	MELROSE INDUSTRIES PLC EXBZ1G438	1.41	51,745.70	47,200.24	0.05	-4,545.46
1,940.000	JOHNSON MATTHEY PLC EXBZ4BQC2	25.92	48,625.38	50,290.40	0.05	1,665.02
	TOTAL EQUITY POUND STERLING		**11,916,021.84**	**13,894,498.29**	**13.79**	**1,978,476.45**
	TOTAL ASSETS POUND STERLING		**11,941,762.27**	**13,920,203.58**	**13.82**	**1,978,441.31**
SINGAPORE DOLLAR						
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		9,229.28	9,218.03	0.01	-11.25
EQUITY						
24,900.000	SINGAPORE TECHNOLOGIES ENGINEE FM6043216	2.37	57,892.85	58,901.11	0.06	1,008.26
20,600.000	DBS GROUP HOLDINGS LTD FM6175208	14.91	255,368.69	307,143.11	0.30	51,774.42
7,200.000	CITY DEVELOPMENTS LTD FM6197921	6.04	33,243.37	43,456.51	0.04	10,213.14
3,100.000	JARDINE CYCLE & CARRIAGE LTD FM6242263	14.45	46,450.84	44,798.39	0.04	-1,652.45

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PARAMETRIC EAFE MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
22,400.000 ASCENDAS REAL ESTATE INVESTMEN FM6563874	2.27	35,557.23	50,899.97	0.05	15,342.74
14,100.000 SINGAPORE AIRLINES LTD FM6811737	2.67	43,154.70	37,699.72	0.04	-5,454.98
12,200.000 UNITED OVERSEAS BANK LTD FM6916783	14.50	171,308.78	176,915.52	0.18	5,606.74
4,100.000 VENTURE CORP LTD FM6927376	11.60	42,537.06	47,552.42	0.05	5,015.36
55,400.000 SEMBCORP INDUSTRIES LTD FMB08X160	1.25	62,133.10	69,495.72	0.07	7,362.62
32,800.000 OVERSEA-CHINESE BANKING CORP L FMB0F9V21	6.45	208,169.73	211,605.32	0.21	3,435.59
16,400.000 WILMAR INTERNATIONAL LTD FMB17KC65	2.93	39,813.11	48,081.43	0.05	8,268.32
11,400.000 KEPPEL CORP LTD FMB1VQ5C0	4.27	44,808.99	48,703.63	0.05	3,894.64
38,300.000 MAPLETREE COMMERCIAL TRUST FMB5143W1	1.38	47,128.67	52,986.63	0.05	5,857.96
TOTAL EQUITY SINGAPORE DOLLAR		**1,087,567.12**	**1,198,239.48**	**1.19**	**110,672.36**
TOTAL ASSETS SINGAPORE DOLLAR		**1,096,796.40**	**1,207,457.51**	**1.20**	**110,661.11**

SWEDISH KRONA

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Asset Detail - By Currency

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Base Currency : USD
Status : FINAL

PARAMETRIC EAFE MON - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
CASH & CASH EQUIVALENTS					
NON-BASE CURRENCY		3,673.49	3,686.48	0.00	12.99
EQUITY					
18,750.000 SKANDINAVISKA ENSKILDA BANKEN SS4813340	8.66	133,365.32	162,410.85	0.16	29,045.53
8,125.000 SWEDBANK AB SS4846522	12.82	98,045.99	104,128.09	0.10	6,082.10
1,400.000 SWEDISH MATCH AB SS5048565	70.30	33,672.32	98,425.94	0.10	64,753.62
3,206.000 SECURITAS AB SS5554042	13.48	34,181.09	43,203.65	0.04	9,022.56
4,182.000 INVESTOR AB SS5679591	52.78	113,414.67	220,711.24	0.22	107,296.57
3,241.000 HENNES & MAURITZ AB SS5687438	14.49	51,191.64	46,962.70	0.05	-4,228.94
22,949.000 TELEFONAKTIEBOLAGET LM ERICSSO SS5959373	9.25	149,993.76	212,231.42	0.21	62,237.66
14,723.000 TELIA CO AB SS5978381	3.74	49,521.35	54,994.06	0.05	5,472.71

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PARAMETRIC EAFE MON - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,718.000 SKANSKA AB SS7142093	20.34	42,485.29	55,283.93	0.05	12,798.64
2,701.000 ALFA LAVAL AB SS7332686	21.94	43,727.45	59,257.82	0.06	15,530.37
7,781.000 HUSQVARNA AB SSB12PJ24	8.19	46,596.49	63,723.58	0.06	17,127.09
140.000 MODERN TIMES GROUP MTG AB SSB151P43	10.85	2,044.01	1,519.22	0.00	-524.79
3,193.000 SKF AB SSB1Q3J35	18.59	47,528.29	59,341.93	0.06	11,813.64
12,887.000 VOLVO AB SSB1QH836	15.66	146,652.67	201,812.16	0.20	55,159.49
9,676.000 SANDVIK AB SSB1VQ251	18.69	135,465.18	180,815.16	0.18	45,349.98
4,160.000 SVENSKA CELLULOSA AB SCA SSB1VVGZ9	11.89	14,214.14	49,473.58	0.05	35,259.44
1,966.000 HEXAGON AB SSB1XFTL9	58.39	49,816.34	114,794.91	0.11	64,978.57
502.000 ETRION CORP SSB5TZGM3	0.15	279.38	76.08	0.00	-203.30

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PARAMETRIC EAFE MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6,614.000 TELE2 AB SSB97C732	13.26	52,811.71	87,709.61	0.09	34,897.90
5,389.000 ATLAS COPCO AB SSBD97BN3	42.35	84,095.90	228,247.21	0.23	144,151.31
2,898.000 ATLAS COPCO AB SSBD97BS2	36.99	39,563.57	107,189.90	0.11	67,626.33
400.000 INTERNATIONAL PETROLEUM CORP/S SSBDCT292	1.81	1,029.21	725.15	0.00	-304.06
5,090.000 EPIROC AB SSBDZV110	12.46	21,692.77	63,429.34	0.06	41,736.57
2,898.000 EPIROC AB SSBDZV128	12.23	12,573.87	35,444.83	0.04	22,870.96
4,160.000 ESSITY AB SSBF1K7P7	32.32	55,495.14	134,444.89	0.13	78,949.75
140.000 NORDIC ENTERTAINMENT GROUP AB SSBHWV254	30.59	2,848.17	4,282.66	0.00	1,434.49
2,950.000 BOLIDEN AB SSBJV12J7	22.75	51,018.91	67,127.13	0.07	16,108.22
2,547.000 KINNEVIK AB SSBK9X804	26.31	55,558.00	67,005.81	0.07	11,447.81

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15,334.000	SVENSKA HANDELSBANKEN AB SSBXDZ9Q8	9.49	139,873.13	145,560.79	0.14	5,687.66
6,204.000	ASSA ABLOY AB SSBYPC1T6	20.33	57,762.66	126,155.62	0.13	68,392.96
36,047.000	NORDEA BANK ABP SSBYZF9J2	6.90	227,656.27	248,821.47	0.25	21,165.20
	TOTAL EQUITY SWEDISH KRONA		**1,994,174.69**	**3,045,310.73**	**3.02**	**1,051,136.04**
	TOTAL ASSETS SWEDISH KRONA		**1,997,848.18**	**3,048,997.21**	**3.03**	**1,051,149.03**
SWISS FRANC						
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		236.53	237.36	0.00	0.83
EQUITY						
57.000	SGS SA ES4824771	2,443.14	97,085.75	139,259.14	0.14	42,173.39
308.000	SWISSCOM AG ES5533975	523.35	128,643.60	161,191.70	0.16	32,548.10
8.000	CHOCOLADEFABRIKEN LINDT & SPRU ES5962281	8,231.76	44,657.30	65,854.04	0.07	21,196.74
1.000	CHOCOLADEFABRIKEN LINDT & SPRU ES5962307	85,905.76	27,285.93	85,905.76	0.09	58,619.83

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68.000 GIVAUDAN SA ES5980614	3,723.29	84,927.24	253,183.47	0.25	168,256.23
1,026.000 ZURICH INSURANCE GROUP AG ES5983816	352.70	264,582.90	361,869.24	0.36	97,286.34
17,035.000 NOVARTIS AG ES7103066	86.98	971,936.47	1,481,742.07	1.47	509,805.60
15,149.000 ABB LTD ES7108891	22.51	281,167.37	341,014.37	0.34	59,847.00
5,523.000 ROCHE HOLDING AG ES7110384	346.53	1,099,758.83	1,913,858.95	1.90	814,100.12
2,544.000 LAFARGEHOLCIM LTD ES7110756	43.81	97,529.05	111,446.83	0.11	13,917.78
3,121.000 CLARIANT AG ES7113990	19.64	56,412.26	61,296.83	0.06	4,884.57
24,163.000 NESTLE SA ES7123874	110.54	1,513,875.14	2,670,922.51	2.65	1,157,047.37
425.000 BALOISE HOLDING AG ES7124591	149.97	42,690.13	63,735.42	0.06	21,045.29
404.000 TEMENOS AG ES7147899	155.30	49,771.15	62,739.28	0.06	12,968.13

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390.000 SONOVA HOLDING AG ES7156031	199.62	49,090.07	77,851.83	0.08	28,761.76
67.000 STRAUMANN HOLDING AG ES7156833	859.06	41,860.07	57,556.86	0.06	15,696.79
16,342.000 CREDIT SUISSE GROUP AG ES7171584	10.34	134,597.74	168,982.03	0.17	34,384.29
244.000 SWATCH GROUP AG/THE ES7184728	199.57	47,180.70	48,694.42	0.05	1,513.72
545.000 LONZA GROUP AG ES7333374	527.89	85,320.24	287,698.80	0.29	202,378.56
340.000 SWISS LIFE HOLDING AG ES7437803	370.43	72,035.10	125,945.86	0.13	53,910.76
88.000 EMS-CHEMIE HOLDING AG ES7635612	774.63	51,045.72	68,167.38	0.07	17,121.66
679.000 SWISS PRIME SITE AG ESB083BH9	92.45	52,071.96	62,772.84	0.06	10,700.88
103.000 PARTNERS GROUP HOLDING AG ESB119QG7	906.97	32,756.88	93,417.97	0.09	60,661.09
442.000 SCHINDLER HOLDING AG ESB11TCY9	235.34	66,536.00	104,021.95	0.10	37,485.95

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425.000 KUEHNE + NAGEL INTERNATIONAL A ESB142S69	166.11	49,405.66	70,597.86	0.07	21,192.20
260.000 GEBERIT AG ESB1WGG94	500.45	55,746.66	130,116.62	0.13	74,369.96
2,095.000 JULIUS BAER GROUP LTD ESB4R2R51	41.84	75,203.54	87,664.77	0.09	12,461.23
2,387.000 SWISS RE AG ESB545MG7	77.10	124,531.94	184,047.51	0.18	59,515.57
2,595.000 CIE FINANCIERE RICHEMONT SA ESBCRWZ17	63.79	103,172.35	165,523.51	0.16	62,351.16
701.000 IDORSIA LTD ESBF0YK60	31.98	5,621.64	22,416.02	0.02	16,794.38
1,020.000 SIKA AG ESBF2DSG4	192.44	42,699.35	196,292.54	0.19	153,593.19
1,301.000 GROUPE BRUXELLES LAMBERT SA ESBHZLGZ7	83.18	109,194.84	108,221.01	0.11	-973.83
3,476.000 ALCON INC ESBJT1GR2	57.37	131,301.07	199,414.66	0.20	68,113.59
538.000 BANQUE CANTONALE VAUDOISE ESBMFY8R7	97.20	51,605.92	52,292.54	0.05	686.62

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BNY MELLON

Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

PARAMETRIC EAFE MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
14,202.000 UBS GROUP AG ESBRJL171	11.51	121,473.38	163,445.53	0.16	41,972.15
342.000 VIFOR PHARMA AG ESBZ12TW9	150.44	42,262.17	51,450.69	0.05	9,188.52
TOTAL EQUITY SWISS FRANC		**6,305,036.12**	**10,300,612.81**	**10.23**	**3,995,576.69**
TOTAL ASSETS SWISS FRANC		**6,305,272.65**	**10,300,850.17**	**10.23**	**3,995,577.52**
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
48,000.670 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	48,000.67	48,000.67	0.05	0.00
EQUITY					
2,320.000 ALTICE USA INC 02156K103	22.54	38,542.20	52,292.80	0.05	13,750.60
323.000 BEIGENE LTD 07725L102 ADR	188.40	42,942.85	60,853.20	0.06	17,910.35
2,458.000 MELCO RESORTS & ENTERTAINMENT 585464100 ADR	15.52	35,102.98	38,148.16	0.04	3,045.18
12,281.000 TEVA PHARMACEUTICAL INDUSTRIES 881624209 ADR	12.33	86,646.81	151,424.73	0.15	64,777.92
1,100.000 JARDINE MATHESON HOLDINGS LTD FM6472118	41.74	46,913.18	45,914.00	0.05	-999.18

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PARAMETRIC EAFE MON - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,600.000 JARDINE STRATEGIC HOLDINGS LTD FM6472969	21.55	52,605.78	56,030.00	0.06	3,424.22
754.000 CHECK POINT SOFTWARE TECHNOLOG M22465104	107.43	67,528.09	81,002.22	0.08	13,474.13
509.000 CYBERARK SOFTWARE LTD M2682V108	99.27	38,586.78	50,528.43	0.05	11,941.65
315.000 WIX.COM LTD M98068105	256.22	50,385.83	80,709.30	0.08	30,323.47
469.000 NXP SEMICONDUCTORS NV N6596X109	114.04	36,120.53	53,484.76	0.05	17,364.23
TOTAL EQUITY U.S. DOLLAR		**495,375.03**	**670,387.60**	**0.67**	**175,012.57**
TOTAL ASSETS U.S. DOLLAR		**543,375.70**	**718,388.27**	**0.71**	**175,012.57**
TOTAL ASSETS		**69,676,399.45**	**100,736,995.11**	**100.00**	**31,060,595.66**

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Status : FINAL

WELLINGTON EMD MON - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
FIXED INCOME SECURITIES					
2,880,704.993 WTC-CTF JPM PAG EMERGING 99VVAJY68 MARKETS DEBT	10.53	28,843,087.91	30,333,820.70	100.00	1,490,732.79

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Status : FINAL

STEPSTONE MONTI - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
PRIVATE EQUITY					
63,867,268.000 STEPSTONE XL OPP FUND LP 99VVAKD50		46,782,535.95	63,867,268.00	52.12	17,084,732.05
38,067,148.000 STEPSTONE XL OP FUND II-A 99VVBMW13		34,950,125.45	38,067,148.00	31.06	3,117,022.55
20,615,538.000 STEPSTONE CAP PARTNERS IV LP 99VVBNR66		18,822,495.00	20,615,538.00	16.82	1,793,043.00
TOTAL PRIVATE EQUITY U.S. DOLLAR		**100,555,156.40**	**122,549,954.00**	**100.00**	**21,994,797.60**
TOTAL ASSETS U.S. DOLLAR		**100,555,156.40**	**122,549,954.00**	**100.00**	**21,994,797.60**
TOTAL ASSETS		**100,555,156.40**	**122,549,954.00**	**100.00**	**21,994,797.60**

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Asset Detail - By Currency

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FIRST PRINCIPLES MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
926,289.640 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	926,289.64	926,289.64	0.44	0.00
-64,791.660 SWAP COLLATERAL WITH BARCLAYS 99QAAAPN2		-64,791.66	-64,791.66	-0.03	0.00
CASH		19,297.69	19,297.69	0.01	0.00
TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**880,795.67**	**880,795.67**	**0.42**	**0.00**
FIXED INCOME SECURITIES					
370,000.000 AT&T INC 00206RBK7 4.350% 06/15/2045 DD 06/15/13	112.53	352,756.89	416,375.80	0.20	63,618.91
270,000.000 AT&T INC 00206RDH2 5.150% 03/15/2042 DD 03/15/16	124.82	264,882.18	337,016.70	0.16	72,134.52
1,400,000.000 AT&T INC 00206RGQ9 4.300% 02/15/2030 DD 08/15/18	117.20	1,566,886.58	1,640,730.00	0.77	73,843.42
750,000.000 AT&T INC 00206RHK1 4.850% 03/01/2039 DD 02/19/19	120.61	760,640.40	904,590.00	0.43	143,949.60
2,240,000.000 ABBVIE INC 144A 00287YBU2 2.950% 11/21/2026 DD 11/21/19	108.77	2,272,371.30	2,436,336.00	1.15	163,964.70

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FIRST PRINCIPLES MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
920,000.000 AERCAP IRELAND CAPITAL DAC / A 00774MAE5 3.875% 01/23/2028 DD 01/23/18	90.32	956,038.48	830,971.60	0.39	-125,066.88
875,000.000 AIR LEASE CORP 00912XAV6 3.625% 04/01/2027 DD 03/08/17	98.08	855,505.10	858,200.00	0.40	2,694.90
1,350,000.000 AIRCASTLE LTD 00928QAQ4 4.125% 05/01/2024 DD 03/20/17	93.95	1,412,375.22	1,268,257.50	0.60	-144,117.72
1,700,000.000 ALIBABA GROUP HOLDING LTD 01609WAT9 3.400% 12/06/2027 DD 12/06/17	111.10	1,781,422.76	1,888,632.00	0.89	107,209.24
750,000.000 ALIBABA GROUP HOLDING LTD 01609WAV4 4.200% 12/06/2047 DD 12/06/17	123.33	727,029.49	924,997.50	0.44	197,968.01
750,000.000 AMAZON.COM INC 023135BF2 3.875% 08/22/2037 DD 02/22/18	123.82	765,543.55	928,657.50	0.44	163,113.95
350,000.000 AMAZON.COM INC 023135BJ4 4.050% 08/22/2047 DD 02/22/18	130.09	365,223.08	455,311.50	0.21	90,088.42
820,000.000 AMGEN INC 031162CD0 4.563% 06/15/2048 DD 12/15/16	130.22	973,155.52	1,067,804.00	0.50	94,648.48
2,000,000.000 AMGEN INC 031162CF5 4.663% 06/15/2051 DD 12/15/16	133.32	2,581,431.27	2,666,320.00	1.26	84,888.73
520,000.000 ANHEUSER-BUSCH INBEV WORLDWIDE 03523TBF4 8.200% 01/15/2039 DD 01/15/11	157.70	800,709.51	820,019.20	0.39	19,309.69

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FIRST PRINCIPLES MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
500,000.000 ANHEUSER-BUSCH INBEV FINANCE I 035242AN6 4.900% 02/01/2046 DD 01/25/16	121.70	569,272.37	608,515.00	0.29	39,242.63
470,000.000 ANTHEM INC 036752AG8 4.101% 03/01/2028 DD 03/02/18	117.19	517,001.56	550,797.70	0.26	33,796.14
820,000.000 APPLE INC 037833BX7 4.650% 02/23/2046 DD 02/23/16	137.72	1,058,453.77	1,129,263.00	0.53	70,809.23
500,000.000 APPLE INC 037833DD9 3.750% 09/12/2047 DD 09/12/17	119.95	497,298.35	599,740.00	0.28	102,441.65
1,000,000.000 ARES XXXIV CLO LTD 2A BR2 144A 04015GAR0 VAR RT 04/17/2033 DD 03/20/20	100.00	1,000,000.00	1,000,000.00	0.47	0.00
470,000.000 ASTRAZENECA PLC 046353AD0 6.450% 09/15/2037 DD 09/12/07	152.07	675,868.99	714,705.50	0.34	38,836.51
400,000.000 AUSTRALIA & NEW ZEALAND B 144A 052528AL0 VAR RT 07/22/2030 DD 01/22/20	101.99	400,000.00	407,972.00	0.19	7,972.00
470,000.000 AUTOZONE INC 053332AV4 3.750% 06/01/2027 DD 04/18/17	112.07	508,119.98	526,710.20	0.25	18,590.22
750,000.000 BP CAPITAL MARKETS PLC 05565QDH8 3.723% 11/28/2028 DD 11/28/16	113.33	776,010.74	849,945.00	0.40	73,934.26
278,000.000 BANK OF AMERICA CORP 06051GHS1 VAR RT 03/15/2050 DD 03/15/19	129.23	331,839.12	359,259.40	0.17	27,420.28

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FIRST PRINCIPLES MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,000,000.000 BANK OF AMERICA CORP 06051GJB6 VAR RT 04/29/2031 DD 04/29/20	105.82	2,055,356.93	2,116,300.00	1.00	60,943.07
500,000.000 BARRICK GOLD CORP 067901AH1 5.250% 04/01/2042 DD 04/03/12	131.78	627,597.66	658,890.00	0.31	31,292.34
820,000.000 BECTON DICKINSON AND CO 075887BV0 3.363% 06/06/2024 DD 06/06/17	107.93	859,601.63	885,001.40	0.42	25,399.77
400,000.000 BECTON DICKINSON AND CO 075887BW8 3.700% 06/06/2027 DD 06/06/17	111.77	421,316.16	447,084.00	0.21	25,767.84
600,000.000 BOEING CO/THE 097023AS4 6.625% 02/15/2038 DD 02/24/98	119.32	821,324.99	715,938.00	0.34	-105,386.99
1,170,000.000 BOSTON SCIENTIFIC CORP 101137AX5 4.000% 03/01/2029 DD 02/25/19	114.42	1,311,788.83	1,338,749.10	0.63	26,960.27
820,000.000 BP CAPITAL MARKETS AMERICA INC 10373QBE9 3.410% 02/11/2026 DD 02/11/19	110.60	875,489.01	906,903.60	0.43	31,414.59
970,000.000 BRISTOL-MYERS SQUIBB CO 144A 110122CC0 4.125% 06/15/2039 DD 05/16/19	127.31	1,093,471.60	1,234,887.60	0.58	141,416.00
450,000.000 BRISTOL-MYERS SQUIBB CO 144A 110122CD8 4.250% 10/26/2049 DD 05/16/19	131.92	479,377.38	593,640.00	0.28	114,262.62
520,000.000 BROADCOM CORP / BROADCOM CAYMA 11134LAP4 3.125% 01/15/2025 DD 10/17/17	106.82	519,902.35	555,464.00	0.26	35,561.65

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Base Currency : USD
Status : FINAL

FIRST PRINCIPLES MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
175,000.000 BROADCOM INC 144A 11135FAE1 4.250% 04/15/2026 DD 04/05/19	111.29	173,022.28	194,759.25	0.09	21,736.97
470,000.000 BURLINGTON NORTHERN SANTA FE L 12189LAW1 4.150% 04/01/2045 DD 03/09/15	123.07	554,044.55	578,405.50	0.27	24,360.95
820,000.000 CIGNA CORP 144A 125523CA6 3.400% 03/01/2027 DD 09/01/19	110.16	864,613.64	903,271.00	0.43	38,657.36
2,350,000.000 CIT GROUP INC 125581GW2 5.250% 03/07/2025 DD 03/09/18	103.60	2,566,396.71	2,434,694.00	1.15	-131,702.71
820,000.000 CVS HEALTH CORP 126650CX6 4.300% 03/25/2028 DD 03/09/18	116.96	905,505.69	959,047.40	0.45	53,541.71
1,870,000.000 CAPITAL ONE FINANCIAL CORP 14040HBW4 3.800% 01/31/2028 DD 01/30/18	111.33	2,028,850.68	2,081,908.40	0.98	53,057.72
500,000.000 CENTENE CORP 15135BAR2 4.250% 12/15/2027 DD 12/06/19	103.19	514,374.78	515,955.00	0.24	1,580.22
400,000.000 CHARTER COMMUNICATIONS OPERATI 161175AY0 4.908% 07/23/2025 DD 07/23/16	114.61	413,446.45	458,432.00	0.22	44,985.55
600,000.000 CHARTER COMMUNICATIONS OPERATI 161175BJ2 3.750% 02/15/2028 DD 07/06/17	109.01	562,214.12	654,066.00	0.31	91,851.88
470,000.000 CHARTER COMMUNICATIONS OPERATI 161175BR4 5.050% 03/30/2029 DD 01/17/19	118.04	536,908.22	554,792.70	0.26	17,884.48

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FIRST PRINCIPLES MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,170,000.000 CITIGROUP INC 172967KR1 4.750% 05/18/2046 DD 05/18/16	127.20	1,433,869.89	1,488,251.70	0.70	54,381.81
1,000,000.000 CITIGROUP INC 172967LP4 VAR RT 07/24/2028 DD 07/24/17	111.49	1,008,343.46	1,114,930.00	0.53	106,586.54
810,000.000 CITIGROUP INC 172967LS8 VAR RT 10/27/2028 DD 10/27/17	110.21	810,000.00	892,660.50	0.42	82,660.50
2,050,000.000 CITIGROUP INC 172967ME8 VAR RT 03/20/2030 DD 03/20/19	114.92	2,137,080.56	2,355,798.50	1.11	218,717.94
500,000.000 COMCAST CORP 20030NCE9 3.999% 11/01/2049 DD 10/19/17	120.76	522,253.07	603,820.00	0.28	81,566.93
2,000,000.000 CONSUMERS ENERGY CO 210518CZ7 3.250% 08/15/2046 DD 08/10/16	111.60	2,196,581.37	2,232,000.00	1.05	35,418.63
1,210,000.000 CREDIT SUISSE AG 144A 22546DAA4 6.500% 08/08/2023 DD 08/08/13	109.03	1,329,953.96	1,319,214.60	0.62	-10,739.36
1,210,000.000 CROWN CASTLE INTERNATIONAL COR 22822VAB7 4.450% 02/15/2026 DD 02/08/16	114.63	1,336,084.97	1,387,010.90	0.65	50,925.93
820,000.000 DR HORTON INC 23331ABM0 2.500% 10/15/2024 DD 10/10/19	104.45	832,801.40	856,449.00	0.40	23,647.60
200,000.000 DAIMLER FINANCE NORTH AME 144A 233851CS1 2.850% 01/06/2022 DD 01/06/17	102.24	199,930.24	204,472.00	0.10	4,541.76

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FIRST PRINCIPLES MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,453,125.000 DAVITA 8/19 DELAYED DRAW TLA 23918VAW4	96.50	2,447,543.37	2,367,265.63	1.12	-80,277.74
700,000.000 JOHN DEERE CAPITAL CORP 24422EUU1 3.450% 03/07/2029 DD 03/07/19	115.93	767,535.29	811,496.00	0.38	43,960.71
1,300,000.000 DELL INTERNATIONAL LLC / 144A 24703DAY7 4.000% 07/15/2024 DD 03/20/19	107.80	1,357,675.06	1,401,335.00	0.66	43,659.94
2,290,000.000 DELTA AIR LINES INC 247361ZU5 2.900% 10/28/2024 DD 10/28/19	81.10	2,277,958.61	1,857,235.80	0.88	-420,722.81
400,000.000 DELL INTERNATIONAL LLC / 144A 25272KAK9 6.020% 06/15/2026 DD 06/01/16	114.65	418,668.41	458,592.00	0.22	39,923.59
470,000.000 DISCOVERY COMMUNICATIONS LLC 25470DBF5 4.125% 05/15/2029 DD 05/21/19	114.18	513,453.75	536,636.60	0.25	23,182.85
900,000.000 DOMINION ENERGY INC 25746UCZ0 4.600% 03/15/2049 DD 03/13/19	125.95	1,001,514.29	1,133,568.00	0.53	132,053.71
250,000.000 DOW CHEMICAL CO/THE 260543CR2 5.550% 11/30/2048 DD 05/30/19	130.67	281,773.47	326,662.50	0.15	44,889.03
800,000.000 DUKE ENERGY CORP 26441CAS4 2.650% 09/01/2026 DD 08/12/16	108.50	774,354.30	867,968.00	0.41	93,613.70
600,000.000 DUKE ENERGY CORP 26441CBF1 4.200% 06/15/2049 DD 06/07/19	122.00	610,217.14	731,988.00	0.35	121,770.86

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FIRST PRINCIPLES MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
300,000.000 DUKE ENERGY CAROLINAS LLC 26442CAA2 6.100% 06/01/2037 DD 06/05/07	142.68	383,766.80	428,031.00	0.20	44,264.20
470,000.000 EASTMAN CHEMICAL CO 277432AW0 4.500% 12/01/2028 DD 11/06/18	114.89	529,309.72	540,001.80	0.25	10,692.08
460,000.000 ENERGY TRANSFER OPERATING LP 29273RBD0 4.050% 03/15/2025 DD 03/12/15	106.11	479,209.12	488,119.80	0.23	8,910.68
640,000.000 ENERGY TRANSFER OPERATING LP 29278NAF0 4.950% 06/15/2028 DD 06/08/18	107.39	693,626.31	687,289.60	0.32	-6,336.71
800,000.000 ENERGY TRANSFER OPERATING LP 29278NAG8 5.250% 04/15/2029 DD 01/15/19	109.58	882,221.02	876,600.00	0.41	-5,621.02
1,230,000.000 ENERGY TRANSFER OPERATING LP 29278NAN3 5.500% 06/01/2027 DD 12/01/18	111.46	1,360,996.22	1,370,958.00	0.65	9,961.78
450,000.000 ENTERPRISE PRODUCTS OPERATING 29379VBA0 4.850% 03/15/2044 DD 03/18/13	115.85	471,889.68	521,311.50	0.25	49,421.82
2,800,000.000 EQUINIX INC 29444UAR7 5.375% 05/15/2027 DD 03/22/17	109.10	2,991,224.38	3,054,800.00	1.44	63,575.62
415,000.000 FEDEX CORP 31428XBM7 3.300% 03/15/2027 DD 01/06/17	107.71	417,644.85	446,996.50	0.21	29,351.65
470,000.000 FISERV INC 337738AU2 3.500% 07/01/2029 DD 06/24/19	112.41	503,959.23	528,336.40	0.25	24,377.17

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FIRST PRINCIPLES MON - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
600,000.000 FOX CORP 35137LAH8 4.709% 01/25/2029 DD 01/25/20	120.13	665,254.29	720,756.00	0.34	55,501.71
3,000,000.000 GENERAL MOTORS CO 37045VAW0 5.400% 10/02/2023 DD 05/12/20	108.13	3,097,321.46	3,243,750.00	1.53	146,428.54
500,000.000 GENERAL MOTORS FINANCIAL CO IN 37045XBR6 VAR RT 01/14/2022 DD 01/17/17	99.34	503,074.57	496,705.00	0.23	-6,369.57
820,000.000 GENERAL MOTORS FINANCIAL CO IN 37045XBW5 3.950% 04/13/2024 DD 04/13/17	103.45	860,238.03	848,290.00	0.40	-11,948.03
820,000.000 GILEAD SCIENCES INC 375558BG7 4.600% 09/01/2035 DD 09/14/15	131.22	1,010,271.63	1,076,020.40	0.51	65,748.77
1,250,000.000 GOLDMAN SACHS GROUP INC/THE 38141GFD1 6.750% 10/01/2037 DD 10/03/07	145.59	1,624,394.89	1,819,825.00	0.86	195,430.11
750,000.000 GOLDMAN SACHS GROUP INC/THE 38141GWM2 VAR RT 07/24/2023 DD 07/24/17	103.89	750,334.11	779,182.50	0.37	28,848.39
910,000.000 GOLDMAN SACHS GROUP INC/THE 38141GXD1 VAR RT 05/15/2026 DD 05/17/18	99.27	919,215.99	903,357.00	0.43	-15,858.99
510,000.000 HCA INC 404119BN8 5.000% 03/15/2024 DD 03/17/14	111.15	535,535.66	566,865.00	0.27	31,329.34
1,620,000.000 HCA INC 404119BQ1 5.250% 04/15/2025 DD 10/17/14	114.69	1,794,310.39	1,857,913.20	0.88	63,602.81

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800,000.000 HCA INC 404119BU2 4.500% 02/15/2027 DD 08/15/16	111.50	813,032.33	891,976.00	0.42	78,943.67
1,400,000.000 HSBC HOLDINGS PLC 404280AW9 4.300% 03/08/2026 DD 03/08/16	112.88	1,537,708.24	1,580,320.00	0.75	42,611.76
700,000.000 WELLTOWER INC 42217KBF2 4.000% 06/01/2025 DD 05/26/15	110.53	759,669.92	773,703.00	0.37	14,033.08
1,500,000.000 HILTON HOTELS 6/19 COV-LITE 43289DAH6 0.000% 06/18/2026 DD 06/10/19	94.23	1,509,375.00	1,413,480.00	0.67	-95,895.00
500,000.000 HONEYWELL INTERNATIONAL INC 438516BZ8 1.950% 06/01/2030 DD 05/18/20	104.51	499,460.97	522,545.00	0.25	23,084.03
650,000.000 HUNTINGTON INGALLS INDUST 144A 446413AH9 5.000% 11/15/2025 DD 11/17/15	103.54	668,340.84	672,977.50	0.32	4,636.66
500,000.000 HYUNDAI CAPITAL AMERICA 144A 44891AAR8 3.250% 09/20/2022 DD 09/20/17	102.72	499,988.96	513,575.00	0.24	13,586.04
1,000,000.000 INTEL CORP 458140AY6 4.100% 05/11/2047 DD 05/11/17	125.43	994,523.29	1,254,300.00	0.59	259,776.71
250,000.000 INTERCONTINENTAL EXCHANGE INC 45866FAL8 3.000% 06/15/2050 DD 05/26/20	104.40	246,247.58	260,993.72	0.12	14,746.14
400,000.000 INTERNATIONAL BUSINESS MACHINE 459200KC4 4.250% 05/15/2049 DD 05/15/19	127.32	409,061.92	509,284.00	0.24	100,222.08

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
820,000.000 IPALCO ENTERPRISES INC 462613AM2 3.700% 09/01/2024 DD 08/22/17	106.91	855,710.63	876,662.00	0.41	20,951.37
420,000.000 JPMORGAN CHASE & CO 46625HLL2 4.950% 06/01/2045 DD 05/29/15	134.53	477,421.31	565,030.20	0.27	87,608.89
750,000.000 JPMORGAN CHASE & CO 46647PAJ5 VAR RT 07/24/2038 DD 07/24/17	117.44	750,000.00	880,762.50	0.42	130,762.50
220,000.000 JPMORGAN CHASE & CO 46647PAN6 VAR RT 01/23/2049 DD 01/23/18	120.87	220,000.00	265,907.40	0.13	45,907.40
400,000.000 JOHNSON & JOHNSON 478160CF9 3.625% 03/03/2037 DD 03/03/17	119.33	399,107.59	477,312.00	0.23	78,204.41
1,320,000.000 KINDER MORGAN INC 49456BAF8 4.300% 06/01/2025 DD 11/26/14	112.19	1,422,207.91	1,480,960.80	0.70	58,752.89
400,000.000 KROGER CO/THE 501044DE8 2.650% 10/15/2026 DD 10/03/16	108.68	380,207.34	434,728.00	0.21	54,520.66
1,728,912.640 LFS 2019A LLC A A 144A 50201NAA9 5.250% 05/15/2031 DD 05/30/19	100.00	1,728,912.64	1,728,912.64	0.82	0.00
1,620,000.000 LENNAR CORP 526057BZ6 4.500% 04/30/2024 DD 04/28/17	103.98	1,713,938.40	1,684,459.80	0.79	-29,478.60
1,210,000.000 LLOYDS BANKING GROUP PLC 539439AQ2 VAR RT 11/07/2028 DD 11/07/17	108.69	1,284,728.97	1,315,100.60	0.62	30,371.63

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
820,000.000 LOCKHEED MARTIN CORP 539830BB4 4.070% 12/15/2042 DD 12/14/12	126.84	975,801.04	1,040,088.00	0.49	64,286.96
610,000.000 LOWE'S COS INC 548661DR5 3.650% 04/05/2029 DD 04/05/19	114.68	664,566.91	699,541.90	0.33	34,974.99
750,000.000 LOWE'S COS INC 548661DS3 4.550% 04/05/2049 DD 04/05/19	125.85	756,197.43	943,875.00	0.45	187,677.57
470,000.000 LYONDELLBASELL INDUSTRIES NV 552081AK7 5.750% 04/15/2024 DD 04/09/12	115.12	531,423.92	541,054.60	0.26	9,630.68
750,000.000 MARATHON PETROLEUM CORP 56585ABC5 5.125% 12/15/2026 DD 12/15/18	115.06	807,287.60	862,980.00	0.41	55,692.40
470,000.000 MARRIOTT INTERNATIONAL INC/MD 571903AS2 3.125% 06/15/2026 DD 06/10/16	97.27	490,260.50	457,173.70	0.22	-33,086.80
470,000.000 MCDONALD'S CORP 58013MER1 3.625% 05/01/2043 DD 05/06/13	109.73	495,641.63	515,721.60	0.24	20,079.97
500,000.000 MCDONALD'S CORP 58013MFC3 4.450% 03/01/2047 DD 03/09/17	121.69	497,687.48	608,425.00	0.29	110,737.52
617,000.000 BERKSHIRE HATHAWAY ENERGY CO 59562VAM9 6.125% 04/01/2036 DD 10/01/06	144.48	834,070.39	891,453.94	0.42	57,383.55
1,400,000.000 MITSUBISHI UFJ FINANCIAL GROUP 606822BM5 3.195% 07/18/2029 DD 07/18/19	109.35	1,477,051.11	1,530,956.00	0.72	53,904.89

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
400,000.000 MIZUHO FINANCIAL GROUP INC 60687YAK5 3.663% 02/28/2027 DD 02/28/17	110.34	400,000.00	441,372.00	0.21	41,372.00
1,100,000.000 MORGAN STANLEY 61744YAK4 VAR RT 07/22/2028 DD 07/24/17	112.45	1,104,269.27	1,236,928.00	0.58	132,658.73
500,000.000 MORGAN STANLEY 61746BEG7 4.375% 01/22/2047 DD 01/20/17	128.84	526,988.71	644,180.00	0.30	117,191.29
1,825,000.000 MOUNTAIN VIEW CLO X 2A B1 144A 62432PAL6 VAR RT 01/15/2033 DD 01/24/20	100.00	1,825,000.00	1,825,000.00	0.86	0.00
470,000.000 NXP BV / NXP FUNDING LLC 144A 62947QAZ1 4.875% 03/01/2024 DD 12/06/18	111.68	515,102.78	524,914.80	0.25	9,812.02
470,000.000 NEWMONT CORP 651639AX4 2.800% 10/01/2029 DD 09/16/19	105.46	481,677.57	495,671.40	0.23	13,993.83
470,000.000 NEXTERA ENERGY CAPITAL HOLDING 65339KAT7 3.550% 05/01/2027 DD 04/28/17	113.36	505,143.60	532,773.20	0.25	27,629.60
450,000.000 NORFOLK SOUTHERN CORP 655844BQ0 4.450% 06/15/2045 DD 06/02/15	124.60	469,386.60	560,713.50	0.26	91,326.90
470,000.000 NORFOLK SOUTHERN CORP 655844CE6 2.550% 11/01/2029 DD 11/04/19	106.31	476,382.88	499,647.60	0.24	23,264.72
750,000.000 NORTHROP GRUMMAN CORP 666807BJ0 3.850% 04/15/2045 DD 02/06/15	117.36	734,626.12	880,185.00	0.42	145,558.88

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820,000.000 OHIO POWER CO 677415CR0 4.000% 06/01/2049 DD 05/22/19	121.23	956,237.05	994,102.40	0.47	37,865.35
820,000.000 ORACLE CORP 68389XBN4 3.250% 11/15/2027 DD 11/09/17	112.58	882,787.46	923,147.80	0.44	40,360.34
820,000.000 PACCAR FINANCIAL CORP 69371RQ25 2.150% 08/15/2024 DD 08/15/19	105.30	829,901.80	863,419.00	0.41	33,517.20
1,030,000.000 PFIZER INC 717081DE0 4.300% 06/15/2043 DD 06/03/13	126.61	1,116,830.50	1,304,093.30	0.62	187,262.80
253,000.000 PRUDENTIAL FINANCIAL INC 744320AY8 3.905% 12/07/2047 DD 12/07/17	113.70	259,601.50	287,666.06	0.14	28,064.56
340,000.000 REPUBLIC SERVICES INC 760759AP5 3.550% 06/01/2022 DD 05/21/12	105.05	346,045.39	357,183.60	0.17	11,138.21
470,000.000 NATWEST GROUP PLC 780097BD2 3.875% 09/12/2023 DD 09/12/16	107.81	493,157.75	506,725.80	0.24	13,568.05
1,050,000.000 SHELL INTERNATIONAL FINANCE BV 822582BQ4 4.000% 05/10/2046 DD 05/10/16	116.91	1,062,334.25	1,227,565.50	0.58	165,231.25
820,000.000 SOUTHERN CO/THE 842587CX3 4.400% 07/01/2046 DD 05/24/16	118.67	944,574.05	973,094.00	0.46	28,519.95
1,000,000.000 STARBUCKS CORP 855244AS8 4.500% 11/15/2048 DD 08/10/18	117.87	1,133,673.10	1,178,670.00	0.56	44,996.90

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,000,000.000 STARBUCKS CORP 855244BA6 3.500% 11/15/2050 DD 05/07/20	105.36	1,018,085.26	1,053,600.00	0.50	35,514.74
1,400,000.000 SUMITOMO MITSUI FINANCIAL GROU 86562MBP4 3.040% 07/16/2029 DD 07/16/19	107.58	1,458,730.29	1,506,176.00	0.71	47,445.71
1,320,000.000 SUNOCO LOGISTICS PARTNERS OPER 86765BAU3 4.000% 10/01/2027 DD 09/21/17	102.44	1,314,828.19	1,352,247.60	0.64	37,419.41
580,000.000 SYNCHRONY FINANCIAL 87165BAC7 3.750% 08/15/2021 DD 08/11/14	102.25	581,076.53	593,032.60	0.28	11,956.07
2,280,000.000 SYNCHRONY FINANCIAL 87165BAG8 4.500% 07/23/2025 DD 07/23/15	106.25	2,435,689.31	2,422,500.00	1.14	-13,189.31
1,000,000.000 SYSCO CORP 871829BJ5 3.300% 02/15/2050 DD 02/13/20	94.17	1,002,044.54	941,740.00	0.44	-60,304.54
3,500,000.000 SYSCO CORP 871829BL0 5.950% 04/01/2030 DD 04/02/20	125.61	4,250,011.38	4,396,385.00	2.07	146,373.62
500,000.000 SYSCO CORP 871829BP1 5.650% 04/01/2025 DD 04/02/20	116.73	568,382.34	583,635.00	0.28	15,252.66
470,000.000 TRANSCONTINENTAL GAS PIPE LINE 893574AH6 7.850% 02/01/2026 DD 08/01/16	130.17	595,666.29	611,780.20	0.29	16,113.91
470,000.000 UNION PACIFIC CORP 907818EB0 3.375% 02/01/2035 DD 01/29/15	112.54	502,980.98	528,947.40	0.25	25,966.42

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,726,500.150 US TREAS-CPI INFLAT 912810FQ6 3.375% 04/15/2032 DD 10/15/01	148.81	2,284,868.15	2,569,187.61	1.21	284,319.46
3,890,500.710 US TREAS-CPI INFLAT 912810QF8 2.125% 02/15/2040 DD 02/15/10	147.32	4,948,413.42	5,731,641.27	2.70	783,227.85
5,822,139.600 US TREAS-CPI INFLAT 912810QV3 0.750% 02/15/2042 DD 02/15/12	119.65	5,778,037.21	6,966,422.92	3.29	1,188,385.71
6,274,237.500 US TREAS-CPI INFLAT 912810RA8 0.625% 02/15/2043 DD 02/15/13	117.60	6,032,412.28	7,378,377.82	3.48	1,345,965.54
5,826,310.498 US TREAS-CPI INFLAT 912810RL4 0.750% 02/15/2045 DD 02/15/15	122.20	6,200,349.47	7,119,809.69	3.36	919,460.22
5,584,719.600 US TREAS-CPI INFLAT 912810RR1 1.000% 02/15/2046 DD 02/15/16	129.37	6,037,430.19	7,224,840.05	3.41	1,187,409.86
4,225,005.720 US TREAS-CPI INFLAT 912810RW0 0.875% 02/15/2047 DD 02/15/17	127.39	4,445,514.26	5,382,023.54	2.54	936,509.28
3,864,417.040 US TREAS-CPI INFLAT 912810SB5 1.000% 02/15/2048 DD 02/15/18	132.07	3,815,262.49	5,103,542.36	2.41	1,288,279.87
2,619,138.400 US TREAS-CPI INFLAT 912810SG4 1.000% 02/15/2049 DD 02/15/19	133.27	2,882,560.74	3,490,394.79	1.65	607,834.05
1,127,152.400 US TREAS-CPI INFLAT 912810SM1 0.250% 02/15/2050 DD 02/15/20	112.17	1,181,491.06	1,264,304.30	0.60	82,813.24

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
718,000.000 RAYTHEON TECHNOLOGIES CORP 913017BT5 4.500% 06/01/2042 DD 06/01/12	124.63	793,229.23	894,850.58	0.42	101,621.35
470,000.000 RAYTHEON TECHNOLOGIES CORP 913017CY3 4.125% 11/16/2028 DD 08/16/18	117.79	537,660.86	553,603.60	0.26	15,942.74
600,000.000 UNITEDHEALTH GROUP INC 91324PCZ3 4.250% 04/15/2047 DD 03/13/17	128.41	628,376.60	770,466.00	0.36	142,089.40
1,095,000.000 UNITEDHEALTH GROUP INC 91324PDF6 3.750% 10/15/2047 DD 10/25/17	119.33	1,169,662.78	1,306,619.70	0.62	136,956.92
820,000.000 VALERO ENERGY CORP 91913YAW0 4.000% 04/01/2029 DD 03/25/19	111.24	885,048.26	912,143.40	0.43	27,095.14
700,000.000 VENTAS REALTY LP 92277GAE7 3.500% 02/01/2025 DD 01/14/15	103.21	738,147.27	722,491.00	0.34	-15,656.27
610,000.000 VERIZON COMMUNICATIONS INC 92343VCX0 4.522% 09/15/2048 DD 03/13/15	132.28	756,404.22	806,914.10	0.38	50,509.88
450,000.000 VERIZON COMMUNICATIONS INC 92343VCZ5 4.672% 03/15/2055 DD 03/13/15	135.94	470,338.48	611,721.00	0.29	141,382.52
500,000.000 VISA INC 92826CAF9 4.300% 12/14/2045 DD 12/14/15	132.04	502,410.16	660,210.00	0.31	157,799.84
500,000.000 VISA INC 92826CAJ1 3.650% 09/15/2047 DD 09/11/17	121.50	502,379.02	607,495.00	0.29	105,115.98

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,240,000.000 VISTRA OPERATIONS CO LLC 144A 92840VAD4 3.550% 07/15/2024 DD 06/11/19	103.21	2,265,251.95	2,311,859.20	1.09	46,607.25
820,000.000 VODAFONE GROUP PLC 92857WBJ8 4.125% 05/30/2025 DD 05/30/18	113.38	892,491.50	929,675.00	0.44	37,183.50
600,000.000 WALGREENS BOOTS ALLIANCE INC 931427AQ1 3.450% 06/01/2026 DD 06/01/16	108.32	600,010.33	649,920.00	0.31	49,909.67
750,000.000 WELLS FARGO & CO 94974BGL8 4.300% 07/22/2027 DD 07/22/15	114.80	764,308.17	860,985.00	0.41	96,676.83
1,210,000.000 WESTPAC BANKING CORP 961214DW0 3.400% 01/25/2028 DD 01/25/18	114.04	1,314,088.91	1,379,932.40	0.65	65,843.49
1,250,000.000 ZAIS CLO 14 LTD 14A B 144A 98888BAC0 VAR RT 04/15/2032 DD 03/26/20	100.00	1,250,000.00	1,250,000.00	0.59	0.00
-3,750,000.000 IRS R US0003M P 6.75% 99QACLUT7 2034 JAN 29 **4996857B**	0.00	0.00	0.00	0.00	0.00
3,750,000.000 IRS_R US0003M P 6.75% 99QACLUX8 2034 JAN 27 **4996857B**	0.00	99,375.00	86.25	0.00	-99,288.75
25,000,000.000 IFL UL CPURNSA INDEX 99QAFKQM6 R_1.376% 2025 JUN 30 **SL3350WV**	-0.20	0.00	-50,675.00	-0.02	-50,675.00
-25,000,000.000 IFL UL CPURNSA INDEX 99QAFKQL8 R 1.376% 2025 JUN 30 **SL3350WV**	0.00	0.00	0.00	0.00	0.00

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-1,830,000.000 IRS R US0003M P 6.75% 99QACF2J3 2038 JUN 19 **SWPNDT00005**	0.00	0.00	0.00	0.00	0.00
1,830,000.000 IRS_R US0003M P 6.75% 99QACF2K0 2038 JUN 19 **SWPNDT00005**	0.00	59,109.00	29.28	0.00	-59,079.72
TOTAL FIXED INCOME SECURITIES U.S. DOLLAR		**195,011,309.18**	**211,032,007.00**	**99.58**	**16,020,697.82**
TOTAL ASSETS U.S. DOLLAR		**195,892,104.85**	**211,912,802.67**	**100.00**	**16,020,697.82**
TOTAL ASSETS		**195,892,104.85**	**211,912,802.67**	**100.00**	**16,020,697.82**

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U.S. DOLLAR					
EQUITY					
26,310.976 MARATHON EAFE 99VVA3995	1,595.16	37,045,444.81	41,970,298.84	100.00	4,924,854.03

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BNY MELLON

Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

EATON VANCE HY MON - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
EURO CURRENCY UNIT					
CASH & CASH EQUIVALENTS					
NON-BASE CURRENCY		8,072.37	8,072.36	0.02	-0.01
FIXED INCOME SECURITIES					
100,000.000 CATALENT PHARMA SOLUTIONS 144A 14879EAG3 2.375% 03/01/2028 DD 03/02/20	106.14	108,035.00	106,137.68	0.20	-1,897.32
100,000.000 ALTICE FINCO SA REGS ELBF2DYR8 4.750% 01/15/2028	102.22	114,887.19	102,223.95	0.20	-12,663.24
282,000.000 ALTICE FINANCING SA 144A ELBJLVWS9 2.250% 01/15/2025	105.01	313,569.90	296,140.96	0.57	-17,428.94
235,000.000 ARD FINANCE SA REGS ELBKDLTB8 5.000% 06/30/2027	107.71	260,239.00	253,110.78	0.49	-7,128.22
200,000.000 VIVION INVESTMENTS SARL REGS ELBKLVKS9 3.000% 08/08/2024	102.29	220,403.67	204,579.53	0.40	-15,824.14
313,000.000 ALTICE FRANCE HOLDING SA REGS ELBM636G6 4.000% 02/15/2028	101.08	345,724.15	316,391.36	0.61	-29,332.79
381,000.000 STANDARD INDUSTRIES INC/N 144A NABL4PZ32 2.250% 11/21/2026	105.50	419,157.15	401,949.74	0.78	-17,207.41
100,000.000 SILGAN HOLDINGS INC 144A NABL4SFZ7 2.250% 06/01/2028	107.76	107,925.00	107,755.01	0.21	-169.99

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TOTAL FIXED INCOME SECURITIES EURO CURRENCY UNIT		**1,889,941.06**	**1,788,289.01**	**3.45**	**-101,652.05**
TOTAL ASSETS EURO CURRENCY UNIT		**1,898,013.43**	**1,796,361.37**	**3.47**	**-101,652.06**
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
1,421,461.090 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	1,421,461.09	1,421,461.09	2.75	0.00
CASH		363.50	363.50	0.00	0.00
TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**1,421,824.59**	**1,421,824.59**	**2.75**	**0.00**
CONVERTIBLE OR EXCHANGEABLE SE					
85,000.000 AIR TRANSPORT SERVICES GROUP I 00922RAB1 1.125% 10/15/2024 DD 09/29/17	94.17	76,591.90	80,041.10	0.15	3,449.20
15,000.000 ROYAL CARIBBEAN CRUISES L 144A 780153BA9 4.250% 06/15/2023 DD 06/09/20	93.00	15,000.00	13,950.00	0.03	-1,050.00
TOTAL CONVERTIBLE OR EXCHANGEABLE SE U.S. DOLLAR		**91,591.90**	**93,991.10**	**0.18**	**2,399.20**
EQUITY					
2,931.000 CLEAR CHANNEL OUTDOOR HOLDINGS 18453H106	1.04	13,922.25	3,048.24	0.01	-10,874.01
614.000 IHEARTMEDIA INC 45174J509	8.35	38,387.48	5,126.90	0.01	-33,260.58
TOTAL EQUITY U.S. DOLLAR		**52,309.73**	**8,175.14**	**0.02**	**-44,134.59**
FIXED INCOME SECURITIES					
213,000.000 AG ISSUER LLC 144A 00119LAA9 6.250% 03/01/2028 DD 02/13/20	93.00	214,570.49	198,090.00	0.38	-16,480.49

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
336,000.000 AES CORP/THE 00130HBX2 6.000% 05/15/2026 DD 05/25/16	103.88	349,138.39	349,020.00	0.67	-118.39
41,000.000 AES CORP/THE 00130HBY0 5.125% 09/01/2027 DD 08/28/17	103.75	43,307.35	42,537.50	0.08	-769.85
109,000.000 AMC ENTERTAINMENT HOLDING 144A 00165CAN4 10.500% 04/15/2025 DD 04/24/20	81.07	106,884.00	88,366.30	0.17	-18,517.70
120,000.000 ACADIA HEALTHCARE CO INC 00404AAM1 6.500% 03/01/2024 DD 02/16/16	101.77	123,170.25	122,121.60	0.24	-1,048.65
83,000.000 ACADIA HEALTHCARE CO INC 144A 00404AAN9 5.500% 07/01/2028 DD 06/24/20	100.25	83,000.00	83,207.50	0.16	207.50
75,000.000 AECOM 00766TAD2 5.875% 10/15/2024 DD 10/15/15	108.00	74,371.01	81,000.00	0.16	6,628.99
50,000.000 AECOM 00774CAB3 5.125% 03/15/2027 DD 02/21/17	107.50	50,000.00	53,750.00	0.10	3,750.00
295,000.000 ADVANCED DISPOSAL SERVICE 144A 00790XAA9 5.625% 11/15/2024 DD 11/10/16	103.75	300,111.92	306,062.50	0.59	5,950.58
158,000.000 ALBERTSONS COS INC / SAFE 144A 013092AB7 5.875% 02/15/2028 DD 08/15/19	103.18	158,000.00	163,019.66	0.31	5,019.66
217,795.000 ALIXPARTNERS 4/17 COV-LITE TLB 01642PAW6	96.46	216,623.72	210,080.70	0.41	-6,543.02

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40,000.000 ALLEGHENY LUDLUM LLC 016900AC6 6.950% 12/15/2025 DD 12/15/95	97.00	40,951.91	38,800.00	0.07	-2,151.91
251,000.000 ALLEGHENY TECHNOLOGIES INC 01741RAH5 5.875% 12/01/2027 DD 11/22/19	92.50	251,000.00	232,175.00	0.45	-18,825.00
175,000.000 ALLIANCE DATA SYSTEMS COR 144A 018581AK4 4.750% 12/15/2024 DD 12/20/19	90.00	175,000.00	157,500.00	0.30	-17,500.00
404,000.000 ALLIANT HOLDINGS INTERMED 144A 01883LAA1 6.750% 10/15/2027 DD 10/11/19	99.66	404,000.00	402,634.48	0.78	-1,365.52
150,000.000 ALLIED UNIVERSAL HOLDCO L 144A 019576AA5 6.625% 07/15/2026 DD 07/12/19	105.00	153,037.69	157,500.00	0.30	4,462.31
71,000.000 ALLIED UNIVERSAL HOLDCO L 144A 019576AB3 9.750% 07/15/2027 DD 07/12/19	105.38	75,010.80	74,816.25	0.14	-194.55
200,000.000 ALTICE FRANCE SA/FRANCE 144A 02156LAA9 8.125% 02/01/2027 DD 07/31/18	109.38	210,505.98	218,750.00	0.42	8,244.02
245,000.000 ALTICE FRANCE HOLDING SA 144A 02156TAB0 10.500% 05/15/2027 DD 11/15/19	110.16	275,027.67	269,879.75	0.52	-5,147.92
10,000.000 AMERIGAS PARTNERS LP / AMERIGA 030981AK0 5.500% 05/20/2025 DD 12/28/16	103.00	10,033.08	10,300.00	0.02	266.92
67,000.000 AMWINS GROUP INC 144A 031921AA7 7.750% 07/01/2026 DD 07/06/18	105.00	66,188.31	70,350.00	0.14	4,161.69

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
150,000.000 ANTERO MIDSTREAM PARTNERS 144A 03690AAD8 5.750% 03/01/2027 DD 02/25/19	79.00	141,576.87	118,500.00	0.23	-23,076.87
11,000.000 APACHE CORP 037411AY1 5.250% 02/01/2042 DD 12/03/10	81.61	7,873.77	8,977.32	0.02	1,103.55
13,000.000 APACHE CORP 037411BA2 4.750% 04/15/2043 DD 04/09/12	80.51	9,045.59	10,466.17	0.02	1,420.58
40,000.000 APACHE CORP 037411BE4 4.375% 10/15/2028 DD 08/23/18	88.31	32,688.87	35,322.40	0.07	2,633.53
94,000.000 APACHE CORP 037411BF1 4.250% 01/15/2030 DD 06/19/19	86.45	74,557.11	81,259.24	0.16	6,702.13
131,000.000 ARCHROCK PARTNERS LP / AR 144A 03959KAC4 6.250% 04/01/2028 DD 12/20/19	91.00	132,052.46	119,210.00	0.23	-12,842.46
220,000.000 ARCONIC CORP 144A 03966VAA5 6.125% 02/15/2028 DD 02/07/20	99.98	227,117.34	219,945.00	0.42	-7,172.34
250,000.000 ARDAGH PACKAGING FINANCE 144A 03969AAP5 5.250% 08/15/2027 DD 08/12/19	98.24	257,500.00	245,595.00	0.47	-11,905.00
11,000.000 ASBURY AUTOMOTIVE GROUP I 144A 043436AS3 4.500% 03/01/2028 DD 02/19/20	97.00	11,000.00	10,670.00	0.02	-330.00
15,000.000 ASBURY AUTOMOTIVE GROUP I 144A 043436AT1 4.750% 03/01/2030 DD 02/19/20	97.50	15,000.00	14,625.00	0.03	-375.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
137,000.000 ASCENT RESOURCES UTICA HO 144A 04364VAG8 7.000% 11/01/2026 DD 10/11/18	64.00	136,135.57	87,680.00	0.17	-48,455.57
425,000.000 ASURION 7/17 2ND LIEN TLB2 04649VAU4	99.25	424,624.46	421,812.50	0.81	-2,811.96
170,000.000 BWX TECHNOLOGIES INC 144A 05605HAA8 5.375% 07/15/2026 DD 05/24/18	103.04	171,085.87	175,164.60	0.34	4,078.73
80,000.000 BWX TECHNOLOGIES INC 144A 05605HAB6 4.125% 06/30/2028 DD 06/12/20	99.75	80,000.00	79,800.00	0.15	-200.00
90,000.000 BAUSCH HEALTH COS INC 144A 071734AJ6 5.250% 01/30/2030 DD 12/30/19	94.88	91,768.24	85,387.50	0.16	-6,380.74
128,000.000 BAUSCH HEALTH COS INC 144A 071734AK3 6.250% 02/15/2029 DD 05/26/20	100.50	128,000.00	128,640.00	0.25	640.00
87,750.000 BELLRING BRANDS/POST HOLDINGS 07982EAB2 0.000% 10/10/2024 DD 09/24/19	99.31	89,348.47	87,147.16	0.17	-2,201.31
149,000.000 BOMBARDIER INC 144A 097751BT7 7.875% 04/15/2027 DD 03/07/19	65.50	148,021.26	97,595.00	0.19	-50,426.26
32,000.000 BROOKFIELD RESIDENTIAL PR 144A 11283YAB6 6.250% 09/15/2027 DD 09/23/19	95.63	31,520.72	30,601.92	0.06	-918.80
59,000.000 BROOKFIELD RESIDENTIAL PR 144A 11283YAD2 4.875% 02/15/2030 DD 02/26/20	83.56	57,243.31	49,300.40	0.10	-7,942.91

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
123,000.000 BROOKFIELD PROPERTY REIT 144A 11284DAA3 5.750% 05/15/2026 DD 05/01/19	84.50	123,000.00	103,935.00	0.20	-19,065.00
88,000.000 BUCKEYE PARTNERS LP 144A 118230AT8 4.125% 03/01/2025 DD 02/19/20	95.93	88,000.00	84,415.76	0.16	-3,584.24
77,000.000 BUCKEYE PARTNERS LP 144A 118230AU5 4.500% 03/01/2028 DD 02/19/20	93.50	77,000.00	71,995.00	0.14	-5,005.00
269,000.000 BUILDERS FIRSTSOURCE INC 144A 12008RAM9 6.750% 06/01/2027 DD 05/30/19	102.38	283,522.45	275,388.75	0.53	-8,133.70
42,000.000 BUILDERS FIRSTSOURCE INC 144A 12008RAN7 5.000% 03/01/2030 DD 02/11/20	94.00	42,460.96	39,480.00	0.08	-2,980.96
210,000.000 STANDARD INDUSTRIES INC/N 144A 120111BN8 6.000% 10/15/2025 DD 10/05/15	102.93	215,431.28	216,146.70	0.42	715.42
88,000.000 BURLINGTON COAT FACTORY W 144A 121579AH9 6.250% 04/15/2025 DD 04/16/20	104.50	88,650.33	91,960.00	0.18	3,309.67
210,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPBT9 5.125% 05/01/2027 DD 02/06/17	103.46	210,398.86	217,266.00	0.42	6,867.14
60,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPBX0 5.000% 02/01/2028 DD 08/08/17	103.25	60,000.00	61,950.00	0.12	1,950.00
95,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPCB7 5.375% 06/01/2029 DD 05/23/19	105.50	96,749.40	100,225.00	0.19	3,475.60

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
516,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPCD3 4.750% 03/01/2030 DD 10/01/19	102.32	524,315.61	527,966.04	1.02	3,650.43
217,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPCE1 4.500% 08/15/2030 DD 02/18/20	102.00	218,272.55	221,340.00	0.43	3,067.45
65,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPCJ0 4.500% 05/01/2032 DD 03/18/20	101.25	65,000.00	65,812.50	0.13	812.50
235,000.000 CDK GLOBAL INC 12508EAF8 4.875% 06/01/2027 DD 12/01/17	102.60	240,397.28	241,098.25	0.47	700.97
83,000.000 CDK GLOBAL INC 144A 12508EAJ0 5.250% 05/15/2029 DD 05/15/19	103.84	83,000.00	86,188.86	0.17	3,188.86
42,000.000 CD&R SMOKEY BUYER INC 144A 12510CAA9 6.750% 07/15/2025 DD 07/01/20	103.97	42,570.00	43,667.40	0.08	1,097.40
305,000.000 CIT GROUP INC 125581GX0 6.125% 03/09/2028 DD 03/09/18	107.79	311,651.24	328,753.40	0.63	17,102.16
100,000.000 CSC HOLDINGS LLC 126307AF4 6.750% 11/15/2021 DD 11/15/11	104.97	100,598.40	104,971.00	0.20	4,372.60
220,000.000 CSC HOLDINGS LLC 126307AH0 5.250% 06/01/2024 DD 05/23/14	105.25	222,209.22	231,550.00	0.45	9,340.78
274,000.000 CSC HOLDINGS LLC 144A 126307BA4 5.750% 01/15/2030 DD 07/10/19	104.15	285,776.57	285,371.00	0.55	-405.57

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322,000.000 CAESARS RESORT COLLECTION 144A 12652AAA1 5.250% 10/15/2025 DD 10/16/17	87.00	322,086.79	280,140.00	0.54	-41,946.79
208,000.000 CVR ENERGY INC 144A 12662PAD0 5.750% 02/15/2028 DD 01/27/20	87.50	208,000.00	182,000.00	0.35	-26,000.00
135,000.000 CALPINE CORP 131347CF1 5.750% 01/15/2025 DD 07/22/14	100.98	134,214.56	136,321.65	0.26	2,107.09
60,000.000 CALPINE CORP 144A 131347CK0 5.250% 06/01/2026 DD 05/31/16	100.97	60,000.00	60,582.60	0.12	582.60
75,000.000 CALPINE CORP 144A 131347CM6 4.500% 02/15/2028 DD 12/20/19	97.50	75,000.00	73,125.00	0.14	-1,875.00
125,000.000 CALPINE CORP 144A 131347CN4 5.125% 03/15/2028 DD 12/27/19	98.00	125,000.00	122,500.00	0.24	-2,500.00
116,000.000 CARGO AIRCRAFT MANAGEMENT 144A 14180LAA4 4.750% 02/01/2028 DD 01/28/20	99.13	116,203.00	114,985.00	0.22	-1,218.00
46,000.000 CARNIVAL CORP 144A 143658BC5 11.500% 04/01/2023 DD 04/08/20	108.50	45,571.11	49,910.00	0.10	4,338.89
140,000.000 CATALENT PHARMA SOLUTIONS 144A 14879EAD0 4.875% 01/15/2026 DD 10/18/17	101.52	141,153.62	142,128.00	0.27	974.38
103,000.000 CATALENT PHARMA SOLUTIONS 144A 14879EAE8 5.000% 07/15/2027 DD 06/27/19	103.81	104,199.03	106,927.39	0.21	2,728.36

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274,000.000 CENTENE CORP 144A 15135BAM3 5.375% 08/15/2026 DD 08/15/19	104.02	279,164.57	285,017.54	0.55	5,852.97
164,000.000 CENTENE CORP 15135BAR2 4.250% 12/15/2027 DD 12/06/19	103.19	162,705.76	169,233.24	0.33	6,527.48
287,000.000 CENTENE CORP 15135BAT8 4.625% 12/15/2029 DD 12/06/19	105.50	287,000.00	302,785.00	0.58	15,785.00
128,000.000 CENTENE CORP 15135BAV3 3.375% 02/15/2030 DD 02/13/20	100.97	128,000.00	129,242.88	0.25	1,242.88
91,000.000 CENOVUS ENERGY INC 15135UAF6 6.750% 11/15/2039 DD 05/15/10	97.37	74,818.70	88,603.06	0.17	13,784.36
11,000.000 CENOVUS ENERGY INC 15135UAJ8 3.800% 09/15/2023 DD 08/15/13	94.03	9,778.30	10,343.74	0.02	565.44
44,000.000 CENOVUS ENERGY INC 15135UAR0 5.400% 06/15/2047 DD 04/07/17	85.85	34,440.67	37,773.12	0.07	3,332.45
355,000.000 CENTENE CORP 144A 15137TAA8 5.375% 06/01/2026 DD 05/23/18	103.67	355,000.00	368,014.30	0.71	13,014.30
280,000.000 CENTENNIAL RESOURCE PRODU 144A 15138AAA8 5.375% 01/15/2026 DD 11/30/17	53.00	284,047.08	148,400.00	0.29	-135,647.08
230,000.000 CENTRAL GARDEN & PET CO 153527AL0 6.125% 11/15/2023 DD 11/09/15	102.00	234,600.00	234,600.00	0.45	0.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
45,000.000 CENTRAL GARDEN & PET CO 153527AM8 5.125% 02/01/2028 DD 12/14/17	103.41	42,335.25	46,535.85	0.09	4,200.60
175,000.000 CENTURYLINK INC 156700AZ9 5.625% 04/01/2025 DD 10/01/15	103.40	175,000.00	180,950.00	0.35	5,950.00
18,000.000 CENTURYLINK INC 156700BA3 7.500% 04/01/2024 DD 04/06/16	109.88	18,413.77	19,778.76	0.04	1,364.99
72,000.000 COLFAX CORP 144A 15723RAA2 6.000% 02/15/2024 DD 02/05/19	103.13	72,000.00	74,250.00	0.14	2,250.00
265,000.000 CHARLES RIVER LABORATORIE 144A 159864AC1 5.500% 04/01/2026 DD 04/03/18	104.00	267,703.52	275,600.00	0.53	7,896.48
80,000.000 CHARLES RIVER LABORATORIE 144A 159864AE7 4.250% 05/01/2028 DD 10/23/19	99.95	80,000.00	79,959.20	0.15	-40.80
273,000.000 CHENIERE ENERGY PARTNERS LP 16411QAG6 4.500% 10/01/2029 DD 04/01/20	96.88	275,885.77	264,468.75	0.51	-11,417.02
165,000.000 CINEMARK USA INC 172441AZ0 4.875% 06/01/2023 DD 05/24/13	84.50	163,274.38	139,425.00	0.27	-23,849.38
40,000.000 CLARIOS GLOBAL LP 144A 18060TAA3 6.750% 05/15/2025 DD 05/20/20	104.00	40,000.00	41,600.00	0.08	1,600.00
250,000.000 CLEAN HARBORS INC 144A 184496AP2 5.125% 07/15/2029 DD 07/02/19	103.72	256,469.52	259,290.00	0.50	2,820.48

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
40,000.000 CLEARWAY ENERGY OPERATING 144A 18539UAC9 4.750% 03/15/2028 DD 12/11/19	101.99	40,790.23	40,797.60	0.08	7.37
115,000.000 CLEVELAND-CLIFFS INC 144A 185899AG6 6.750% 03/15/2026 DD 03/13/20	96.50	113,828.46	110,975.00	0.21	-2,853.46
164,000.000 COMPASS MINERALS INTERNAT 144A 20451NAG6 6.750% 12/01/2027 DD 11/26/19	105.00	164,000.00	172,200.00	0.33	8,200.00
200,000.000 CONNECT FINCO SARL / CONN 144A 20752TAA2 6.750% 10/01/2026 DD 10/07/19	94.75	201,903.00	189,500.00	0.37	-12,403.00
4,000.000 CONTINENTAL RESOURCES INC/OK 212015AQ4 4.900% 06/01/2044 DD 05/19/14	79.63	3,195.82	3,185.00	0.01	-10.82
103,000.000 CONTINENTAL RESOURCES INC/OK 212015AS0 4.375% 01/15/2028 DD 12/08/17	88.02	92,401.31	90,662.66	0.18	-1,738.65
235,000.000 COVANTA HOLDING CORP 22282EAF9 5.875% 03/01/2024 DD 03/06/14	100.88	235,538.59	237,056.25	0.46	1,517.66
110,000.000 COVANTA HOLDING CORP 22282EAG7 5.875% 07/01/2025 DD 03/16/17	101.25	113,001.84	111,375.00	0.22	-1,626.84
140,000.000 CROWN AMERICAS LLC / CROWN AME 228187AB6 4.750% 02/01/2026 DD 02/01/19	101.90	140,076.53	142,664.20	0.28	2,587.67
90,000.000 CROWN AMERICAS LLC / CROWN AME 22819KAB6 4.250% 09/30/2026 DD 03/31/17	102.25	83,254.35	92,025.00	0.18	8,770.65

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
198,000.000 CROWNROCK LP / CROWNROCK 144A 228701AF5 5.625% 10/15/2025 DD 10/11/17	89.63	197,889.36	177,457.50	0.34	-20,431.86
44,000.000 DELL INTERNATIONAL LLC / 144A 24703DBB6 5.850% 07/15/2025 DD 04/09/20	114.92	43,942.22	50,564.80	0.10	6,622.58
88,000.000 DELL INTERNATIONAL LLC / 144A 24703DBC4 6.100% 07/15/2027 DD 04/09/20	115.53	87,796.26	101,662.00	0.20	13,865.74
45,000.000 DELL INTERNATIONAL LLC / 144A 24703DBD2 6.200% 07/15/2030 DD 04/09/20	117.25	44,919.14	52,763.85	0.10	7,844.71
57,000.000 DELTA AIR LINES INC 247361ZZ4 7.375% 01/15/2026 DD 06/12/20	96.74	56,992.15	55,141.80	0.11	-1,850.35
213,000.000 DIAMOND SPORTS GROUP LLC 144A 25277LAA4 5.375% 08/15/2026 DD 08/02/19	72.38	195,643.48	154,158.75	0.30	-41,484.73
43,000.000 DISH DBS CORP 25470XAY1 7.750% 07/01/2026 DD 06/13/16	106.00	42,296.94	45,580.00	0.09	3,283.06
200,000.000 DRAX FINCO PLC 144A 26151AAA7 6.625% 11/01/2025 DD 04/26/18	102.50	202,551.69	205,000.00	0.40	2,448.31
300,000.000 VISTRA CORP 144A 26817RBA5 8.125% 01/30/2026 DD 08/21/17	104.25	312,156.21	312,750.00	0.60	593.79
330,000.000 EIG INVESTORS CORP 26854XAB5 10.875% 02/01/2024 DD 02/01/17	97.00	346,052.59	320,100.00	0.62	-25,952.59

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147,000.000 EP ENERGY LLC / EVEREST A 144A 268787AJ7 7.750% 05/15/2026 DD 05/23/18	20.00	129,992.19	29,400.00	0.06	-100,592.19
51,000.000 EQT CORP 26884LAG4 VAR RT 02/01/2030 DD 01/21/20	103.00	52,723.08	52,531.53	0.10	-191.55
34,000.000 EQT CORP 26884LAH2 VAR RT 02/01/2025 DD 01/21/20	99.65	33,950.17	33,881.68	0.07	-68.49
59,000.000 EQM MIDSTREAM PARTNERS LP 144A 26885BAF7 6.000% 07/01/2025 DD 06/18/20	101.29	59,000.00	59,762.28	0.12	762.28
59,000.000 EQM MIDSTREAM PARTNERS LP 144A 26885BAH3 6.500% 07/01/2027 DD 06/18/20	102.42	59,000.00	60,428.98	0.12	1,428.98
163,000.000 ESH HOSPITALITY INC 144A 26907YAB0 4.625% 10/01/2027 DD 09/18/19	93.63	161,762.59	152,608.75	0.29	-9,153.84
93,000.000 EDGEWELL PERSONAL CARE CO 144A 28035QAA0 5.500% 06/01/2028 DD 05/22/20	102.75	93,722.96	95,557.50	0.18	1,834.54
212,000.000 COLT MERGER SUB INC 144A 28470RAH5 6.250% 07/01/2025 DD 07/06/20	99.38	212,000.00	210,675.00	0.41	-1,325.00
169,000.000 COLT MERGER SUB INC 144A 28470RAK8 8.125% 07/01/2027 DD 07/06/20	96.63	169,525.00	163,296.25	0.32	-6,228.75
84,000.000 ELDORADO GOLD CORP 144A 284902AE3 9.500% 06/01/2024 DD 06/05/19	106.50	82,622.51	89,460.00	0.17	6,837.49

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
235,000.000 ENDEAVOR ENERGY RESOURCES 144A 29260FAD2 5.500% 01/30/2026 DD 12/07/17	95.75	232,973.18	225,012.50	0.43	-7,960.68
120,000.000 ENCOMPASS HEALTH CORP 29261AAA8 4.500% 02/01/2028 DD 09/18/19	95.91	119,605.58	115,094.40	0.22	-4,511.18
140,000.000 ENCOMPASS HEALTH CORP 29261AAB6 4.750% 02/01/2030 DD 09/18/19	95.50	139,406.25	133,700.00	0.26	-5,706.25
21,000.000 ENERGIZER HOLDINGS INC 144A 29272WAA7 6.375% 07/15/2026 DD 07/06/18	103.40	21,460.17	21,713.16	0.04	252.99
238,000.000 ENERGIZER HOLDINGS INC 144A 29272WAB5 7.750% 01/15/2027 DD 01/28/19	106.63	248,163.40	253,772.26	0.49	5,608.86
83,000.000 ENTEGRIS INC 144A 29362UAC8 4.375% 04/15/2028 DD 04/30/20	101.75	83,000.00	84,452.50	0.16	1,452.50
217,212.780 ENVISION HEALTHCARE 9/18 29373UAC5 0.000% 10/10/2025 DD 06/11/18	65.25	184,411.51	141,731.34	0.27	-42,680.17
287,000.000 ENVIVA PARTNERS LP / ENVI 144A 29413XAD9 6.500% 01/15/2026 DD 12/09/19	104.00	288,425.00	298,480.00	0.58	10,055.00
41,000.000 EXPEDIA GROUP INC 144A 30212PAS4 6.250% 05/01/2025 DD 05/05/20	106.53	41,000.00	43,676.07	0.08	2,676.07
21,000.000 EXPEDIA GROUP INC 144A 30212PAU9 7.000% 05/01/2025 DD 05/05/20	103.95	21,000.00	21,828.45	0.04	828.45

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
230,000.000 EXTRACTION OIL & GAS INC 144A 30227MAB1 5.625% 02/01/2026 DD 01/25/18	19.25	223,845.27	44,275.00	0.09	-179,570.27
157,000.000 FIVE POINT OPERATING CO L 144A 33834YAA6 7.875% 11/15/2025 DD 11/22/17	94.50	159,065.40	148,365.00	0.29	-10,700.40
85,000.000 FORD MOTOR CO 345370CA6 7.450% 07/16/2031 DD 07/16/99	105.25	92,054.64	89,462.50	0.17	-2,592.14
207,000.000 FORD MOTOR CO 345370CV0 8.500% 04/21/2023 DD 04/22/20	105.75	207,000.00	218,902.50	0.42	11,902.50
248,000.000 FORD MOTOR CO 345370CW8 9.000% 04/22/2025 DD 04/22/20	108.22	247,602.75	268,385.60	0.52	20,782.85
103,000.000 FORD MOTOR CO 345370CX6 9.625% 04/22/2030 DD 04/22/20	118.43	102,520.69	121,982.90	0.24	19,462.21
200,000.000 FORD MOTOR CREDIT CO LLC 345397WF6 4.250% 09/20/2022 DD 09/25/12	98.02	180,947.38	196,042.00	0.38	15,094.62
182,000.000 FREEPORT-MCMORAN INC 35671DBC8 5.450% 03/15/2043 DD 09/15/13	98.00	167,040.22	178,360.00	0.34	11,319.78
259,000.000 GEMS MENASA CAYMAN LTD / 144A 36166LAA5 7.125% 07/31/2026 DD 08/08/19	95.00	262,677.61	246,050.00	0.48	-16,627.61
274,000.000 GFL ENVIRONMENTAL INC 144A 36168QAE4 8.500% 05/01/2027 DD 04/23/19	108.75	282,010.37	297,975.00	0.58	15,964.63

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
77,000.000 GARTNER INC 144A 366651AC1 4.500% 07/01/2028 DD 06/22/20	101.17	77,099.74	77,900.90	0.15	801.16
325,000.000 GATEWAY CASINOS & ENTERTA 144A 36760BAE9 8.250% 03/01/2024 DD 02/22/17	82.00	336,976.11	266,500.00	0.51	-70,476.11
195,000.000 GO DADDY OPERATING CO LLC 144A 38016LAA3 5.250% 12/01/2027 DD 06/04/19	101.75	196,698.62	198,412.50	0.38	1,713.88
212,000.000 GOLDEN NUGGET INC 144A 38113YAE9 6.750% 10/15/2024 DD 10/04/16	71.88	210,598.57	152,375.00	0.29	-58,223.57
220,000.000 WR GRACE & CO-CONN 144A 383909AF5 5.625% 10/01/2024 DD 09/16/14	105.25	234,817.57	231,550.00	0.45	-3,267.57
97,000.000 WR GRACE & CO-CONN 144A 383909AG3 4.875% 06/15/2027 DD 06/26/20	101.30	97,000.00	98,263.91	0.19	1,263.91
169,000.000 GREAT WESTERN PETROLEUM L 144A 39143GAA8 9.000% 09/30/2021 DD 09/22/16	60.00	170,434.04	101,400.00	0.20	-69,034.04
28,000.000 GREYSTAR REAL ESTATE PART 144A 39807UAB2 5.750% 12/01/2025 DD 11/24/17	100.52	27,464.65	28,145.60	0.05	680.95
171,000.000 GTCR AP FINANCE INC 144A 40060QAA3 8.000% 05/15/2027 DD 05/13/19	102.94	175,355.46	176,022.27	0.34	666.81
150,000.000 HCA INC 404119BV0 5.500% 06/15/2047 DD 06/22/17	121.78	150,000.00	182,668.50	0.35	32,668.50

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
164,000.000 HCA INC 404119BW8 5.875% 02/01/2029 DD 01/30/19	113.16	164,000.00	185,580.76	0.36	21,580.76
130,000.000 HCA INC 404119CA5 3.500% 09/01/2030 DD 02/26/20	96.32	130,000.00	125,212.10	0.24	-4,787.90
475,000.000 HCA INC 404121AJ4 5.625% 09/01/2028 DD 08/23/18	111.63	474,495.88	530,218.75	1.02	55,722.87
230,887.500 HERBALIFE 8/18 COV-LITE 40421YAF9 TLB	96.38	231,646.84	222,517.83	0.43	-9,129.01
63,000.000 HAT HOLDINGS I LLC / HAT 144A 418751AB9 6.000% 04/15/2025 DD 04/21/20	104.75	63,000.00	65,992.50	0.13	2,992.50
101,000.000 HERBALIFE NUTRITION LTD / 144A 42704MAA0 7.875% 09/01/2025 DD 05/29/20	103.25	101,000.00	104,282.50	0.20	3,282.50
233,000.000 HILCORP ENERGY I LP / HIL 144A 431318AS3 6.250% 11/01/2028 DD 10/16/18	80.25	219,190.13	186,982.50	0.36	-32,207.63
98,740.550 HILLMAN 5/18 COV-LITE TLB 43162TAK6	93.50	96,604.16	92,322.41	0.18	-4,281.75
20,000.000 HOLOGIC INC 144A 436440AK7 4.375% 10/15/2025 DD 10/10/17	100.98	20,173.65	20,195.80	0.04	22.15
146,000.000 HOWMET AEROSPACE INC 443201AA6 6.875% 05/01/2025 DD 04/24/20	108.49	146,000.00	158,389.56	0.31	12,389.56

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
234,000.000 HUB INTERNATIONAL LTD 144A 44332PAD3 7.000% 05/01/2026 DD 04/25/18	99.79	232,256.71	233,508.60	0.45	1,251.89
220,000.000 HUGHES SATELLITE SYSTEMS CORP 444454AF9 6.625% 08/01/2026 DD 02/01/17	103.79	234,657.48	228,333.60	0.44	-6,323.88
120,000.000 GFL ENVIRONMENTAL INC 144A 44485HAA2 7.000% 06/01/2026 DD 05/14/18	103.50	124,027.46	124,200.00	0.24	172.54
75,000.000 IAA INC 144A 449253AB9 5.500% 06/15/2027 DD 06/06/19	103.16	75,000.00	77,371.50	0.15	2,371.50
39,000.000 IRB HOLDING CORP 144A 44988MAC9 7.000% 06/15/2025 DD 05/21/20	103.07	39,235.45	40,197.30	0.08	961.85
252,000.000 ICAHN ENTERPRISES LP / ICAHN E 451102BT3 6.250% 05/15/2026 DD 05/10/19	100.07	252,000.00	252,176.40	0.49	176.40
102,000.000 ICAHN ENTERPRISES LP / ICAHN E 451102BZ9 5.250% 05/15/2027 DD 12/12/19	96.50	102,000.00	98,430.00	0.19	-3,570.00
14,089.000 IHEARTCOMMUNICATIONS INC 45174HBC0 6.375% 05/01/2026 DD 05/01/19	99.00	14,606.94	13,948.11	0.03	-658.83
120,286.000 IHEARTCOMMUNICATIONS INC 45174HBD8 8.375% 05/01/2027 DD 05/01/19	91.64	125,059.96	110,226.48	0.21	-14,833.48
159,000.000 INFRABUILD AUSTRALIA PTY 144A 45682RAA8 12.000% 10/01/2024 DD 10/03/19	90.25	159,000.00	143,497.50	0.28	-15,502.50

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
175,000.000 INTELSAT JACKSON HOLDINGS SA 45824TAP0 5.500% 08/01/2023 DD 06/05/13	57.00	160,232.73	99,750.00	0.19	-60,482.73
84,000.000 INTELSAT JACKSON HOLDINGS 144A 45824TBA2 8.500% 10/15/2024 DD 09/19/18	60.13	85,034.50	50,505.00	0.10	-34,529.50
99,000.000 IRON MOUNTAIN INC 144A 46284VAJ0 5.250% 07/15/2030 DD 06/22/20	98.50	99,000.00	97,515.00	0.19	-1,485.00
67,000.000 IRON MOUNTAIN INC 144A 46284VAL5 5.625% 07/15/2032 DD 06/22/20	99.79	67,000.00	66,859.30	0.13	-140.70
166,000.000 JBS USA LUX SA / JBS USA 144A 46590XAB2 5.500% 01/15/2030 DD 08/06/19	102.50	178,124.32	170,150.00	0.33	-7,974.32
87,000.000 JAGUAR HOLDING CO II / PP 144A 47010LAA0 5.000% 06/15/2028 DD 06/05/20	102.38	87,000.00	89,066.25	0.17	2,066.25
100,000.000 JAGUAR HOLDING CO II / PP 144A 47010LAB8 4.625% 06/15/2025 DD 06/05/20	101.77	100,000.00	101,770.00	0.20	1,770.00
150,000.000 KFC HOLDING CO/PIZZA HUT 144A 48250NAA3 5.000% 06/01/2024 DD 06/16/16	101.88	150,000.00	152,812.50	0.30	2,812.50
25,000.000 KFC HOLDING CO/PIZZA HUT 144A 48250NAC9 4.750% 06/01/2027 DD 06/15/17	102.50	25,000.00	25,625.00	0.05	625.00
58,000.000 KORN FERRY 144A 50067PAA7 4.625% 12/15/2027 DD 12/16/19	97.00	58,000.00	56,260.00	0.11	-1,740.00

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255,000.000 KRAFT HEINZ FOODS CO 50077LAB2 4.375% 06/01/2046 DD 05/24/16	98.31	243,129.53	250,687.95	0.48	7,558.42
102,000.000 KRAFT HEINZ FOODS CO 144A 50077LBA3 3.875% 05/15/2027 DD 05/18/20	104.50	102,000.00	106,588.98	0.21	4,588.98
102,000.000 KRAFT HEINZ FOODS CO 144A 50077LBD7 4.250% 03/01/2031 DD 05/18/20	106.03	102,000.00	108,149.58	0.21	6,149.58
102,000.000 KRAFT HEINZ FOODS CO 144A 50077LBG0 5.500% 06/01/2050 DD 05/18/20	106.60	102,000.00	108,727.92	0.21	6,727.92
121,000.000 L BRANDS INC 501797AL8 6.875% 11/01/2035 DD 10/30/15	83.19	123,779.73	100,659.90	0.19	-23,119.83
39,000.000 L BRANDS INC 144A 501797AS3 6.875% 07/01/2025 DD 06/18/20	103.25	39,432.88	40,267.50	0.08	834.62
27,000.000 L BRANDS INC 144A 501797AU8 9.375% 07/01/2025 DD 06/18/20	100.12	27,000.00	27,032.40	0.05	32.40
67,000.000 LAREDO PETROLEUM INC 516806AF3 9.500% 01/15/2025 DD 01/24/20	69.13	67,000.00	46,313.75	0.09	-20,686.25
101,000.000 LAREDO PETROLEUM INC 516806AG1 10.125% 01/15/2028 DD 01/24/20	69.00	101,000.00	69,690.00	0.13	-31,310.00
330,000.000 LEVEL 3 FINANCING INC 527298BM4 5.250% 03/15/2026 DD 10/15/16	102.75	336,792.63	339,075.00	0.65	2,282.37

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175,000.000 REGIONALCARE HOSPITAL PAR 144A 53219LAR0 9.750% 12/01/2026 DD 11/16/18	103.00	187,040.45	180,250.00	0.35	-6,790.45
120,000.000 LIFEPOINT HEALTH INC 144A 53219LAS8 4.375% 02/15/2027 DD 02/13/20	94.50	120,483.17	113,400.00	0.22	-7,083.17
64,000.000 LIFEPOINT HEALTH INC 144A 53219LAT6 6.750% 04/15/2025 DD 04/13/20	103.25	64,000.00	66,080.00	0.13	2,080.00
22,000.000 L BRANDS INC 532716AN7 7.600% 07/15/2037 DD 07/17/07	68.00	21,891.05	14,960.00	0.03	-6,931.05
82,000.000 LITHIA MOTORS INC 144A 536797AE3 4.625% 12/15/2027 DD 12/09/19	99.00	82,000.00	81,180.00	0.16	-820.00
181,000.000 LIVE NATION ENTERTAINMENT 144A 538034AR0 4.750% 10/15/2027 DD 10/17/19	86.02	177,338.16	155,698.01	0.30	-21,640.15
223,000.000 MEG ENERGY CORP 144A 552704AE8 7.125% 02/01/2027 DD 01/31/20	83.13	223,000.00	185,368.75	0.36	-37,631.25
225,000.000 MGM RESORTS INTERNATIONAL 552953CC3 6.000% 03/15/2023 DD 11/25/14	101.00	232,002.37	227,250.00	0.44	-4,752.37
193,000.000 MGM GROWTH PROPERTIES OPERATIN 55303XAJ4 5.750% 02/01/2027 DD 08/01/19	102.50	196,865.41	197,825.00	0.38	959.59
74,000.000 M/I HOMES INC 55305BAS0 4.950% 02/01/2028 DD 01/22/20	99.38	74,000.00	73,537.50	0.14	-462.50

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452,000.000 MPH ACQUISITION HOLDINGS 144A 553283AB8 7.125% 06/01/2024 DD 06/07/16	93.00	467,405.97	420,360.00	0.81	-47,045.97
44,000.000 MSCI INC 144A 55354GAK6 3.625% 09/01/2030 DD 03/04/20	99.50	44,000.00	43,780.00	0.08	-220.00
111,000.000 MSCI INC 144A 55354GAL4 3.875% 02/15/2031 DD 05/26/20	102.00	111,000.00	113,220.00	0.22	2,220.00
72,879.000 MANITOWOC 10/18 TLB 56356XAE9	86.00	57,377.62	62,675.94	0.12	5,298.32
89,000.000 MASONITE INTERNATIONAL CO 144A 575385AD1 5.375% 02/01/2028 DD 07/25/19	102.25	89,200.12	91,002.50	0.18	1,802.38
145,000.000 MATADOR RESOURCES CO 576485AE6 5.875% 09/15/2026 DD 08/21/18	74.00	145,000.00	107,300.00	0.21	-37,700.00
107,000.000 MOLINA HEALTHCARE INC 144A 60855RAJ9 4.375% 06/15/2028 DD 06/02/20	99.88	107,000.00	106,866.25	0.21	-133.75
119,000.000 MOOG INC 144A 615394AM5 4.250% 12/15/2027 DD 12/13/19	97.00	119,553.33	115,430.00	0.22	-4,123.33
175,000.000 MOSS CREEK RESOURCES HOLD 144A 61965RAA3 7.500% 01/15/2026 DD 01/18/18	50.00	176,173.43	87,500.00	0.17	-88,673.43
125,000.000 MURPHY OIL USA INC 626738AD0 5.625% 05/01/2027 DD 04/25/17	103.25	131,065.35	129,062.50	0.25	-2,002.85

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115,000.000 MURPHY OIL USA INC 626738AE8 4.750% 09/15/2029 DD 09/13/19	102.25	115,224.41	117,587.50	0.23	2,363.09
89,000.000 NCL CORP LTD 144A 62886HAP6 3.625% 12/15/2024 DD 12/16/19	61.13	83,679.84	54,401.25	0.11	-29,278.59
165,000.000 NRG ENERGY INC 629377CE0 5.750% 01/15/2028 DD 07/15/18	105.50	165,000.00	174,075.00	0.34	9,075.00
105,000.000 NRG ENERGY INC 144A 629377CH3 5.250% 06/15/2029 DD 05/14/19	105.00	105,000.00	110,250.00	0.21	5,250.00
100,000.000 NABORS INDUSTRIES LTD 144A 629571AA8 7.250% 01/15/2026 DD 01/10/20	61.50	100,000.00	61,500.00	0.12	-38,500.00
83,000.000 NAVISTAR INTERNATIONAL CO 144A 63934EAW8 9.500% 05/01/2025 DD 04/27/20	107.16	83,000.00	88,938.65	0.17	5,938.65
375,000.000 NEPTUNE ENERGY BONDCO PLC 144A 64073KAA1 6.625% 05/15/2025 DD 05/11/18	87.00	366,638.65	326,250.00	0.63	-40,388.65
185,000.000 NETFLIX INC 64110LAS5 4.875% 04/15/2028 DD 10/26/17	106.93	185,000.00	197,814.95	0.38	12,814.95
235,000.000 NETFLIX INC 64110LAT3 5.875% 11/15/2028 DD 04/26/18	113.88	235,000.00	267,606.25	0.52	32,606.25
35,000.000 NEW GOLD INC 144A 644532AA1 6.375% 05/15/2025 DD 05/18/17	101.00	33,580.36	35,350.00	0.07	1,769.64

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137,000.000 NEW GOLD INC 144A 644535AH9 7.500% 07/15/2027 DD 06/24/20	103.17	137,000.00	141,341.53	0.27	4,341.53
188,000.000 NEXTERA ENERGY OPERATING 144A 65342QAB8 4.500% 09/15/2027 DD 09/25/17	104.53	173,981.19	196,522.04	0.38	22,540.85
75,000.000 NEXTERA ENERGY OPERATING 144A 65342QAC6 4.250% 09/15/2024 DD 09/25/17	100.60	75,000.00	75,447.00	0.15	447.00
209,000.000 NEXSTAR BROADCASTING INC 144A 65343HAA9 5.625% 07/15/2027 DD 07/03/19	99.26	212,786.62	207,445.04	0.40	-5,341.58
71,000.000 NINE ENERGY SERVICE INC 144A 65441VAA9 8.750% 11/01/2023 DD 10/25/18	48.75	71,000.00	34,612.50	0.07	-36,387.50
230,000.000 NOVELIS CORP 144A 670001AC0 5.875% 09/30/2026 DD 09/14/16	99.88	236,243.66	229,712.50	0.44	-6,531.16
221,000.000 NUFARM AUSTRALIA LTD / NU 144A 67052NAA3 5.750% 04/30/2026 DD 04/26/18	96.50	216,444.86	213,265.00	0.41	-3,179.86
200,000.000 ALTICE FRANCE SA/FRANCE 144A 67054KAA7 7.375% 05/01/2026 DD 04/11/16	104.28	209,053.03	208,560.00	0.40	-493.03
2,000.000 OCCIDENTAL PETROLEUM CORP 674599CC7 3.125% 02/15/2022 DD 08/18/11	95.77	1,667.90	1,915.40	0.00	247.50
43,000.000 OCCIDENTAL PETROLEUM CORP 674599CF0 4.625% 06/15/2045 DD 06/23/15	70.00	32,117.49	30,100.00	0.06	-2,017.49

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23,000.000 OCCIDENTAL PETROLEUM CORP 674599CK9 2.600% 04/15/2022 DD 04/04/16	95.28	19,885.47	21,914.40	0.04	2,028.93
79,000.000 OCCIDENTAL PETROLEUM CORP 674599CN3 4.200% 03/15/2048 DD 03/02/18	67.72	55,910.08	53,498.80	0.10	-2,411.28
26,000.000 OCCIDENTAL PETROLEUM CORP 674599CP8 2.700% 08/15/2022 DD 08/08/19	93.10	21,757.28	24,204.70	0.05	2,447.42
20,000.000 OCCIDENTAL PETROLEUM CORP 674599CQ6 VAR RT 08/15/2022 DD 08/08/19	92.02	15,753.60	18,403.80	0.04	2,650.20
50,000.000 OCCIDENTAL PETROLEUM CORP 674599CS2 3.500% 08/15/2029 DD 08/08/19	73.16	34,681.15	36,580.00	0.07	1,898.85
8,000.000 OCCIDENTAL PETROLEUM CORP 674599CW3 2.900% 08/15/2024 DD 08/08/19	85.45	6,083.53	6,835.84	0.01	752.31
62,000.000 OCCIDENTAL PETROLEUM CORP 674599CY9 4.400% 08/15/2049 DD 08/08/19	69.00	44,335.06	42,780.00	0.08	-1,555.06
20,000.000 OCCIDENTAL PETROLEUM CORP 674599DA0 3.450% 07/15/2024 DD 07/15/19	83.00	14,382.39	16,600.00	0.03	2,217.61
41,000.000 OCCIDENTAL PETROLEUM CORP 674599DJ1 6.200% 03/15/2040 DD 09/15/19	83.75	29,586.17	34,337.50	0.07	4,751.33
166,000.000 OCCIDENTAL PETROLEUM CORP 674599DZ5 8.500% 07/15/2027 DD 07/13/20	99.88	166,000.00	165,792.50	0.32	-207.50

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142,000.000 OCCIDENTAL PETROLEUM CORP 674599EA9 8.875% 07/15/2030 DD 07/13/20	99.88	142,000.00	141,822.50	0.27	-177.50
141,000.000 1011778 BC ULC / NEW RED 144A 68245XAE9 5.000% 10/15/2025 DD 08/28/17	99.41	141,489.87	140,169.51	0.27	-1,320.36
105,000.000 1011778 BC ULC / NEW RED 144A 68245XAH2 3.875% 01/15/2028 DD 09/24/19	97.02	105,000.00	101,867.85	0.20	-3,132.15
164,000.000 1011778 BC ULC / NEW RED 144A 68245XAJ8 4.375% 01/15/2028 DD 11/19/19	98.02	164,000.00	160,751.16	0.31	-3,248.84
32,000.000 1011778 BC ULC / NEW RED 144A 68245XAK5 5.750% 04/15/2025 DD 04/07/20	105.00	32,000.00	33,600.00	0.06	1,600.00
163,000.000 OPEN TEXT CORP 144A 683715AC0 3.875% 02/15/2028 DD 02/18/20	96.28	163,000.00	156,938.03	0.30	-6,061.97
143,000.000 OPEN TEXT HOLDINGS INC 144A 683720AA4 4.125% 02/15/2030 DD 02/18/20	98.25	143,000.00	140,497.50	0.27	-2,502.50
82,000.000 OUTFRONT MEDIA CAPITAL LL 144A 69007TAD6 6.250% 06/15/2025 DD 05/15/20	100.66	82,000.00	82,537.10	0.16	537.10
295,000.000 PBF HOLDING CO LLC / PBF 144A 69318FAH1 6.000% 02/15/2028 DD 01/24/20	83.00	295,000.00	244,850.00	0.47	-50,150.00
299,000.000 PERFORMANCE FOOD GROUP IN 144A 69346VAA7 5.500% 10/15/2027 DD 09/27/19	96.50	315,897.68	288,535.00	0.56	-27,362.68

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81,000.000 PTC INC 144A 69370CAB6 3.625% 02/15/2025 DD 02/13/20	99.25	81,000.00	80,392.50	0.16	-607.50
81,000.000 PTC INC 144A 69370CAC4 4.000% 02/15/2028 DD 02/13/20	99.01	81,000.00	80,199.72	0.15	-800.28
256,000.000 CLARIOS GLOBAL LP / CLARI 144A 69867DAA6 6.250% 05/15/2026 DD 04/01/19	103.13	258,544.38	264,000.00	0.51	5,455.62
306,000.000 CLARIOS GLOBAL LP / CLARI 144A 69867DAC2 8.500% 05/15/2027 DD 04/01/19	100.50	307,711.88	307,514.70	0.59	-197.18
125,000.000 SEVEN GENERATIONS ENERGY 144A 699320AH0 6.875% 06/30/2023 DD 06/05/15	96.75	127,243.39	120,937.50	0.23	-6,305.89
140,000.000 PARSLEY ENERGY LLC / PARS 144A 701885AD7 5.375% 01/15/2025 DD 12/13/16	97.28	141,261.14	136,192.00	0.26	-5,069.14
102,000.000 PARSLEY ENERGY LLC / PARS 144A 701885AH8 5.625% 10/15/2027 DD 10/11/17	98.50	102,000.00	100,470.00	0.19	-1,530.00
70,000.000 PATTERN ENERGY GROUP INC 144A 70338PAC4 5.875% 02/01/2024 DD 01/25/17	100.50	71,501.80	70,350.00	0.14	-1,151.80
241,522.480 PETSMART 9/16 TLB 71677HAG0	98.53	241,592.53	237,981.76	0.46	-3,610.77
39,000.000 PICASSO FINANCE SUB INC 144A 71953LAA9 6.125% 06/15/2025 DD 06/15/20	102.25	39,000.00	39,877.50	0.08	877.50

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
266,175.000 PLAYTIKA 12/19 COV-LITE TLB 72814CAE8 0.000% 12/10/2024 DD 11/08/19	99.75	261,440.69	265,509.56	0.51	4,068.87
50,000.000 POST HOLDINGS INC 144A 737446AM6 5.750% 03/01/2027 DD 02/14/17	103.25	50,000.00	51,625.00	0.10	1,625.00
11,000.000 PRECISION DRILLING CORP 740212AK1 7.750% 12/15/2023 DD 06/15/17	68.50	11,000.00	7,535.00	0.01	-3,465.00
55,000.000 PRECISION DRILLING CORP 144A 740212AL9 7.125% 01/15/2026 DD 11/22/17	61.00	55,000.00	33,550.00	0.06	-21,450.00
70,000.000 PRECISION DRILLING CORP 74022DAJ9 5.250% 11/15/2024 DD 11/15/14	66.80	65,861.37	46,760.70	0.09	-19,100.67
57,000.000 PRESIDIO HOLDINGS INC 144A 74101XAE0 4.875% 02/01/2027 DD 01/22/20	97.75	57,000.00	55,717.50	0.11	-1,282.50
159,000.000 PRESIDIO HOLDINGS INC 144A 74101XAF7 8.250% 02/01/2028 DD 01/22/20	100.00	163,594.28	159,000.00	0.31	-4,594.28
58,000.000 PRESTIGE BRANDS INC 144A 74112BAL9 5.125% 01/15/2028 DD 12/02/19	98.50	58,000.00	57,130.00	0.11	-870.00
185,000.000 RIVERBED TECHNOLOGY INC 144A 74339KAA0 8.875% 03/01/2023 DD 03/09/15	60.75	178,234.80	112,387.50	0.22	-65,847.30
198,000.000 RHP HOTEL PROPERTIES LP / RHP 749571AD7 5.000% 04/15/2023 DD 04/14/15	93.25	195,965.87	184,635.00	0.36	-11,330.87

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
104,224.000 REGIONALCARE/LIFEPOINT HEALTH 75915TAD4 0.000% 11/14/2025 DD 10/30/18	93.49	104,484.56	97,435.89	0.19	-7,048.67
110,000.000 REYNOLDS GROUP ISSUER INC 144A 761735AT6 5.125% 07/15/2023 DD 06/27/16	100.76	104,910.02	110,834.90	0.21	5,924.88
38,000.000 ROYAL CARIBBEAN CRUISES L 144A 780153BC5 9.125% 06/15/2023 DD 06/09/20	99.12	38,000.00	37,667.12	0.07	-332.88
10,000.000 SM ENERGY CO 78454LAH3 5.000% 01/15/2024 DD 01/15/14	54.00	9,317.80	5,400.00	0.01	-3,917.80
108,000.000 SM ENERGY CO 78454LAL4 5.625% 06/01/2025 DD 05/21/15	53.00	101,150.92	57,240.00	0.11	-43,910.92
42,000.000 SM ENERGY CO 78454LAN0 6.750% 09/15/2026 DD 09/12/16	50.29	39,905.11	21,120.96	0.04	-18,784.15
82,000.000 SS&C TECHNOLOGIES INC 144A 78466CAC0 5.500% 09/30/2027 DD 03/28/19	101.46	85,308.53	83,200.48	0.16	-2,108.05
53,649.600 SS&C TECHNOLOGIES 4/18 COV-LT 78466DBD5 TLB3	95.53	53,557.67	51,252.00	0.10	-2,305.67
36,434.690 SS&C TECHNOLOGIES 4/18 COV-LT 78466DBE3 TLB4	95.53	36,372.25	34,806.42	0.07	-1,565.83
200,000.000 SPCM SA 144A 7846ELAC1 4.875% 09/15/2025 DD 04/20/17	100.78	195,908.14	201,554.00	0.39	5,645.86

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
30,000.000 SCIENCE APPLICATIONS INTE 144A 808625AA5 4.875% 04/01/2028 DD 03/13/20	99.41	30,000.00	29,821.80	0.06	-178.20
164,000.000 SCRIPPS ESCROW INC 144A 81104PAA7 5.875% 07/15/2027 DD 07/26/19	94.75	165,203.95	155,390.00	0.30	-9,813.95
116,741.200 SEDGWICK CMS 12/18 COV-LITE TL 81527CAL1 0.000% 11/06/2025 DD 10/29/18	94.18	117,070.71	109,945.69	0.21	-7,125.02
200,000.000 SENSATA TECHNOLOGIES UK F 144A 81727TAA6 6.250% 02/15/2026 DD 11/27/15	103.75	208,598.74	207,500.00	0.40	-1,098.74
240,000.000 SERVICEMASTER CO LLC/THE 817609AB6 7.450% 08/15/2027 DD 08/19/97	108.22	257,661.76	259,728.00	0.50	2,066.24
85,000.000 SERVICE PROPERTIES TRUST 81761LAA0 7.500% 09/15/2025 DD 06/17/20	105.35	86,033.55	89,550.05	0.17	3,516.50
190,000.000 SEVEN GENERATIONS ENERGY 144A 81783QAC9 5.375% 09/30/2025 DD 10/02/17	88.00	190,000.00	167,200.00	0.32	-22,800.00
119,000.000 SHEA HOMES LP / SHEA HOME 144A 82088KAE8 4.750% 02/15/2028 DD 02/20/20	95.00	119,427.21	113,050.00	0.22	-6,377.21
175,000.000 SHELF DRILLING HOLDINGS L 144A 822538AE4 8.250% 02/15/2025 DD 02/07/18	45.00	176,172.54	78,750.00	0.15	-97,422.54
169,000.000 SINCLAIR TELEVISION GROUP 144A 829259AY6 5.500% 03/01/2030 DD 11/27/19	92.50	169,000.00	156,325.00	0.30	-12,675.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
230,000.000 SIRIUS XM RADIO INC 144A 82967NAU2 5.375% 04/15/2025 DD 03/06/15	102.70	222,235.29	236,210.00	0.46	13,974.71
230,000.000 SIRIUS XM RADIO INC 144A 82967NBA5 5.000% 08/01/2027 DD 07/05/17	102.21	235,207.09	235,076.10	0.45	-130.99
250,000.000 SONIC AUTOMOTIVE INC 83545GBC5 6.125% 03/15/2027 DD 03/10/17	99.00	249,010.66	247,500.00	0.48	-1,510.66
145,459.460 HARD ROCK NORTHERN INDIANA 12/ 84752PAC2 0.000% 12/23/2025 DD 09/24/19	92.00	141,542.01	133,822.70	0.26	-7,719.31
10,540.540 HARD ROCK NORTHERN INDIANA 12/ 84752PAD0 0.000% 12/23/2025 DD 09/24/19	92.00	10,256.46	9,697.30	0.02	-559.16
50,000.000 SPECTRUM BRANDS INC 84762LAS4 6.125% 12/15/2024 DD 12/15/15	102.75	50,000.00	51,375.00	0.10	1,375.00
130,000.000 SPECTRUM BRANDS INC 84762LAU9 5.750% 07/15/2025 DD 01/15/16	102.63	129,153.32	133,415.10	0.26	4,261.78
64,000.000 SPECTRUM BRANDS INC 144A 84762LAV7 5.000% 10/01/2029 DD 09/24/19	98.75	64,000.00	63,200.00	0.12	-800.00
59,000.000 SPECTRUM BRANDS INC 144A 84762LAW5 5.500% 07/15/2030 DD 06/30/20	100.13	59,074.98	59,073.75	0.11	-1.23
280,000.000 SPRINT CAPITAL CORP 852060AD4 6.875% 11/15/2028 DD 11/16/98	121.75	307,523.22	340,900.00	0.66	33,376.78

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Status : FINAL

EATON VANCE HY MON - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
22,000.000 SPRINT COMMUNICATIONS INC 852061AR1 7.000% 08/15/2020 DD 08/14/12	100.41	22,061.61	22,089.10	0.04	27.49
240,000.000 SPRINT COMMUNICATIONS INC 852061AS9 6.000% 11/15/2022 DD 11/14/12	105.47	227,927.13	253,135.20	0.49	25,208.07
179,000.000 SPRINT CORP 85207UAF2 7.875% 09/15/2023 DD 09/15/14	112.63	184,200.01	201,598.75	0.39	17,398.74
205,000.000 SPRINT CORP 85207UAH8 7.125% 06/15/2024 DD 06/15/14	112.91	202,897.98	231,473.70	0.45	28,575.72
124,000.000 SPRINT CORP 85207UAK1 7.625% 03/01/2026 DD 02/22/18	118.04	124,000.00	146,365.88	0.28	22,365.88
39,000.000 STANDARD INDUSTRIES INC/N 144A 853496AC1 5.000% 02/15/2027 DD 02/07/17	101.25	38,807.70	39,487.50	0.08	679.80
97,000.000 STANDARD INDUSTRIES INC/N 144A 853496AG2 4.375% 07/15/2030 DD 06/30/20	99.75	97,000.00	96,757.50	0.19	-242.50
48,000.000 SUNOCO LP / SUNOCO FINANCE COR 86765LAL1 5.500% 02/15/2026 DD 08/15/18	97.00	48,000.00	46,560.00	0.09	-1,440.00
190,000.000 T-MOBILE USA INC 87264AAP0 6.500% 01/15/2026 DD 11/05/15	104.51	198,072.01	198,570.90	0.38	498.89
25,000.000 T-MOBILE USA INC 87264AAT2 5.375% 04/15/2027 DD 03/16/17	105.25	25,000.00	26,312.50	0.05	1,312.50

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
120,000.000 T-MOBILE USA INC 87264AAU9 4.500% 02/01/2026 DD 01/25/18	101.20	120,000.00	121,435.20	0.23	1,435.20
120,000.000 T-MOBILE USA INC 87264AAV7 4.750% 02/01/2028 DD 01/25/18	105.64	117,084.71	126,768.00	0.24	9,683.29
50,000.000 TRI POINTE GROUP INC 87265HAF6 5.250% 06/01/2027 DD 06/08/17	99.50	50,000.00	49,750.00	0.10	-250.00
27,000.000 TRI POINTE GROUP INC 87265HAG4 5.700% 06/15/2028 DD 06/10/20	101.50	27,000.00	27,405.00	0.05	405.00
87,000.000 TARGA RESOURCES PARTNERS LP / 87612BBL5 6.500% 07/15/2027 DD 01/17/19	100.25	87,000.00	87,217.50	0.17	217.50
176,000.000 TARGA RESOURCES PARTNERS LP / 87612BBN1 6.875% 01/15/2029 DD 01/17/19	104.75	177,003.24	184,360.00	0.36	7,356.76
126,000.000 TAYLOR MORRISON COMMUNITI 144A 87724RAA0 5.875% 06/15/2027 DD 06/05/19	103.57	126,000.00	130,503.24	0.25	4,503.24
61,000.000 TEGNA INC 144A 87901JAC9 5.000% 09/15/2029 DD 09/13/19	93.62	61,000.00	57,106.37	0.11	-3,893.63
98,000.000 TEGNA INC 144A 87901JAE5 4.625% 03/15/2028 DD 01/09/20	92.00	98,000.00	90,160.00	0.17	-7,840.00
200,000.000 TELECOM ITALIA CAPITAL SA 87927VAM0 6.000% 09/30/2034 DD 09/30/05	108.70	230,967.65	217,400.00	0.42	-13,567.65

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
225,000.000 TELEFLEX INC 879369AF3 4.625% 11/15/2027 DD 11/20/17	105.72	228,500.67	237,872.25	0.46	9,371.58
19,000.000 TELEFLEX INC 144A 879369AG1 4.250% 06/01/2028 DD 05/27/20	102.50	19,000.00	19,475.00	0.04	475.00
69,000.000 TENET HEALTHCARE CORP 88033GCS7 4.625% 07/15/2024 DD 06/14/17	97.98	69,000.00	67,605.51	0.13	-1,394.49
125,000.000 TENET HEALTHCARE CORP 88033GCU2 5.125% 05/01/2025 DD 06/14/17	96.52	125,000.00	120,651.25	0.23	-4,348.75
255,000.000 TENET HEALTHCARE CORP 144A 88033GDA5 5.125% 11/01/2027 DD 08/26/19	98.67	255,000.00	251,608.50	0.49	-3,391.50
43,000.000 TENET HEALTHCARE CORP 144A 88033GDC1 4.625% 09/01/2024 DD 08/26/19	97.75	43,000.00	42,032.50	0.08	-967.50
32,000.000 TENET HEALTHCARE CORP 144A 88033GDG2 4.625% 06/15/2028 DD 06/16/20	97.42	32,000.00	31,174.40	0.06	-825.60
102,000.000 TEAM HEALTH HOLDINGS INC 144A 88047PAA2 6.375% 02/01/2025 DD 02/01/17	58.00	98,882.10	59,160.00	0.11	-39,722.10
224,000.000 TERRAFORM POWER OPERATING 144A 88104LAE3 5.000% 01/31/2028 DD 12/12/17	104.25	240,581.08	233,520.00	0.45	-7,061.08
323,000.000 TERRIER MEDIA BUYER INC 144A 88146LAA1 8.875% 12/15/2027 DD 12/17/19	95.88	324,834.05	309,676.25	0.60	-15,157.80

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
156,000.000 TRANSDIGM INC 893647BH9 7.500% 03/15/2027 DD 09/15/19	95.95	158,359.42	149,682.00	0.29	-8,677.42
332,000.000 TRANSDIGM INC 893647BL0 5.500% 11/15/2027 DD 05/15/20	87.27	332,000.00	289,736.40	0.56	-42,263.60
103,141.860 TRANSDIGM 2/20 COV-LITE TLE 89364MBQ6 0.000% 05/30/2025 DD 01/23/20	89.56	103,451.23	92,376.94	0.18	-11,074.29
85,000.000 TRANSOCEAN INC 144A 893830BF5 7.500% 01/15/2026 DD 10/17/17	54.50	88,035.87	46,325.00	0.09	-41,710.87
31,000.000 TRANSOCEAN INC 144A 893830BK4 7.250% 11/01/2025 DD 10/25/18	54.50	31,000.00	16,895.00	0.03	-14,105.00
44,000.000 TRANSOCEAN POSEIDON LTD 144A 89383JAA6 6.875% 02/01/2027 DD 02/01/19	85.00	43,716.58	37,400.00	0.07	-6,316.58
200,000.000 TRIVIUM PACKAGING FINANCE 144A 89686QAA4 VAR RT 08/15/2026 DD 08/02/19	100.88	200,000.00	201,750.00	0.39	1,750.00
218,000.000 US FOODS INC 144A 90290MAB7 5.875% 06/15/2024 DD 06/27/16	95.00	219,371.60	207,100.00	0.40	-12,271.60
59,000.000 UNIVAR SOLUTIONS USA INC/ 144A 91337CAA4 5.125% 12/01/2027 DD 11/22/19	101.16	59,000.00	59,685.58	0.12	685.58
246,000.000 USI INC/NY 144A 91739VAA6 6.875% 05/01/2025 DD 04/18/17	100.88	243,313.47	248,152.50	0.48	4,839.03

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
13,000.000 BAUSCH HEALTH COS INC 144A 91831AAB7 5.875% 05/15/2023 DD 03/27/15	99.75	12,441.01	12,967.50	0.03	526.49
28,000.000 BAUSCH HEALTH COS INC 144A 91911KAE2 5.500% 03/01/2023 DD 01/30/15	100.00	27,306.03	28,000.00	0.05	693.97
75,000.000 BAUSCH HEALTH COS INC 144A 91911KAN2 5.500% 11/01/2025 DD 10/17/17	102.50	75,000.00	76,875.00	0.15	1,875.00
195,000.000 BAUSCH HEALTH COS INC 144A 91911KAP7 9.000% 12/15/2025 DD 12/18/17	107.72	192,965.70	210,055.95	0.41	17,090.25
320,000.000 BAUSCH HEALTH AMERICAS IN 144A 91911XAV6 9.250% 04/01/2026 DD 03/26/18	108.49	336,717.54	347,168.00	0.67	10,450.46
303,000.000 BAUSCH HEALTH AMERICAS IN 144A 91911XAW4 8.500% 01/31/2027 DD 06/01/18	106.13	319,691.89	321,558.75	0.62	1,866.86
220,000.000 VALVOLINE INC 92047WAB7 4.375% 08/15/2025 DD 08/08/17	100.50	223,179.82	221,100.00	0.43	-2,079.82
66,000.000 VALVOLINE INC 144A 92047WAD3 4.250% 02/15/2030 DD 02/25/20	98.50	66,000.00	65,010.00	0.13	-990.00
32,000.000 VERSCEND ESCROW CORP 144A 92535WAA8 9.750% 08/15/2026 DD 08/27/18	107.44	34,443.34	34,379.20	0.07	-64.14
123,000.000 VIASAT INC 144A 92552VAL4 5.625% 04/15/2027 DD 03/27/19	102.38	123,000.00	125,921.25	0.24	2,921.25

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
257,000.000 VICI PROPERTIES LP / VICI 144A 92564RAB1 4.625% 12/01/2029 DD 11/26/19	97.50	257,000.00	250,575.00	0.48	-6,425.00
179,000.000 VICI PROPERTIES LP / VICI 144A 92564RAE5 4.125% 08/15/2030 DD 02/05/20	95.38	179,000.00	170,721.25	0.33	-8,278.75
340,000.000 VIKING CRUISES LTD 144A 92676XAD9 5.875% 09/15/2027 DD 09/20/17	59.54	340,273.56	202,425.80	0.39	-137,847.76
46,000.000 WASTE PRO USA INC 144A 94107JAA1 5.500% 02/15/2026 DD 02/01/18	95.45	45,602.28	43,906.54	0.08	-1,695.74
161,000.000 WATCO COS LLC / WATCO FIN 144A 941130AB2 6.500% 06/15/2027 DD 06/18/20	102.46	161,000.00	164,957.38	0.32	3,957.38
87,000.000 WESCO DISTRIBUTION INC 144A 95081QAN4 7.125% 06/15/2025 DD 06/12/20	105.31	87,000.00	91,622.31	0.18	4,622.31
78,000.000 WESCO DISTRIBUTION INC 144A 95081QAP9 7.250% 06/15/2028 DD 06/12/20	105.75	77,413.20	82,485.00	0.16	5,071.80
12,000.000 WESTERN MIDSTREAM OPERATING LP 958254AH7 4.500% 03/01/2028 DD 03/02/18	93.50	10,719.57	11,220.00	0.02	500.43
109,000.000 WESTERN MIDSTREAM OPERATING LP 958667AC1 VAR RT 02/01/2030 DD 01/13/20	96.26	97,526.79	104,922.31	0.20	7,395.52
29,000.000 TRI POINTE GROUP INC / TRI POI 962178AN9 5.875% 06/15/2024 DD 06/15/15	102.70	29,225.43	29,783.29	0.06	557.86

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EATON VANCE HY MON - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
124,000.000 WILLIAM CARTER CO/THE 144A 96926JAC1 5.625% 03/15/2027 DD 03/14/19	103.00	124,431.61	127,720.00	0.25	3,288.39
28,000.000 WILLIAM CARTER CO/THE 144A 96926JAE7 5.500% 05/15/2025 DD 05/11/20	103.13	28,000.00	28,875.00	0.06	875.00
58,000.000 WINNEBAGO INDUSTRIES INC 144A 974637AC4 6.250% 07/15/2028 DD 07/08/20	102.00	58,220.00	59,160.00	0.11	940.00
197,000.000 WYNN LAS VEGAS LLC / WYNN 144A 983130AX3 5.250% 05/15/2027 DD 05/11/17	86.45	195,498.64	170,306.50	0.33	-25,192.14
380,000.000 ZIGGO BOND CO BV 144A 98954UAB9 6.000% 01/15/2027 DD 09/23/16	101.50	394,320.37	385,700.00	0.74	-8,620.37
35,000.000 VNU 5/20 B5 TLB 99AAF8931 0.000% 06/06/2025 DD 05/07/20	98.88	34,300.00	34,606.25	0.07	306.25
78,179.560 AMAYA 6/18 (USD) TL N8233BAC6 0.000% 07/10/2025 DD 04/23/18	99.30	78,383.78	77,629.18	0.15	-754.60
TOTAL FIXED INCOME SECURITIES U.S. DOLLAR		**50,351,169.87**	**48,462,194.99**	**93.59**	**-1,888,974.88**
TOTAL ASSETS U.S. DOLLAR		**51,916,896.09**	**49,986,185.82**	**96.53**	**-1,930,710.27**
TOTAL ASSETS		**53,814,909.52**	**51,782,547.19**	**100.00**	**-2,032,362.33**

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MARATHON EMD MON - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
FIXED INCOME SECURITIES					
31,500,000.000 MARATHON EM BOND FUND 99VVBK5X7	1.10	31,500,000.00	34,658,109.49	100.00	3,158,109.49

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Asset Detail - By Currency

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PRAIRIE 1 MINN - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
UNIT OF PARTICIPATION					
29,918,498.206 PRAIRIE #1 QUALIFIED MTU 99VVAQUZ2	15.32	335,862,951.32	458,345,887.51	100.00	122,482,936.19

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CASH PI1 - [redacted]

12/31/2019

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
2,104,044.710 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	2,104,044.71	2,104,044.71	100.00	0.00
CASH		0.29	0.29	0.00	0.00
TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**2,104,045.00**	**2,104,045.00**	**100.00**	**0.00**
TOTAL ASSETS U.S. DOLLAR		**2,104,045.00**	**2,104,045.00**	**100.00**	**0.00**
TOTAL ASSETS		**2,104,045.00**	**2,104,045.00**	**100.00**	**0.00**

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PARAMETRIC US PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
326,193.830 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	326,193.83	326,193.83	0.21	0.00
CASH		1,153.84	1,153.84	0.00	0.00
TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**327,347.67**	**327,347.67**	**0.21**	**0.00**
EQUITY					
3,205.000 ACCO BRANDS CORP 00081T108	9.36	30,180.07	29,998.80	0.02	-181.27
316.000 ABM INDUSTRIES INC 000957100	37.71	7,223.76	11,916.36	0.01	4,692.60
5,330.000 AFLAC INC 001055102	52.90	122,470.34	281,957.00	0.18	159,486.66
31,966.000 AT&T INC 00206R102	39.08	900,777.83	1,249,231.28	0.79	348,453.45
2,953.000 AVX CORP 002444107	20.47	40,178.52	60,447.91	0.04	20,269.39
477.000 AARON'S INC 002535300	57.11	12,883.77	27,241.47	0.02	14,357.70

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PARAMETRIC US PI1 - [redacted] **12/31/2019**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
9,067.000 ABBOTT LABORATORIES 002824100	86.86	228,900.37	787,559.62	0.50	558,659.25
8,347.000 ABBVIE INC 00287Y109	88.54	207,928.42	739,043.38	0.47	531,114.96
340.000 ABIOMED INC 003654100	170.59	24,595.60	58,000.60	0.04	33,405.00
12,057.000 ACACIA RESEARCH CORP 003881307	2.66	30,547.04	32,071.62	0.02	1,524.58
742.000 ACACIA COMMUNICATIONS INC 00401C108	67.81	28,396.34	50,315.02	0.03	21,918.68
1,901.000 ACADIA PHARMACEUTICALS INC 004225108	42.78	29,042.77	81,324.78	0.05	52,282.01
492.000 ACI WORLDWIDE INC 004498101	37.89	5,180.76	18,639.42	0.01	13,458.66
3,601.000 ACTIVISION BLIZZARD INC 00507V109	59.42	91,275.12	213,971.42	0.14	122,696.30
258.000 ACUITY BRANDS INC 00508Y102	138.00	14,107.44	35,604.00	0.02	21,496.56
2,841.000 ADOBE INC 00724F101	329.81	108,225.90	936,990.21	0.60	828,764.31

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PARAMETRIC US PI1 - [redacted] **12/31/2019**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
539.000 ADVANCE AUTO PARTS INC 00751Y106	160.16	33,342.65	86,326.24	0.05	52,983.59
1,727.000 AECOM 00766T100	43.13	37,093.97	74,485.51	0.05	37,391.54
1,375.000 AERIE PHARMACEUTICALS INC 00771V108	24.17	30,248.12	33,233.75	0.02	2,985.63
183.000 ADVANSIX INC 00773T101	19.96	1,021.53	3,652.68	0.00	2,631.15
781.000 AEROJET ROCKETDYNE HOLDINGS IN 007800105	45.66	4,904.68	35,660.46	0.02	30,755.78
2,062.000 ADVANCED MICRO DEVICES INC 007903107	45.86	37,004.89	94,563.32	0.06	57,558.43
1,344.000 ADVANCED DISPOSAL SERVICES INC 00790X101	32.87	30,184.52	44,177.28	0.03	13,992.76
374.000 AFFILIATED MANAGERS GROUP INC 008252108	84.74	29,785.36	31,692.76	0.02	1,907.40
2,375.000 AGILENT TECHNOLOGIES INC 00846U101	85.31	53,797.96	202,611.25	0.13	148,813.29
333.000 AGREE REALTY CORP 008492100	70.17	9,813.51	23,366.61	0.01	13,553.10

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PARAMETRIC US PI1 - [redacted] **12/31/2019**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
195.000 AIR LEASE CORP 00912X302	47.52	4,655.27	9,266.40	0.01	4,611.13
1,382.000 AIR PRODUCTS AND CHEMICALS INC 009158106	234.99	86,407.60	324,756.18	0.21	238,348.58
1,096.000 AKAMAI TECHNOLOGIES INC 00971T101	86.38	36,166.27	94,672.48	0.06	58,506.21
146.000 ALAMO GROUP INC 011311107	125.55	4,950.86	18,330.30	0.01	13,379.44
856.000 ALASKA AIR GROUP INC 011659109	67.75	14,338.00	57,994.00	0.04	43,656.00
197.000 ALBANY INTERNATIONAL CORP 012348108	75.92	4,873.78	14,956.24	0.01	10,082.46
1,562.000 ALCOA CORP 013872106	21.51	28,940.14	33,598.62	0.02	4,658.48
357.000 ALEXANDRIA REAL ESTATE EQUITIE 015271109	161.58	25,139.94	57,684.06	0.04	32,544.12
1,153.000 ALEXION PHARMACEUTICALS INC 015351109	108.15	95,064.09	124,696.95	0.08	29,632.86
365.000 ALIGN TECHNOLOGY INC 016255101	279.04	8,066.50	101,849.60	0.06	93,783.10

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
98.000 ALLEGHANY CORP 017175100	799.57	28,633.04	78,357.86	0.05	49,724.82
107.000 ALLEGIANT TRAVEL CO 01748X102	174.04	4,872.78	18,622.28	0.01	13,749.50
107.000 ALLETE INC 018522300	81.17	5,077.15	8,685.19	0.01	3,608.04
1,340.000 ALLIANT ENERGY CORP 018802108	54.72	30,649.35	73,324.80	0.05	42,675.45
2,169.000 ALLSTATE CORP/THE 020002101	112.45	81,166.87	243,904.05	0.16	162,737.18
2,373.000 ALLY FINANCIAL INC 02005N100	30.56	52,945.65	72,518.88	0.05	19,573.23
820.000 ALNYLAM PHARMACEUTICALS INC 02043Q107	115.17	28,138.84	94,439.40	0.06	66,300.56
1,380.000 ALPHABET INC-CL C 02079K107	1,337.02	294,608.32	1,845,087.60	1.17	1,550,479.28
1,482.000 ALPHABET INC-CL A 02079K305	1,339.39	445,001.25	1,984,975.98	1.26	1,539,974.73
11,116.000 ALTRIA GROUP INC 02209S103	49.91	189,729.51	554,799.56	0.35	365,070.05

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,981.000 AMAZON.COM INC 023135106	1,847.84	272,369.31	3,660,571.04	2.33	3,388,201.73
2,083.000 AMBAC FINANCIAL GROUP INC 023139884	21.57	30,093.93	44,930.31	0.03	14,836.38
53.000 AMERCO 023586100	375.82	5,074.22	19,918.46	0.01	14,844.24
1,085.000 AMEREN CORP 023608102	76.80	33,801.46	83,328.00	0.05	49,526.54
227.000 AMERICAN ASSETS TRUST INC 024013104	45.90	5,077.99	10,419.30	0.01	5,341.31
796.000 AMERICAN CAMPUS COMMUNITIES IN 024835100	47.03	29,176.26	37,435.88	0.02	8,259.62
2,728.000 AMERICAN ELECTRIC POWER CO INC 025537101	94.51	100,427.23	257,823.28	0.16	157,396.05
988.000 AMERICAN EQUITY INVESTMENT LIF 025676206	29.93	22,096.47	29,570.84	0.02	7,474.37
3,219.000 AMERICAN EXPRESS CO 025816109	124.49	193,379.21	400,733.31	0.25	207,354.10
144.000 AMERICAN FINANCIAL GROUP INC/O 025932104	109.65	4,982.40	15,789.60	0.01	10,807.20

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,898.000 AMERICAN HOMES 4 RENT 02665T306	26.21	41,120.51	75,956.58	0.05	34,836.07
3,606.000 AMERICAN INTERNATIONAL GROUP I 026874784	51.33	95,912.00	185,095.98	0.12	89,183.98
604.000 AMERICAN SOFTWARE INC/GA 029683109	14.88	5,031.32	8,987.52	0.01	3,956.20
2,286.000 AMERICAN TOWER CORP 03027X100	229.82	101,514.18	525,368.52	0.33	423,854.34
1,132.000 AMERICAN WATER WORKS CO INC 030420103	122.85	28,899.96	139,066.20	0.09	110,166.24
1,128.000 AMERISOURCEBERGEN CORP 03073E105	85.02	37,000.21	95,902.56	0.06	58,902.35
1,535.000 AMERIPRISE FINANCIAL INC 03076C106	166.58	71,680.97	255,700.30	0.16	184,019.33
572.000 AMERIS BANCORP 03076K108	42.54	5,119.40	24,332.88	0.02	19,213.48
1,432.000 AMETEK INC 031100100	99.74	40,601.97	142,827.68	0.09	102,225.71
3,677.000 AMGEN INC 031162100	241.07	202,738.86	886,414.39	0.56	683,675.53

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,473.000 AMICUS THERAPEUTICS INC 03152W109	9.74	28,813.53	33,827.02	0.02	5,013.49
1,906.000 AMPHENOL CORP 032095101	108.23	31,153.95	206,286.38	0.13	175,132.43
1,426.000 ANALOG DEVICES INC 032654105	118.84	53,599.85	169,465.84	0.11	115,865.99
3,531.000 ANNALY CAPITAL MANAGEMENT INC 035710409	9.42	30,601.11	33,262.02	0.02	2,660.91
547.000 ANSYS INC 03662Q105	257.41	29,023.82	140,803.27	0.09	111,779.45
902.000 ANTHEM INC 036752103	302.03	138,869.41	272,431.06	0.17	133,561.65
4,041.000 ANTERO MIDSTREAM CORP 03676B102	7.59	29,120.40	30,671.19	0.02	1,550.79
1,367.000 APACHE CORP 037411105	25.59	29,210.95	34,981.53	0.02	5,770.58
759.000 APARTMENT INVESTMENT AND MANAG 03748R754	51.65	20,128.83	39,202.35	0.02	19,073.52
664.000 APERGY CORP 03755L104	33.78	10,649.31	22,429.92	0.01	11,780.61

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,394.000 APOLLO COMMERCIAL REAL ESTATE 03762U105	18.29	55,584.48	62,076.26	0.04	6,491.78
23,130.000 APPLE INC 037833100	293.65	254,966.62	6,792,124.50	4.32	6,537,157.88
146.000 APPLIED INDUSTRIAL TECHNOLOGIE 03820C105	66.69	4,991.74	9,736.74	0.01	4,745.00
5,571.000 APPLIED MATERIALS INC 038222105	61.04	74,130.68	340,053.84	0.22	265,923.16
1,028.000 AQUA AMERICA INC 03836W103	46.94	17,632.26	48,254.32	0.03	30,622.06
3,009.000 ARCHER-DANIELS-MIDLAND CO 039483102	46.35	93,918.41	139,467.15	0.09	45,548.74
3,367.000 ARCHROCK INC 03957W106	10.04	28,843.35	33,804.68	0.02	4,961.33
433.000 ARCOSA INC 039653100	44.55	5,891.40	19,290.15	0.01	13,398.75
295.000 ARISTA NETWORKS INC 040413106	203.40	43,057.45	60,003.00	0.04	16,945.55
1,851.000 ARMADA HOFFLER PROPERTIES INC 04208T108	18.35	27,020.34	33,965.85	0.02	6,945.51

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5.000 ARMSTRONG FLOORING INC 04238R106	4.27	56.42	21.35	0.00	-35.07
10.000 ARMSTRONG WORLD INDUSTRIES INC 04247X102	93.97	383.68	939.70	0.00	556.02
789.000 ARROW ELECTRONICS INC 042735100	84.74	26,447.28	66,859.86	0.04	40,412.58
257.799 ARROW FINANCIAL CORP 042744102	37.80	4,973.80	9,744.80	0.01	4,771.00
224.000 ARTESIAN RESOURCES CORP 043113208	37.21	5,028.80	8,335.04	0.01	3,306.24
294.000 ASBURY AUTOMOTIVE GROUP INC 043436104	111.79	5,092.08	32,866.26	0.02	27,774.18
579.000 ASHLAND GLOBAL HOLDINGS INC 044186104	76.53	15,946.99	44,310.87	0.03	28,363.88
504.000 ASPEN TECHNOLOGY INC 045327103	120.93	7,791.84	60,948.72	0.04	53,156.88
2,860.000 ASSOCIATED BANC-CORP 045487105	22.04	29,199.51	63,034.40	0.04	33,834.89
342.000 ASSURANT INC 04621X108	131.08	10,105.19	44,829.36	0.03	34,724.17

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802.000 ATLANTIC UNION BANKSHARES CORP 04911A107	37.55	9,587.27	30,115.10	0.02	20,527.83
538.000 ATMOS ENERGY CORP 049560105	111.86	17,382.78	60,180.68	0.04	42,797.90
14.000 ATRION CORP 049904105	751.50	3,289.44	10,521.00	0.01	7,231.56
1,560.000 AUTODESK INC 052769106	183.46	53,912.82	286,197.60	0.18	232,284.78
2,789.000 AUTOMATIC DATA PROCESSING INC 053015103	170.50	105,255.76	475,524.50	0.30	370,268.74
529.000 AUTONATION INC 05329W102	48.63	11,207.50	25,725.27	0.02	14,517.77
55.000 AUTOZONE INC 053332102	1,191.31	45,505.25	65,522.05	0.04	20,016.80
626.000 AVALONBAY COMMUNITIES INC 053484101	209.70	79,476.42	131,272.20	0.08	51,795.78
244.000 AVANOS MEDICAL INC 05350V106	33.70	5,303.86	8,222.80	0.01	2,918.94
788.000 AVANGRID INC 05351W103	51.16	34,077.37	40,314.08	0.03	6,236.71

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
640.000 AVERY DENNISON CORP 053611109	130.82	18,284.80	83,724.80	0.05	65,440.00
365.000 AVISTA CORP 05379B107	48.09	9,993.70	17,552.85	0.01	7,559.15
3,137.000 BGC PARTNERS INC 05541T101	5.94	6,927.89	18,633.78	0.01	11,705.89
327.000 BOK FINANCIAL CORP 05561Q201	87.40	15,020.32	28,579.80	0.02	13,559.48
630.000 BWX TECHNOLOGIES INC 05605H100	62.08	11,904.08	39,110.40	0.02	27,206.32
2,484.000 BAKER HUGHES CO 05722G100	25.63	51,734.30	63,664.92	0.04	11,930.62
356.000 BALCHEM CORP 057665200	101.63	24,365.36	36,180.28	0.02	11,814.92
1,704.000 BALL CORP 058498106	64.67	38,305.92	110,197.68	0.07	71,891.76
264.000 BANCFIRST CORP 05945F103	62.44	5,043.72	16,484.16	0.01	11,440.44
36,971.000 BANK OF AMERICA CORP 060505104	35.22	414,070.20	1,302,118.62	0.83	888,048.42

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
324.000 BANK OF HAWAII CORP 062540109	95.16	14,878.08	30,831.84	0.02	15,953.76
3,647.000 BANK OF NEW YORK MELLON CORP/T 064058100	50.33	112,431.82	183,553.51	0.12	71,121.69
209.000 BARNES GROUP INC 067806109	61.96	4,903.14	12,949.64	0.01	8,046.50
3,951.000 BAUDAX BIO INC 07160F107	6.92	16,278.12	27,340.92	0.02	11,062.80
3,403.000 BAXTER INTERNATIONAL INC 071813109	83.62	83,185.00	284,558.86	0.18	201,373.86
987.000 BEACON ROOFING SUPPLY INC 073685109	31.98	27,418.86	31,564.26	0.02	4,145.40
1,428.000 BECTON DICKINSON AND CO 075887109	271.97	99,915.23	388,373.16	0.25	288,457.93
282.000 BELDEN INC 077454106	55.00	9,145.26	15,510.00	0.01	6,364.74
703.000 BENCHMARK ELECTRONICS INC 08160H101	34.36	10,258.48	24,155.08	0.02	13,896.60
1,173.000 W R BERKLEY CORP 084423102	69.10	21,364.24	81,054.30	0.05	59,690.06

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
8,950.000 BERKSHIRE HATHAWAY INC 084670702	226.50	780,878.55	2,027,175.00	1.29	1,246,296.45
233.000 BERKSHIRE HILLS BANCORP INC 084680107	32.88	5,063.09	7,661.04	0.00	2,597.95
954.000 BERRY GLOBAL GROUP INC 08579W103	47.49	15,006.42	45,305.46	0.03	30,299.04
1,450.000 BEST BUY CO INC 086516101	87.80	17,574.00	127,310.00	0.08	109,736.00
517.000 BIG LOTS INC 089302103	28.72	10,407.37	14,848.24	0.01	4,440.87
1,228.000 BIOMARIN PHARMACEUTICAL INC 09061G101	84.55	30,086.00	103,827.40	0.07	73,741.40
928.000 BIOGEN INC 09062X103	296.73	69,770.70	275,365.44	0.18	205,594.74
203.000 BIO-TECHNE CORP 09073M104	219.51	14,837.10	44,560.53	0.03	29,723.43
457.000 BLACK KNIGHT INC 09215C105	64.48	4,637.78	29,467.36	0.02	24,829.58
188.000 BLACKBAUD INC 09227Q100	79.60	4,998.92	14,964.80	0.01	9,965.88

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
568.000 BLACKROCK INC 09247X101	502.70	100,837.94	285,533.60	0.18	184,695.66
899.000 BLACKSTONE MORTGAGE TRUST INC 09257W100	37.22	28,651.13	33,460.78	0.02	4,809.65
1,502.000 H&R BLOCK INC 093671105	23.48	22,412.96	35,266.96	0.02	12,854.00
360.000 BLUEBIRD BIO INC 09609G100	87.75	29,952.00	31,590.00	0.02	1,638.00
4,568.000 BLUEROCK RESIDENTIAL GROWTH RE 09627J102	12.05	39,607.37	55,044.40	0.03	15,437.03
2,930.000 BOEING CO/THE 097023105	325.76	229,432.65	954,476.80	0.61	725,044.15
255.000 BOOKING HOLDINGS INC 09857L108	2,053.73	95,568.68	523,701.15	0.33	428,132.47
1,035.000 BORGWARNER INC 099724106	43.38	40,613.22	44,898.30	0.03	4,285.08
58.000 BOSTON BEER CO INC/THE 100557107	377.85	5,150.40	21,915.30	0.01	16,764.90
772.000 BOSTON PRIVATE FINANCIAL HOLDI 101119105	12.03	4,701.48	9,287.16	0.01	4,585.68

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7,377.000 BOSTON SCIENTIFIC CORP 101137107	45.22	53,585.00	333,587.94	0.21	280,002.94
216.000 BOTTOMLINE TECHNOLOGIES DE INC 101388106	53.60	5,080.32	11,577.60	0.01	6,497.28
3,266.000 BOX INC 10316T104	16.78	42,294.70	54,803.48	0.03	12,508.78
1,128.000 BOYD GAMING CORP 103304101	29.94	7,185.36	33,772.32	0.02	26,586.96
2,159.000 BRANDYWINE REALTY TRUST 105368203	15.75	21,629.15	34,004.25	0.02	12,375.10
939.000 BRIGHTHOUSE FINANCIAL INC 10922N103	39.23	29,418.87	36,836.97	0.02	7,418.10
11,651.000 BRISTOL-MYERS SQUIBB CO 110122108	64.19	355,132.38	747,877.69	0.48	392,745.31
1,991.000 BRIXMOR PROPERTY GROUP INC 11120U105	21.61	29,342.38	43,025.51	0.03	13,683.13
685.000 BROADRIDGE FINANCIAL SOLUTIONS 11133T103	123.54	14,727.50	84,624.90	0.05	69,897.40
1,858.000 BROADCOM INC 11135F101	316.02	121,626.86	587,165.16	0.37	465,538.30

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548.000 BROOKLINE BANCORP INC 11373M107	16.46	5,025.16	9,020.08	0.01	3,994.92
1,382.000 BROWN & BROWN INC 115236101	39.48	17,406.29	54,561.36	0.03	37,155.07
1,317.000 BROWN-FORMAN CORP 115637209	67.60	21,085.96	89,029.20	0.06	67,943.24
50.000 BRUNOS INC NEW 116881202	0.00	500.00	0.00	0.00	-500.00
903.000 BRUNSWICK CORP/DE 117043109	59.98	20,341.83	54,161.94	0.03	33,820.11
248.000 BRYN MAWR BANK CORP 117665109	41.24	4,915.36	10,227.52	0.01	5,312.16
314.000 CBOE GLOBAL MARKETS INC 12503M108	120.00	7,570.54	37,680.00	0.02	30,109.46
1,423.000 CBRE GROUP INC 12504L109	61.29	32,425.28	87,215.67	0.06	54,790.39
929.000 CDK GLOBAL INC 12508E101	54.68	14,738.35	50,797.72	0.03	36,059.37
959.000 CF INDUSTRIES HOLDINGS INC 125269100	47.74	25,371.05	45,782.66	0.03	20,411.61

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2,451.000 CIGNA CORP 125523100	204.49	143,484.55	501,204.99	0.32	357,720.44
1,100.000 CIT GROUP INC 125581801	45.63	37,576.00	50,193.00	0.03	12,617.00
1,778.000 CME GROUP INC 12572Q105	200.72	108,823.62	356,880.16	0.23	248,056.54
1,589.000 CMS ENERGY CORP 125896100	62.84	30,429.35	99,852.76	0.06	69,423.41
2,691.000 CNO FINANCIAL GROUP INC 12621E103	18.13	17,478.63	48,787.83	0.03	31,309.20
5,571.000 CSX CORP 126408103	72.36	60,092.71	403,117.56	0.26	343,024.85
4,244.000 CNX RESOURCES CORP 12653C108	8.85	29,606.90	37,559.40	0.02	7,952.50
554.000 CVB FINANCIAL CORP 126600105	21.58	4,875.20	11,955.32	0.01	7,080.12
6,405.000 CVS HEALTH CORP 126650100	74.29	213,062.14	475,827.45	0.30	262,765.31
12.000 CABLE ONE INC 12685J105	1,488.47	1,876.41	17,861.64	0.01	15,985.23

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Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

PARAMETRIC US PI1 - [redacted]

12/31/2019

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,485.000 CABOT OIL & GAS CORP 127097103	17.41	38,182.03	43,263.85	0.03	5,081.82
1,601.000 CADENCE DESIGN SYSTEMS INC 127387108	69.36	16,346.21	111,045.36	0.07	94,699.15
4,580.000 CAESARS ENTERTAINMENT CORP 127686103	13.60	29,248.30	62,288.00	0.04	33,039.70
488.000 CALERES INC 129500104	23.75	5,016.64	11,590.00	0.01	6,573.36
279.000 CALIFORNIA WATER SERVICE GROUP 130788102	51.56	5,091.75	14,385.24	0.01	9,293.49
781.000 CALLAWAY GOLF CO 131193104	21.20	4,810.96	16,557.20	0.01	11,746.24
7,263.000 CALLON PETROLEUM CO 13123X102	4.83	28,439.64	35,080.29	0.02	6,640.65
428.000 CAMDEN PROPERTY TRUST 133131102	106.10	22,136.16	45,410.80	0.03	23,274.64
441.000 CAMPBELL SOUP CO 134429109	49.42	14,893.76	21,794.22	0.01	6,900.46
478.000 CANADIAN IMPERIAL BANK OF COMM 136069101	83.20	11,343.33	39,769.60	0.03	28,426.27

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PARAMETRIC US PI1 - [redacted] **12/31/2019**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
497.000 CANNAE HOLDINGS INC 13765N107	37.19	2,365.68	18,483.43	0.01	16,117.75
2,057.000 CAPITAL ONE FINANCIAL CORP 14040H105	102.91	107,744.99	211,685.87	0.13	103,940.88
1,511.000 CARDINAL HEALTH INC 14149Y108	50.58	67,508.92	76,426.38	0.05	8,917.46
2,992.000 CARETRUST REIT INC 14174T107	20.63	36,743.55	61,724.96	0.04	24,981.41
181.000 CARLISLE COS INC 142339100	161.84	9,945.69	29,293.04	0.02	19,347.35
1,537.000 CARMAX INC 143130102	87.67	40,100.33	134,748.79	0.09	94,648.46
1,620.000 CARNIVAL CORP 143658300	50.83	69,042.98	82,344.60	0.05	13,301.62
542.000 CARTER'S INC 146229109	109.34	22,250.67	59,262.28	0.04	37,011.61
113.000 CASEY'S GENERAL STORES INC 147528103	158.99	4,901.94	17,965.87	0.01	13,063.93
917.000 CATALENT INC 148806102	56.30	28,546.21	51,627.10	0.03	23,080.89

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,205.000 CATERPILLAR INC 149123101	147.68	200,099.37	473,314.40	0.30	273,215.03
471.000 CATHAY GENERAL BANCORP 149150104	38.05	6,579.87	17,921.55	0.01	11,341.68
1,122.000 CELANESE CORP 150870103	123.12	36,431.34	138,140.64	0.09	101,709.30
1,192.000 CENTENE CORP 15135B101	62.87	10,090.28	74,941.04	0.05	64,850.76
3,850.000 CENTERPOINT ENERGY INC 15189T107	27.27	55,009.40	104,989.50	0.07	49,980.10
794.000 CENTERSTATE BANK CORP 15201P109	24.98	5,065.72	19,834.12	0.01	14,768.40
1,057.000 CENTRAL GARDEN & PET CO 153527205	29.36	22,123.01	31,033.52	0.02	8,910.51
371.000 CENTRAL PACIFIC FINANCIAL CORP 154760409	29.58	4,889.59	10,974.18	0.01	6,084.59
2,366.000 CENTURYLINK INC 156700106	13.21	30,514.57	31,254.86	0.02	740.29
1,633.000 CERNER CORP 156782104	73.39	45,747.40	119,845.87	0.08	74,098.47

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,098.000 CHARTER COMMUNICATIONS INC 16119P108	485.08	64,992.71	532,617.84	0.34	467,625.13
608.000 CHATHAM LODGING TRUST 16208T102	18.34	10,019.84	11,150.72	0.01	1,130.88
1,072.000 CHEMOURS CO/THE 163851108	18.09	11,221.47	19,392.48	0.01	8,171.01
966.000 CHENIERE ENERGY INC 16411R208	61.07	22,907.61	58,993.62	0.04	36,086.01
366.000 CHESAPEAKE UTILITIES CORP 165303108	95.83	13,240.44	35,073.78	0.02	21,833.34
9,990.000 CHEVRON CORP 166764100	120.51	646,510.84	1,203,894.90	0.77	557,384.06
248.000 CHILDREN'S PLACE INC/THE 168905107	62.52	15,214.32	15,504.96	0.01	290.64
2,436.000 CHIMERA INVESTMENT CORP 16934Q208	20.56	32,886.00	50,084.16	0.03	17,198.16
90.000 CHIPOTLE MEXICAN GRILL INC 169656105	837.11	22,308.50	75,339.90	0.05	53,031.40
1,672.000 CHURCH & DWIGHT CO INC 171340102	70.34	41,186.43	117,608.48	0.07	76,422.05

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
345.000 CHURCHILL DOWNS INC 171484108	137.20	4,940.40	47,334.00	0.03	42,393.60
1,727.000 CIENA CORP 171779309	42.69	25,278.11	73,725.63	0.05	48,447.52
682.000 CIMAREX ENERGY CO 171798101	52.49	28,889.52	35,798.18	0.02	6,908.66
1.000 CINCINNATI BELL INC 171871502	10.47	14.96	10.47	0.00	-4.49
607.000 CINCINNATI FINANCIAL CORP 172062101	105.15	17,080.98	63,826.05	0.04	46,745.07
553.000 CINEMARK HOLDINGS INC 17243V102	33.85	11,082.12	18,719.05	0.01	7,636.93
266.000 CIRRUS LOGIC INC 172755100	82.41	3,777.20	21,921.06	0.01	18,143.86
20,704.000 CISCO SYSTEMS INC 17275R102	47.96	495,012.04	992,963.84	0.63	497,951.80
753.000 CINTAS CORP 172908105	269.08	26,575.77	202,617.24	0.13	176,041.47
12,123.000 CITIGROUP INC 172967424	79.89	494,588.83	968,506.47	0.62	473,917.64

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
918.000 CITIZENS FINANCIAL GROUP INC 174610105	40.61	30,422.52	37,279.98	0.02	6,857.46
1,336.000 CITRIX SYSTEMS INC 177376100	110.90	39,401.13	148,162.40	0.09	108,761.27
156.000 CITY HOLDING CO 177835105	81.95	4,907.76	12,784.20	0.01	7,876.44
389.000 CLEAN HARBORS INC 184496107	85.75	29,303.37	33,356.75	0.02	4,053.38
4,208.000 CLEVELAND-CLIFFS INC 185899101	8.40	28,892.92	35,347.20	0.02	6,454.28
1,068.000 CLOROX CO/THE 189054109	153.54	68,030.53	163,980.72	0.10	95,950.19
4,285.000 CLOUDERA INC 18914U100	11.63	28,693.07	49,834.55	0.03	21,141.48
158.000 COCA-COLA CONSOLIDATED INC 191098102	284.05	9,996.66	44,879.90	0.03	34,883.24
17,152.000 COCA-COLA CO/THE 191216100	55.35	402,471.36	949,363.20	0.60	546,891.84
5,786.000 COEUR MINING INC 192108504	8.08	30,352.57	46,750.88	0.03	16,398.31

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
560.000 COGENT COMMUNICATIONS HOLDINGS 19239V302	65.81	15,031.20	36,853.60	0.02	21,822.40
600.000 COGNEX CORP 192422103	56.04	5,055.00	33,624.00	0.02	28,569.00
3,947.000 COGNIZANT TECHNOLOGY SOLUTIONS 192446102	62.02	80,491.66	244,792.94	0.16	164,301.28
97.000 COHERENT INC 192479103	166.35	5,028.48	16,135.95	0.01	11,107.47
4,642.000 COLGATE-PALMOLIVE CO 194162103	68.84	145,427.35	319,555.28	0.20	174,127.93
5,758.000 COLONY CAPITAL INC 19626G108	4.75	27,729.77	27,350.50	0.02	-379.27
529.000 COLUMBIA BANKING SYSTEM INC 197236102	40.69	9,517.21	21,522.37	0.01	12,005.16
25,258.000 COMCAST CORP 20030N101	44.97	309,323.78	1,135,852.26	0.72	826,528.48
453.000 COMERICA INC 200340107	71.75	16,605.74	32,502.75	0.02	15,897.01
1,193.000 COMMERCE BANCSHARES INC/MO 200525103	67.94	28,764.05	81,052.42	0.05	52,288.37

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,375.000 COMMERCIAL METALS CO 201723103	22.27	19,717.50	30,621.25	0.02	10,903.75
2,552.000 COMMSCOPE HOLDING CO INC 20337X109	14.19	29,008.48	36,212.88	0.02	7,204.40
219.000 COMMUNITY BANK SYSTEM INC 203607106	70.94	5,315.13	15,535.86	0.01	10,220.73
838.000 COMMUNITY HEALTHCARE TRUST INC 20369C106	42.86	29,455.70	35,916.68	0.02	6,460.98
205.000 COMMUNITY TRUST BANCORP INC 204149108	46.64	5,029.95	9,561.20	0.01	4,531.25
2,257.000 CONAGRA BRANDS INC 205887102	34.24	42,856.92	77,279.68	0.05	34,422.76
697.000 CONCHO RESOURCES INC 20605P101	87.57	36,369.46	61,036.29	0.04	24,666.83
4,909.000 CONDUENT INC 206787103	6.20	30,072.62	30,435.80	0.02	363.18
6,514.000 CONOCOPHILLIPS 20825C104	65.03	299,688.32	423,605.42	0.27	123,917.10
1,353.000 CONSOLIDATED EDISON INC 209115104	90.47	63,200.39	122,405.91	0.08	59,205.52

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
693.000 CONSTELLATION BRANDS INC 21036P108	189.75	19,257.99	131,496.75	0.08	112,238.76
159.000 COOPER COS INC/THE 216648402	321.29	21,814.66	51,085.11	0.03	29,270.45
364.000 COOPER TIRE & RUBBER CO 216831107	28.75	6,329.96	10,465.00	0.01	4,135.04
811.000 COPART INC 217204106	90.94	35,301.92	73,752.34	0.05	38,450.42
263.000 CORESITE REALTY CORP 21870Q105	112.12	22,139.34	29,487.56	0.02	7,348.22
192.000 CORELOGIC INC/UNITED STATES 21871D103	43.71	5,018.88	8,392.32	0.01	3,373.44
4,480.000 CORNING INC 219350105	29.11	55,819.66	130,412.80	0.08	74,593.14
3,411.000 CORTEVA INC 22052L104	29.56	62,614.20	100,829.16	0.06	38,214.96
2,572.000 COSTCO WHOLESALE CORP 22160K105	293.92	128,783.64	755,962.24	0.48	627,178.60
88.000 COSTAR GROUP INC 22160N109	598.30	4,916.56	52,650.40	0.03	47,733.84

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
4,310.000 COTY INC 222070203	11.25	27,955.35	48,487.50	0.03	20,532.15
474.000 COUPA SOFTWARE INC 22266L106	146.25	28,416.30	69,322.50	0.04	40,906.20
928.000 COUSINS PROPERTIES INC 222795502	41.20	29,942.27	38,233.60	0.02	8,291.33
104.000 CRANE CO 224399105	86.38	4,877.60	8,983.52	0.01	4,105.92
82.000 CREDIT ACCEPTANCE CORP 225310101	442.33	30,471.20	36,271.06	0.02	5,799.86
697.000 CREE INC 225447101	46.15	29,078.84	32,166.55	0.02	3,087.71
2,043.000 CROWN CASTLE INTERNATIONAL COR 22822V101	142.15	100,114.23	290,412.45	0.18	190,298.22
531.000 CROWN HOLDINGS INC 228368106	72.54	18,044.86	38,518.74	0.02	20,473.88
1,197.000 CUBESMART 229663109	31.48	22,013.13	37,681.56	0.02	15,668.43
497.000 CUMMINS INC 231021106	178.96	24,037.52	88,943.12	0.06	64,905.60

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
158.000 CURTISS-WRIGHT CORP 231561101	140.89	4,942.24	22,260.62	0.01	17,318.38
527.000 CYRUSONE INC 23283R100	65.43	29,538.35	34,481.61	0.02	4,943.26
1,729.000 DR HORTON INC 23331A109	52.75	24,185.23	91,204.75	0.06	67,019.52
1,473.000 DTE ENERGY CO 233331107	129.87	61,570.23	191,298.51	0.12	129,728.28
1,297.000 DXC TECHNOLOGY CO 23355L106	37.59	30,760.27	48,754.23	0.03	17,993.96
933.000 DANA INC 235825205	18.20	11,447.91	16,980.60	0.01	5,532.69
3,426.000 DANAHER CORP 235851102	153.48	89,503.72	525,822.48	0.33	436,318.76
480.000 DARDEN RESTAURANTS INC 237194105	109.01	18,366.12	52,324.80	0.03	33,958.68
1,553.000 DARLING INGREDIENTS INC 237266101	28.08	23,051.12	43,608.24	0.03	20,557.12
1,010.000 DAVITA INC 23918K108	75.03	28,274.95	75,780.30	0.05	47,505.35

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
108.000 DECKERS OUTDOOR CORP 243537107	168.86	5,114.88	18,236.88	0.01	13,122.00
1,281.000 DEERE & CO 244199105	173.26	54,291.54	221,946.06	0.14	167,654.52
295.000 DELEK US HOLDINGS INC 24665A103	33.53	5,150.79	9,891.35	0.01	4,740.56
4,544.000 DELTA AIR LINES INC 247361702	58.48	57,956.86	265,733.12	0.17	207,776.26
306.000 DELUXE CORP 248019101	49.92	7,203.24	15,275.52	0.01	8,072.28
1,279.000 DENNY'S CORP 24869P104	19.88	4,898.57	25,426.52	0.02	20,527.95
1,430.000 DENTSPLY SIRONA INC 24906P109	56.59	41,952.38	80,923.70	0.05	38,971.32
1,822.000 DESIGNER BRANDS INC 250565108	15.74	27,817.83	28,678.28	0.02	860.45
1,408.000 DEVON ENERGY CORP 25179M103	25.97	28,524.04	36,565.76	0.02	8,041.72
677.000 DEXCOM INC 252131107	218.74	45,408.09	148,086.98	0.09	102,678.89

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66.000 DIAMOND HILL INVESTMENT GROUP 25264R207	140.46	5,039.10	9,270.36	0.01	4,231.26
5,024.000 DIAMOND OFFSHORE DRILLING INC 25271C102	7.19	28,666.92	36,122.56	0.02	7,455.64
868.000 DIAMONDBACK ENERGY INC 25278X109	92.86	71,633.60	80,602.48	0.05	8,968.88
1,013.000 DICK'S SPORTING GOODS INC 253393102	49.49	29,782.13	50,133.37	0.03	20,351.24
1,008.000 DIGITAL REALTY TRUST INC 253868103	119.74	66,372.33	120,697.92	0.08	54,325.59
9,505.000 WALT DISNEY CO/THE 254687106	144.63	309,028.08	1,374,708.15	0.87	1,065,680.07
3,192.000 DISCOVER FINANCIAL SERVICES 254709108	84.82	76,838.66	270,745.44	0.17	193,906.78
962.000 DISH NETWORK CORP 25470M109	35.47	17,762.87	34,122.14	0.02	16,359.27
662.000 DOCUSIGN INC 256163106	74.11	29,273.64	49,060.82	0.03	19,787.18
297.000 DOLBY LABORATORIES INC 25659T107	68.80	9,771.30	20,433.60	0.01	10,662.30

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1,022.000 DOLLAR GENERAL CORP 256677105	155.98	53,146.20	159,411.56	0.10	106,265.36
895.000 DOLLAR TREE INC 256746108	94.05	27,793.35	84,174.75	0.05	56,381.40
4,089.000 DOMINION ENERGY INC 25746U109	82.82	180,630.69	338,650.98	0.22	158,020.29
368.000 DOMINO'S PIZZA INC 25754A201	293.78	9,126.40	108,111.04	0.07	98,984.64
678.000 DONALDSON CO INC 257651109	57.62	19,695.90	39,066.36	0.02	19,370.46
941.000 DOUGLAS EMMETT INC 25960P109	43.90	15,272.43	41,309.90	0.03	26,037.47
352.000 DOUGLAS DYNAMICS INC 25960R105	55.00	5,047.68	19,360.00	0.01	14,312.32
1,328.000 DOVER CORP 260003108	115.26	42,175.78	153,065.28	0.10	110,889.50
2,642.000 DOW INC 260557103	54.73	85,308.99	144,596.66	0.09	59,287.67
1,680.000 DRIL-QUIP INC 262037104	46.91	47,658.20	78,808.80	0.05	31,150.60

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1,518.000 DROPBOX INC 26210C104	17.91	30,463.67	27,187.38	0.02	-3,276.29
2,075.000 DUKE REALTY CORP 264411505	34.67	24,341.05	71,940.25	0.05	47,599.20
3,365.000 DUKE ENERGY CORP 26441C204	91.21	178,374.92	306,921.65	0.20	128,546.73
668.000 DUNKIN' BRANDS GROUP INC 265504100	75.54	21,616.48	50,460.72	0.03	28,844.24
3,411.000 DUPONT DE NEMOURS INC 26614N102	64.20	165,509.77	218,986.20	0.14	53,476.43
321.000 DYCOM INDUSTRIES INC 267475101	47.15	4,798.95	15,135.15	0.01	10,336.20
2,999.000 EOG RESOURCES INC 26875P101	83.76	118,497.55	251,196.24	0.16	132,698.69
2,924.000 EQT CORP 26884L109	10.90	28,967.22	31,871.60	0.02	2,904.38
278.000 EPR PROPERTIES 26884U109	70.64	12,782.44	19,637.92	0.01	6,855.48
166.000 EAGLE BANCORP INC 268948106	48.63	1,933.15	8,072.58	0.01	6,139.43

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PARAMETRIC US PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,013.000 E*TRADE FINANCIAL CORP 269246401	45.37	9,035.96	45,959.81	0.03	36,923.85
952.000 EAST WEST BANCORP INC 27579R104	48.70	17,678.64	46,362.40	0.03	28,683.76
304.000 EASTMAN CHEMICAL CO 277432100	79.26	18,231.76	24,095.04	0.02	5,863.28
6,217.000 EBAY INC 278642103	36.11	74,670.96	224,495.87	0.14	149,824.91
541.000 ECHOSTAR CORP 278768106	43.31	8,861.63	23,430.71	0.01	14,569.08
1,513.000 ECOLAB INC 278865100	192.99	68,501.50	291,993.87	0.19	223,492.37
2,898.000 EDISON INTERNATIONAL 281020107	75.41	126,569.86	218,538.18	0.14	91,968.32
785.000 EDWARDS LIFESCIENCES CORP 28176E108	233.29	77,361.75	183,132.65	0.12	105,770.90
584.000 EL PASO ELECTRIC CO 283677854	67.89	23,414.48	39,647.76	0.03	16,233.28
1,109.000 ELANCO ANIMAL HEALTH INC 28414H103	29.45	30,097.71	32,660.05	0.02	2,562.34

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,799.000 ELECTRONIC ARTS INC 285512109	107.51	32,481.90	193,410.49	0.12	160,928.59
398.000 EMCOR GROUP INC 29084Q100	86.30	11,311.16	34,347.40	0.02	23,036.24
1,745.000 EMERSON ELECTRIC CO 291011104	76.26	90,234.86	133,073.70	0.08	42,838.84
315.000 EMPLOYERS HOLDINGS INC 292218104	41.75	5,021.10	13,151.25	0.01	8,130.15
220.000 ENCORE WIRE CORP 292562105	57.40	5,108.40	12,628.00	0.01	7,519.60
380.000 ENCOMPASS HEALTH CORP 29261A100	69.27	10,028.20	26,322.60	0.02	16,294.40
198.000 ENERGIZER HOLDINGS INC 29272W109	50.22	3,887.05	9,943.56	0.01	6,056.51
202.000 ENERSYS 29275Y102	74.83	5,369.16	15,115.66	0.01	9,746.50
800.000 ENTEGRIS INC 29362U104	50.09	7,832.00	40,072.00	0.03	32,240.00
335.000 ENTERGY CORP 29364G103	119.80	27,423.10	40,133.00	0.03	12,709.90

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
390.000 ENTERPRISE FINANCIAL SERVICES 293712105	48.21	5,190.90	18,801.90	0.01	13,611.00
576.000 EQUIFAX INC 294429105	140.12	21,032.64	80,709.12	0.05	59,676.48
358.000 EQUINIX INC 29444U700	583.70	61,035.05	208,964.60	0.13	147,929.55
973.000 EQUITY COMMONWEALTH 294628102	32.83	24,892.15	31,943.59	0.02	7,051.44
584.000 EQUITY LIFESTYLE PROPERTIES IN 29472R108	70.39	9,962.80	41,107.76	0.03	31,144.96
1,326.000 EQUITY RESIDENTIAL 29476L107	80.92	66,961.62	107,299.92	0.07	40,338.30
322.000 ESSEX PROPERTY TRUST INC 297178105	300.86	49,314.16	96,876.92	0.06	47,562.76
321.000 EURONET WORLDWIDE INC 298736109	157.56	4,827.84	50,576.76	0.03	45,748.92
623.000 EVERCORE INC 29977A105	74.76	16,135.62	46,575.48	0.03	30,439.86
1,367.000 EVERGY INC 30034W106	65.09	47,277.23	88,978.03	0.06	41,700.80

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,700.000 EVERSOURCE ENERGY 30040W108	85.07	57,489.19	144,619.00	0.09	87,129.81
1,031.000 EXACT SCIENCES CORP 30063P105	92.48	10,907.98	95,346.88	0.06	84,438.90
4,920.000 EXELON CORP 30161N101	45.59	169,250.14	224,302.80	0.14	55,052.66
1,706.000 EXELIXIS INC 30161Q104	17.62	27,138.93	30,059.72	0.02	2,920.79
875.000 EXPEDIA GROUP INC 30212P303	108.14	37,524.54	94,622.50	0.06	57,097.96
422.000 EXPEDITORS INTERNATIONAL OF WA 302130109	78.02	19,023.76	32,924.44	0.02	13,900.68
744.000 EXPONENT INC 30214U102	69.01	9,830.10	51,343.44	0.03	41,513.34
15,000.000 EXPRESS INC 30219E103	4.87	29,630.00	73,050.00	0.05	43,420.00
559.000 EXTRA SPACE STORAGE INC 30225T102	105.62	11,453.91	59,041.58	0.04	47,587.67
18,650.000 EXXON MOBIL CORP 30231G102	69.78	1,230,700.98	1,301,397.00	0.83	70,696.02

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
712.000 FLIR SYSTEMS INC 302445101	52.07	25,354.32	37,073.84	0.02	11,719.52
780.000 FMC CORP 302491303	99.82	48,418.78	77,859.60	0.05	29,440.82
3,039.000 FNB CORP/PA 302520101	12.70	29,984.73	38,595.30	0.02	8,610.57
11,482.000 FACEBOOK INC 30303M102	205.25	460,369.73	2,356,680.50	1.50	1,896,310.77
238.000 FAIR ISAAC CORP 303250104	374.68	6,899.62	89,173.84	0.06	82,274.22
123.000 FARO TECHNOLOGIES INC 311642102	50.35	5,098.35	6,193.05	0.00	1,094.70
244.000 FEDERAL REALTY INVESTMENT TRUS 313747206	128.73	29,636.24	31,410.12	0.02	1,773.88
1,281.000 FEDEX CORP 31428X106	151.21	137,787.43	193,700.01	0.12	55,912.58
511.000 F5 NETWORKS INC 315616102	139.65	43,737.58	71,361.15	0.05	27,623.57
2,536.000 FIDELITY NATIONAL INFORMATION 31620M106	139.09	74,210.18	352,732.24	0.22	278,522.06

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,493.000 FIDELITY NATIONAL FINANCIAL IN 31620R303	45.35	12,441.83	67,707.55	0.04	55,265.72
4,665.000 FIFTH THIRD BANCORP 316773100	30.74	67,771.04	143,402.10	0.09	75,631.06
311.000 FINANCIAL INSTITUTIONS INC 317585404	32.10	5,010.21	9,983.10	0.01	4,972.89
626.000 FIRST AMERICAN FINANCIAL CORP 31847R102	58.32	9,615.36	36,508.32	0.02	26,892.96
5,524.000 FIRST BANCORP/PUERTO RICO 318672706	10.59	22,537.92	58,499.16	0.04	35,961.24
322.000 FIRST BUSEY CORP 319383204	27.50	5,119.80	8,855.00	0.01	3,735.20
77.000 FIRST CITIZENS BANCSHARES INC/ 31946M103	532.21	15,462.06	40,980.17	0.03	25,518.11
1,067.000 FIRST COMMONWEALTH FINANCIAL C 319829107	14.51	5,217.63	15,482.17	0.01	10,264.54
732.000 FIRST DEFIANCE FINANCIAL CORP 32006W106	31.49	5,223.11	23,050.68	0.01	17,827.57
1,249.000 FIRST FINANCIAL BANCORP 320209109	25.44	11,514.53	31,774.56	0.02	20,260.03

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
752.000 FIRST FINANCIAL BANKSHARES INC 32020R109	35.10	6,282.96	26,395.20	0.02	20,112.24
557.000 FIRST HORIZON NATIONAL CORP 320517105	16.56	5,590.54	9,223.92	0.01	3,633.38
465.000 FIRST INDUSTRIAL REALTY TRUST 32054K103	41.51	4,998.75	19,302.15	0.01	14,303.40
426.000 FIRST OF LONG ISLAND CORP/THE 320734106	25.08	5,097.33	10,684.08	0.01	5,586.75
974.000 FIRST MIDWEST BANCORP INC/IL 320867104	23.06	10,412.72	22,460.44	0.01	12,047.72
456.000 FIRST REPUBLIC BANK/CA 33616C100	117.45	14,287.12	53,557.20	0.03	39,270.08
820.000 FIRST SOLAR INC 336433107	55.96	33,229.86	45,887.20	0.03	12,657.34
269.000 1ST SOURCE CORP 336901103	51.88	4,912.90	13,955.72	0.01	9,042.82
187.000 FIRSTCASH INC 33767D105	80.63	7,278.04	15,077.81	0.01	7,799.77
3,421.000 FISERV INC 337738108	115.63	40,359.60	395,570.23	0.25	355,210.63

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,894.000 FIRSTENERGY CORP 337932107	48.60	67,664.30	92,048.40	0.06	24,384.10
308.000 FIVE BELOW INC 33829M101	127.86	29,444.80	39,380.88	0.03	9,936.08
341.000 FLEETCOR TECHNOLOGIES INC 339041105	287.72	51,405.39	98,112.52	0.06	46,707.13
1,533.000 FLUOR CORP 343412102	18.88	29,706.87	28,943.04	0.02	-763.83
1,029.000 FOOT LOCKER INC 344849104	38.99	27,334.65	40,120.71	0.03	12,786.06
14,219.000 FORD MOTOR CO 345370860	9.30	115,245.00	132,236.70	0.08	16,991.70
871.000 FORRESTER RESEARCH INC 346563109	41.70	30,380.48	36,320.70	0.02	5,940.22
1,713.000 FORTIVE CORP 34959J108	76.39	29,205.83	130,856.07	0.08	101,650.24
1,350.000 FORTUNE BRANDS HOME & SECURITY 34964C106	65.34	30,829.20	88,209.00	0.06	57,379.80
153.000 FORWARD AIR CORP 349853101	69.95	4,974.03	10,702.35	0.01	5,728.32

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,269.000 FOSSIL GROUP INC 34988V106	7.88	23,164.85	25,759.72	0.02	2,594.87
230.000 FRANKLIN ELECTRIC CO INC 353514102	57.32	5,146.25	13,183.60	0.01	8,037.35
7,121.000 FREEPORT-MCMORAN INC 35671D857	13.12	41,048.06	93,427.52	0.06	52,379.46
3,596.000 FRONT YARD RESIDENTIAL CORP 35904G107	12.34	33,609.62	44,374.64	0.03	10,765.02
882.000 FRONTDOOR INC 35905A109	47.42	29,591.10	41,824.44	0.03	12,233.34
228.000 HB FULLER CO 359694106	51.57	5,344.32	11,757.96	0.01	6,413.64
2,206.000 FULTON FINANCIAL CORP 360271100	17.43	22,721.80	38,450.58	0.02	15,728.78
135.000 GATX CORP 361448103	82.85	4,895.10	11,184.75	0.01	6,289.65
551.000 GCI LIBERTY INC 36164V305	70.85	5,579.35	39,038.35	0.02	33,459.00
556.000 GCP APPLIED TECHNOLOGIES INC 36164Y101	22.71	5,265.95	12,626.76	0.01	7,360.81

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
658.000 ARTHUR J GALLAGHER & CO 363576109	95.23	18,443.74	62,661.34	0.04	44,217.60
1,252.000 GAMING AND LEISURE PROPERTIES 36467J108	43.05	35,848.12	53,898.60	0.03	18,050.48
542.000 GANNETT CO INC 36472T109	6.38	3,387.50	3,457.96	0.00	70.46
459.000 GARRETT MOTION INC 366505105	9.99	1,991.30	4,585.41	0.00	2,594.11
848.000 GARTNER INC 366651107	154.10	36,692.84	130,676.80	0.08	93,983.96
269.000 GENERAC HOLDINGS INC 368736104	100.59	5,054.51	27,058.71	0.02	22,004.20
1,665.000 GENERAL DYNAMICS CORP 369550108	176.35	119,872.17	293,622.75	0.19	173,750.58
31,027.000 GENERAL ELECTRIC CO 369604103	11.16	239,580.87	346,261.32	0.22	106,680.45
4,189.000 GENERAL MILLS INC 370334104	53.56	119,272.77	224,362.84	0.14	105,090.07
5,389.000 GENERAL MOTORS CO 37045V100	36.60	151,242.57	197,237.40	0.13	45,994.83

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
329.000 GENUINE PARTS CO 372460105	106.23	17,544.25	34,949.67	0.02	17,405.42
457.000 GIBRALTAR INDUSTRIES INC 374689107	50.44	4,958.45	23,051.08	0.01	18,092.63
7,374.000 GILEAD SCIENCES INC 375558103	64.98	160,861.68	479,162.52	0.30	318,300.84
857.000 GLACIER BANCORP INC 37637Q105	45.99	10,690.57	39,413.43	0.03	28,722.86
1,497.000 GLADSTONE COMMERCIAL CORP 376536108	21.86	22,385.71	32,724.42	0.02	10,338.71
3,058.000 P H GLATFELTER CO 377316104	18.30	32,159.87	55,961.40	0.04	23,801.53
1,110.000 GLAUKOS CORP 377322102	54.47	29,991.65	60,461.70	0.04	30,470.05
1,662.000 GLOBAL NET LEASE INC 379378201	20.28	29,281.13	33,705.36	0.02	4,424.23
2,353.000 GLOBAL PAYMENTS INC 37940X102	182.56	55,192.52	429,563.68	0.27	374,371.16
819.000 GLOBE LIFE INC 37959E102	105.25	22,753.64	86,199.75	0.05	63,446.11

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480.000 GODADDY INC 380237107	67.92	30,748.80	32,601.60	0.02	1,852.80
7,281.000 GOLD RESOURCE CORP 38068T105	5.54	30,663.10	40,336.74	0.03	9,673.64
1,444.000 GOLDMAN SACHS GROUP INC/THE 38141G104	229.93	232,324.66	332,018.92	0.21	99,694.26
556.000 W R GRACE & CO 38388F108	69.85	21,402.92	38,836.60	0.02	17,433.68
2,187.000 GRACO INC 384109104	52.00	23,524.83	113,724.00	0.07	90,199.17
12.000 GRAHAM HOLDINGS CO 384637104	638.99	2,925.27	7,667.88	0.00	4,742.61
276.000 WW GRAINGER INC 384802104	338.52	54,853.32	93,431.52	0.06	38,578.20
377.000 GRAND CANYON EDUCATION INC 38526M106	95.79	5,108.35	36,112.83	0.02	31,004.48
2,181.000 GRAPHIC PACKAGING HOLDING CO 388689101	16.65	10,425.85	36,313.65	0.02	25,887.80
269.000 GREAT SOUTHERN BANCORP INC 390905107	63.32	4,898.49	17,033.08	0.01	12,134.59

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567.000 GREEN DOT CORP 39304D102	23.30	7,189.56	13,211.10	0.01	6,021.54
249.000 GREENBRIER COS INC/THE 393657101	32.43	4,932.69	8,075.07	0.01	3,142.38
511.000 GRIFFON CORP 398433102	20.33	4,997.58	10,388.63	0.01	5,391.05
131.000 GROUP 1 AUTOMOTIVE INC 398905109	100.00	5,148.30	13,100.00	0.01	7,951.70
737.000 GRUBHUB INC 400110102	48.64	23,326.05	35,847.68	0.02	12,521.63
414.000 GUIDEWIRE SOFTWARE INC 40171V100	109.77	23,486.22	45,444.78	0.03	21,958.56
379.000 H&E EQUIPMENT SERVICES INC 404030108	33.43	4,839.83	12,669.97	0.01	7,830.14
853.000 HCA HEALTHCARE INC 40412C101	147.81	67,070.74	126,081.93	0.08	59,011.19
267.000 HNI CORP 404251100	37.46	6,442.71	10,001.82	0.01	3,559.11
1,756.000 HMS HOLDINGS CORP 40425J101	29.60	29,532.14	51,977.60	0.03	22,445.46

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1,713.000 HP INC 40434L105	20.55	16,412.93	35,202.15	0.02	18,789.22
1,479.000 HALLIBURTON CO 406216101	24.47	28,764.15	36,191.13	0.02	7,426.98
758.000 HALOZYME THERAPEUTICS INC 40637H109	17.73	4,972.48	13,439.34	0.01	8,466.86
110.000 HAMILTON BEACH BRANDS HOLDING 40701T104	19.10	1,114.96	2,101.00	0.00	986.04
3,440.000 HANESBRANDS INC 410345102	14.85	25,923.08	51,084.00	0.03	25,160.92
1,625.000 HANMI FINANCIAL CORP 410495204	20.00	30,303.12	32,491.88	0.02	2,188.76
1,521.000 HANNON ARMSTRONG SUSTAINABLE I 41068X100	32.18	29,078.91	48,945.78	0.03	19,866.87
136.000 HANOVER INSURANCE GROUP INC/TH 410867105	136.67	4,955.84	18,587.12	0.01	13,631.28
2,153.000 HARTFORD FINANCIAL SERVICES GR 416515104	60.77	52,917.27	130,837.81	0.08	77,920.54
699.000 HASBRO INC 418056107	105.61	41,491.32	73,821.39	0.05	32,330.07

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PARAMETRIC US PI1 - [redacted] **12/31/2019**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
879.000 HAWAIIAN HOLDINGS INC 419879101	29.29	5,054.25	25,745.91	0.02	20,691.66
1,030.000 HAYNES INTERNATIONAL INC 420877201	35.78	30,220.05	36,853.40	0.02	6,633.35
1,218.000 HEALTHCARE SERVICES GROUP INC 421906108	24.32	29,949.53	29,621.76	0.02	-327.77
238.000 HEALTHCARE REALTY TRUST INC 421946104	33.37	4,874.24	7,942.06	0.01	3,067.82
1,131.000 HEALTHCARE TRUST OF AMERICA IN 42225P501	30.28	29,778.57	34,246.68	0.02	4,468.11
2,533.000 HEALTHPEAK PROPERTIES INC 42250P103	34.47	59,213.87	87,312.51	0.06	28,098.64
19,109.000 HECLA MINING CO 422704106	3.39	30,674.94	64,779.51	0.04	34,104.57
306.000 HEICO CORP 422806109	114.15	5,339.38	34,929.90	0.02	29,590.52
514.000 JACK HENRY & ASSOCIATES INC 426281101	145.67	15,060.20	74,874.38	0.05	59,814.18
985.000 HERITAGE COMMERCE CORP 426927109	12.83	4,869.25	12,637.55	0.01	7,768.30

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,099.000 HERITAGE FINANCIAL CORP/WA 42722X106	28.30	16,066.78	31,101.70	0.02	15,034.92
612.000 HERSHEY CO/THE 427866108	146.98	33,932.30	89,951.76	0.06	56,019.46
1,033.000 HESS CORP 42809H107	66.81	43,078.89	69,014.73	0.04	25,935.84
5,094.000 HEWLETT PACKARD ENTERPRISE CO 42824C109	15.86	30,749.99	80,790.84	0.05	50,040.85
238.000 HEXCEL CORP 428291108	73.31	4,990.86	17,447.78	0.01	12,456.92
151.000 HIGHWOODS PROPERTIES INC 431284108	48.91	4,898.44	7,385.41	0.00	2,486.97
149.000 HILL-ROM HOLDINGS INC 431475102	113.53	5,264.17	16,915.97	0.01	11,651.80
642.000 HOLLYFRONTIER CORP 436106108	50.71	30,180.42	32,555.82	0.02	2,375.40
1,984.000 HOLOGIC INC 436440101	52.21	36,485.40	103,584.64	0.07	67,099.24
2,217.000 HOME BANCSHARES INC/AR 436893200	19.66	22,420.27	43,586.22	0.03	21,165.95

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6,048.000 HOME DEPOT INC/THE 437076102	218.38	221,178.40	1,320,762.24	0.84	1,099,583.84
338.000 HOMESTREET INC 43785V102	34.00	4,912.76	11,492.00	0.01	6,579.24
4,310.000 HONEYWELL INTERNATIONAL INC 438516106	177.00	170,214.10	762,870.00	0.48	592,655.90
1,335.000 HOPE BANCORP INC 43940T109	14.86	10,325.32	19,838.10	0.01	9,512.78
331.000 HORACE MANN EDUCATORS CORP 440327104	43.66	4,951.76	14,451.46	0.01	9,499.70
1,006.000 HORMEL FOODS CORP 440452100	45.11	20,941.61	45,380.66	0.03	24,439.05
2,321.000 HOST HOTELS & RESORTS INC 44107P104	18.55	38,172.98	43,054.55	0.03	4,881.57
185.000 HOWARD HUGHES CORP/THE 44267D107	126.80	15,117.50	23,458.00	0.01	8,340.50
960.000 HUDSON PACIFIC PROPERTIES INC 444097109	37.65	21,638.48	36,144.00	0.02	14,505.52
971.000 HUMANA INC 444859102	366.52	61,969.90	355,890.92	0.23	293,921.02

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544.000 JB HUNT TRANSPORT SERVICES INC 445658107	116.78	24,871.68	63,528.32	0.04	38,656.64
10,092.000 HUNTINGTON BANCSHARES INC/OH 446150104	15.08	61,809.11	152,187.36	0.10	90,378.25
371.000 HUNTINGTON INGALLS INDUSTRIES 446413106	250.88	13,890.61	93,076.48	0.06	79,185.87
1,640.000 HUNTSMAN CORP 447011107	24.16	29,959.60	39,622.40	0.03	9,662.80
263.000 HYATT HOTELS CORP 448579102	89.71	10,325.38	23,593.73	0.01	13,268.35
29.000 HYSTER-YALE MATERIALS HANDLING 449172105	58.96	903.94	1,709.84	0.00	805.90
437.000 IAC/INTERACTIVECORP 44919P508	249.11	15,950.50	108,861.07	0.07	92,910.57
198.000 ICF INTERNATIONAL INC 44925C103	91.62	4,950.00	18,140.76	0.01	13,190.76
182.000 ICU MEDICAL INC 44930G107	187.12	29,560.44	34,055.84	0.02	4,495.40
2,377.000 ISTAR INC 45031U101	14.51	15,359.36	34,490.27	0.02	19,130.91

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809.000 ITT INC 45073V108	73.91	15,859.06	59,793.19	0.04	43,934.13
315.000 IDACORP INC 451107106	106.80	15,032.32	33,642.00	0.02	18,609.68
287.000 IDEX CORP 45167R104	172.00	14,860.69	49,364.00	0.03	34,503.31
684.000 IDEXX LABORATORIES INC 45168D104	261.13	25,571.34	178,612.92	0.11	153,041.58
2,482.000 ILLINOIS TOOL WORKS INC 452308109	179.63	111,867.47	445,841.66	0.28	333,974.19
752.000 ILLUMINA INC 452327109	331.74	29,561.12	249,468.48	0.16	219,907.36
1,021.000 INCYTE CORP 45337C102	87.32	16,407.47	89,153.72	0.06	72,746.25
2,913.000 INDEPENDENCE REALTY TRUST INC 45378A106	14.08	23,595.30	41,015.04	0.03	17,419.74
190.000 INDEPENDENT BANK CORP 453836108	83.25	4,932.40	15,817.50	0.01	10,885.10
259.000 INGEVITY CORP 45688C107	87.38	4,733.04	22,631.42	0.01	17,898.38

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
301.000 INGLES MARKETS INC 457030104	47.51	4,809.98	14,300.51	0.01	9,490.53
455.000 INGREDION INC 457187102	92.95	24,374.35	42,292.25	0.03	17,917.90
305.000 INSIGHT ENTERPRISES INC 45765U103	70.29	5,072.15	21,438.45	0.01	16,366.30
156.000 INNOSPEC INC 45768S105	103.44	4,873.11	16,136.64	0.01	11,263.53
389.000 INSULET CORP 45784P101	171.20	15,372.81	66,596.80	0.04	51,223.99
587.000 INTEGRA LIFESCIENCES HOLDINGS 457985208	58.28	30,388.99	34,210.36	0.02	3,821.37
22,377.000 INTEL CORP 458140100	59.85	466,406.06	1,339,263.45	0.85	872,857.39
629.000 INTER PARFUMS INC 458334109	72.71	10,258.99	45,734.59	0.03	35,475.60
1,474.000 INTERACTIVE BROKERS GROUP INC 45841N107	46.62	24,203.52	68,717.88	0.04	44,514.36
447.000 INTERCEPT PHARMACEUTICALS INC 45845P108	123.92	29,457.30	55,392.24	0.04	25,934.94

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2,149.000 INTERCONTINENTAL EXCHANGE INC 45866F104	92.55	68,895.86	198,889.95	0.13	129,994.09
1,103.000 INTERNATIONAL BANCSHARES CORP 459044103	43.07	17,780.36	47,506.21	0.03	29,725.85
4,165.000 INTERNATIONAL BUSINESS MACHINE 459200101	134.04	342,020.23	558,276.60	0.35	216,256.37
762.000 INTERNATIONAL FLAVORS & FRAGRA 459506101	129.02	30,228.77	98,313.24	0.06	68,084.47
1,514.000 INTERNATIONAL PAPER CO 460146103	46.05	51,985.44	69,719.70	0.04	17,734.26
3,469.000 INTERPUBLIC GROUP OF COS INC/T 460690100	23.10	34,237.99	80,133.90	0.05	45,895.91
1,725.000 INTUIT INC 461202103	261.93	56,278.30	451,829.25	0.29	395,550.95
684.000 INTUITIVE SURGICAL INC 46120E602	591.15	62,985.48	404,346.60	0.26	341,361.12
925.000 INVESTORS BANCORP INC 46146L101	11.92	5,045.78	11,021.38	0.01	5,975.60
1,471.000 INVITATION HOMES INC 46187W107	29.97	30,020.75	44,085.87	0.03	14,065.12

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
727.000 IONIS PHARMACEUTICALS INC 462222100	60.41	25,296.66	43,918.07	0.03	18,621.41
4,789.000 IRIDIUM COMMUNICATIONS INC 46269C102	24.64	38,654.72	118,000.96	0.07	79,346.24
1,266.000 IRON MOUNTAIN INC 46284V101	31.87	31,628.68	40,347.42	0.03	8,718.74
524.000 ITRON INC 465741106	83.95	19,209.84	43,989.80	0.03	24,779.96
166.000 JBG SMITH PROPERTIES 46590V100	39.89	4,671.95	6,621.74	0.00	1,949.79
17,027.000 JPMORGAN CHASE & CO 46625H100	139.40	688,742.15	2,373,563.80	1.51	1,684,821.65
225.000 JACK IN THE BOX INC 466367109	78.03	5,033.25	17,556.75	0.01	12,523.50
670.000 JACOBS ENGINEERING GROUP INC 469814107	89.83	27,365.06	60,186.10	0.04	32,821.04
1,569.000 JEFFERIES FINANCIAL GROUP INC 47233W109	21.37	26,160.94	33,529.53	0.02	7,368.59
852.000 JETBLUE AIRWAYS CORP 477143101	18.72	4,311.12	15,949.44	0.01	11,638.32

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
12,433.000 JOHNSON & JOHNSON 478160104	145.87	824,439.60	1,813,601.71	1.15	989,162.11
493.000 JONES LANG LASALLE INC 48020Q107	174.09	37,568.51	85,826.37	0.05	48,257.86
180.000 J2 GLOBAL INC 48123V102	93.71	4,905.00	16,867.80	0.01	11,962.80
1,751.000 JUNIPER NETWORKS INC 48203R104	24.63	30,244.13	43,127.13	0.03	12,883.00
357.000 KANSAS CITY SOUTHERN 485170302	153.16	22,727.02	54,678.12	0.03	31,951.10
1,511.000 KB HOME 48666K109	34.27	12,254.21	51,781.97	0.03	39,527.76
1,037.000 KELLOGG CO 487836108	69.16	51,706.58	71,718.92	0.05	20,012.34
320.000 KELLY SERVICES INC 488152208	22.58	5,027.20	7,225.60	0.00	2,198.40
329.000 KEMPER CORP 488401100	77.50	9,298.36	25,497.50	0.02	16,199.14
1,704.000 KENNEDY-WILSON HOLDINGS INC 489398107	22.30	29,322.32	37,999.20	0.02	8,676.88

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6,524.000 KEYCORP 493267108	20.24	48,212.36	132,045.76	0.08	83,833.40
1,187.000 KEYSIGHT TECHNOLOGIES INC 49338L103	102.63	20,815.68	121,821.81	0.08	101,006.13
380.000 KFORCE INC 493732101	39.70	4,913.40	15,086.00	0.01	10,172.60
348.000 KILROY REALTY CORP 49427F108	83.90	13,241.40	29,197.20	0.02	15,955.80
1,870.000 KIMBERLY-CLARK CORP 494368103	137.55	116,539.72	257,218.50	0.16	140,678.78
2,003.000 KIMCO REALTY CORP 49446R109	20.71	29,559.26	41,482.13	0.03	11,922.87
5,017.000 KINDER MORGAN INC 49456B101	21.17	77,200.75	106,209.89	0.07	29,009.14
320.000 KIRBY CORP 497266106	89.53	17,798.40	28,649.60	0.02	10,851.20
761.000 KNIGHT-SWIFT TRANSPORTATION HO 499049104	35.84	14,866.69	27,274.24	0.02	12,407.55
1,404.000 KOHL'S CORP 500255104	50.95	55,431.33	71,533.80	0.05	16,102.47

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
236.000 KONTOOR BRANDS INC 50050N103	41.99	3,466.47	9,909.64	0.01	6,443.17
1,692.000 KOPPERS HOLDINGS INC 50060P106	38.22	29,115.86	64,668.24	0.04	35,552.38
1,208.000 KRAFT HEINZ CO/THE 500754106	32.13	34,439.04	38,813.04	0.02	4,374.00
7,550.000 KROGER CO/THE 501044101	28.99	86,141.74	218,874.50	0.14	132,732.76
1,698.000 L BRANDS INC 501797104	18.12	28,641.77	30,767.76	0.02	2,125.99
714.000 LHC GROUP INC 50187A107	137.76	10,292.11	98,360.64	0.06	88,068.53
450.000 LPL FINANCIAL HOLDINGS INC 50212V100	92.25	15,174.00	41,512.50	0.03	26,338.50
999.000 L3HARRIS TECHNOLOGIES INC 502431109	197.87	38,806.55	197,672.13	0.13	158,865.58
514.000 LA-Z-BOY INC 505336107	31.48	4,821.32	16,180.72	0.01	11,359.40
206.000 LABORATORY CORP OF AMERICA HOL 50540R409	169.17	13,784.66	34,849.02	0.02	21,064.36

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
306.000 LAKELAND BANCORP INC 511637100	17.38	2,728.33	5,318.28	0.00	2,589.95
346.000 LAKELAND FINANCIAL CORP 511656100	48.93	5,102.35	16,929.78	0.01	11,827.43
1,072.000 LAM RESEARCH CORP 512807108	292.40	26,299.73	313,452.80	0.20	287,153.07
725.000 LAMAR ADVERTISING CO 512816109	89.26	17,624.75	64,713.50	0.04	47,088.75
752.000 LAMB WESTON HOLDINGS INC 513272104	86.03	12,444.91	64,694.56	0.04	52,249.65
68.000 LANCASTER COLONY CORP 513847103	160.10	4,872.20	10,886.80	0.01	6,014.60
816.000 LAS VEGAS SANDS CORP 517834107	69.04	23,335.38	56,336.64	0.04	33,001.26
470.000 ESTEE LAUDER COS INC/THE 518439104	206.54	37,555.99	97,073.80	0.06	59,517.81
769.000 LEAR CORP 521865204	137.20	35,204.07	105,506.80	0.07	70,302.73
645.000 LEGGETT & PLATT INC 524660107	50.83	14,847.90	32,785.35	0.02	17,937.45

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830.000 LEIDOS HOLDINGS INC 525327102	97.89	24,715.57	81,248.70	0.05	56,533.13
1,145.000 LENNAR CORP 526057104	55.79	42,805.65	63,879.55	0.04	21,073.90
28.000 LENNAR CORP 526057302	44.70	904.28	1,251.60	0.00	347.32
507.000 LENNOX INTERNATIONAL INC 526107107	243.97	22,782.20	123,692.79	0.08	100,910.59
735.000 LIBERTY PROPERTY TRUST 531172104	60.05	22,785.00	44,136.75	0.03	21,351.75
739.000 LIBERTY MEDIA CORP-LIBERTY SIR 531229607	48.14	29,959.06	35,575.46	0.02	5,616.40
797.000 LIBERTY MEDIA CORP-LIBERTY FOR 531229854	45.97	29,895.47	36,634.11	0.02	6,738.64
749.000 LIBERTY MEDIA CORP-LIBERTY FOR 531229870	43.78	30,160.36	32,791.22	0.02	2,630.86
298.000 LIFE STORAGE INC 53223X107	108.28	19,937.37	32,267.44	0.02	12,330.07
3,285.000 ELI LILLY AND CO 532457108	131.43	188,487.14	431,747.55	0.27	243,260.41

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421.000 LINCOLN ELECTRIC HOLDINGS INC 533900106	96.73	14,010.88	40,723.33	0.03	26,712.45
1,252.000 LINCOLN NATIONAL CORP 534187109	59.01	37,987.69	73,880.52	0.05	35,892.83
80.000 LINDSAY CORP 535555106	95.99	4,973.60	7,679.20	0.00	2,705.60
143.000 LITTELFUSE INC 537008104	191.30	16,273.60	27,355.90	0.02	11,082.30
238.000 LIVE NATION ENTERTAINMENT INC 538034109	71.47	2,606.10	17,009.86	0.01	14,403.76
1,265.000 LIVERAMP HOLDINGS INC 53815P108	48.07	16,031.23	60,808.55	0.04	44,777.32
867.000 LOCKHEED MARTIN CORP 539830109	389.38	203,019.90	337,592.46	0.21	134,572.56
229.000 LOGMEIN INC 54142L109	85.74	9,902.13	19,634.46	0.01	9,732.33
1,358.000 LOUISIANA-PACIFIC CORP 546347105	29.67	31,055.67	40,291.86	0.03	9,236.19
4,870.000 LOWE'S COS INC 548661107	119.76	139,639.95	583,231.20	0.37	443,591.25

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
524.000 LULULEMON ATHLETICA INC 550021109	231.67	29,350.04	121,395.08	0.08	92,045.04
292.000 M&T BANK CORP 55261F104	169.75	26,778.14	49,567.00	0.03	22,788.86
550.000 MGE ENERGY INC 55277P104	78.82	16,324.79	43,351.00	0.03	27,026.21
1,967.000 MGIC INVESTMENT CORP 552848103	14.17	11,861.01	27,872.39	0.02	16,011.38
2,953.000 MGM RESORTS INTERNATIONAL 552953101	33.27	32,134.93	98,246.31	0.06	66,111.38
626.000 MGP INGREDIENTS INC 55303J106	48.45	20,889.62	30,329.70	0.02	9,440.08
310.000 MKS INSTRUMENTS INC 55306N104	110.01	7,777.90	34,103.10	0.02	26,325.20
138.000 MSA SAFETY INC 553498106	126.36	4,854.84	17,437.68	0.01	12,582.84
592.000 MSCI INC 55354G100	258.18	19,662.02	152,842.56	0.10	133,180.54
789.000 MACQUARIE INFRASTRUCTURE CORP 55608B105	42.84	28,411.89	33,800.76	0.02	5,388.87

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,482.000 STEVEN MADDEN LTD 556269108	43.01	36,756.60	63,740.82	0.04	26,984.22
112.000 MANHATTAN ASSOCIATES INC 562750109	79.75	2,021.04	8,932.00	0.01	6,910.96
341.000 MANITOWOC CO INC/THE 563571405 COM NEW	17.50	4,173.20	5,967.50	0.00	1,794.30
747.000 MANPOWERGROUP INC 56418H100	97.10	27,982.62	72,533.70	0.05	44,551.08
2,510.000 MARATHON OIL CORP 565849106	13.58	29,033.15	34,085.80	0.02	5,052.65
3,759.000 MARATHON PETROLEUM CORP 56585A102	60.25	90,003.49	226,479.75	0.14	136,476.26
398.000 MARCUS CORP/THE 566330106	31.77	5,034.70	12,644.46	0.01	7,609.76
103.000 MARKEL CORP 570535104	1,143.17	38,804.94	117,746.51	0.07	78,941.57
208.000 MARKETAXESS HOLDINGS INC 57060D108	379.11	5,002.40	78,854.88	0.05	73,852.48
302.000 MARRIOTT VACATIONS WORLDWIDE C 57164Y107	128.76	13,183.95	38,885.52	0.02	25,701.57

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,078.000 MARSH & MCLENNAN COS INC 571748102	111.41	88,666.54	342,919.98	0.22	254,253.44
1,725.000 MARRIOTT INTERNATIONAL INC/MD 571903202	151.43	62,575.75	261,216.75	0.17	198,641.00
1,240.000 MARTEN TRANSPORT LTD 573075108	21.49	9,869.66	26,647.60	0.02	16,777.94
263.000 MARTIN MARIETTA MATERIALS INC 573284106	279.64	24,547.70	73,545.32	0.05	48,997.62
2,319.000 MASCO CORP 574599106	47.99	27,792.85	111,288.81	0.07	83,495.96
336.000 MASTEC INC 576323109	64.16	6,132.00	21,557.76	0.01	15,425.76
4,872.000 MASTERCARD INC 57636Q104	298.59	144,261.42	1,454,730.48	0.92	1,310,469.06
571.000 MATSON INC 57686G105	40.80	10,212.74	23,296.80	0.01	13,084.06
2,921.000 MATTEL INC 577081102	13.55	29,346.44	39,579.55	0.03	10,233.11
1,184.000 MAXIM INTEGRATED PRODUCTS INC 57772K101	61.51	28,131.84	72,827.84	0.05	44,696.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
248.000 MAXIMUS INC 577933104	74.39	4,969.30	18,448.72	0.01	13,479.42
770.000 MCCORMICK & CO INC/MD 579780206	169.73	38,243.12	130,692.10	0.08	92,448.98
4,396.000 MCDONALD'S CORP 580135101	197.61	174,695.73	868,693.56	0.55	693,997.83
186.000 MCGRATH RENTCORP 580589109	76.54	5,025.72	14,236.44	0.01	9,210.72
1,566.000 MCKESSON CORP 58155Q103	138.32	83,676.54	216,609.12	0.14	132,932.58
3,110.000 MEDICAL PROPERTIES TRUST INC 58463J304	21.11	51,499.85	65,652.10	0.04	14,152.25
1,404.000 MEDIA GEN INC CVR 584CVR997	0.00	0.00	0.00	0.00	0.00
14,193.000 MERCK & CO INC 58933Y105	90.95	597,034.22	1,290,853.35	0.82	693,819.13
160.000 MEREDITH CORP 589433101	32.47	4,865.60	5,195.20	0.00	329.60
1,001.000 MERIT MEDICAL SYSTEMS INC 589889104	31.22	29,149.11	31,251.22	0.02	2,102.11

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221.000 MERITAGE HOMES CORP 59001A102	61.11	5,049.85	13,505.31	0.01	8,455.46
828.000 MERITOR INC 59001K100	26.19	4,148.28	21,685.32	0.01	17,537.04
94.000 MESA LABORATORIES INC 59064R109	249.40	5,018.66	23,443.60	0.01	18,424.94
2,003.000 METLIFE INC 59156R108	50.97	61,795.71	102,092.91	0.06	40,297.20
191.000 METTLER-TOLEDO INTERNATIONAL I 592688105	793.28	30,401.47	151,516.48	0.10	121,115.01
37,940.000 MICROSOFT CORP 594918104	157.70	1,037,252.01	5,983,138.00	3.80	4,945,885.99
830.000 MICROCHIP TECHNOLOGY INC 595017104	104.72	29,986.38	86,917.60	0.06	56,931.22
5,321.000 MICRON TECHNOLOGY INC 595112103	53.78	45,059.45	286,163.38	0.18	241,103.93
543.000 MID-AMERICA APARTMENT COMMUNIT 59522J103	131.86	31,866.14	71,599.98	0.05	39,733.84
462.000 MIDDLEBY CORP/THE 596278101	109.52	15,559.41	50,598.24	0.03	35,038.83

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233.000 MIDDLESEX WATER CO 596680108	63.57	4,499.23	14,811.81	0.01	10,312.58
274.000 MINERALS TECHNOLOGIES INC 603158106	57.63	8,787.18	15,790.62	0.01	7,003.44
250.000 MOBILE MINI INC 60740F105	37.91	5,067.50	9,477.50	0.01	4,410.00
2,748.000 MODEL N INC 607525102	35.07	35,773.79	96,372.36	0.06	60,598.57
1,775.000 MODERNA INC 60770K107	19.56	30,437.37	34,719.00	0.02	4,281.63
748.000 MODINE MANUFACTURING CO 607828100	7.70	5,071.44	5,759.60	0.00	688.16
339.000 MOHAWK INDUSTRIES INC 608190104	136.38	19,329.78	46,232.82	0.03	26,903.04
241.000 MOLINA HEALTHCARE INC 60855R100	135.69	29,857.49	32,701.29	0.02	2,843.80
546.000 MOLSON COORS BEVERAGE CO 60871R209	53.90	28,011.01	29,429.40	0.02	1,418.39
9,357.000 MONDELEZ INTERNATIONAL INC 609207105	55.08	171,845.65	515,383.56	0.33	343,537.91

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
584.000 MONMOUTH REAL ESTATE INVESTMEN 609720107	14.48	4,905.60	8,456.32	0.01	3,550.72
345.000 MONOLITHIC POWER SYSTEMS INC 609839105	178.02	5,226.75	61,416.90	0.04	56,190.15
1,626.000 MONSTER BEVERAGE CORP 61174X109	63.55	21,154.26	103,332.30	0.07	82,178.04
1,393.000 MOODY'S CORP 615369105	237.41	45,467.52	330,712.13	0.21	285,244.61
270.000 MOOG INC 615394202	85.33	11,134.80	23,039.10	0.01	11,904.30
6,241.000 MORGAN STANLEY 617446448	51.12	126,518.60	319,039.92	0.20	192,521.32
600.000 MOTOROLA SOLUTIONS INC 620076307	161.14	47,023.14	96,684.00	0.06	49,660.86
294.000 MOVADO GROUP INC 624580106	21.74	4,933.32	6,391.56	0.00	1,458.24
450.000 MUELLER INDUSTRIES INC 624756102	31.75	8,181.00	14,287.50	0.01	6,106.50
1,544.000 MURPHY OIL CORP 626717102	26.80	30,444.96	41,379.20	0.03	10,934.24

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307.000 MURPHY USA INC 626755102	117.00	8,906.37	35,919.00	0.02	27,012.63
634.000 MYOKARDIA INC 62857M105	72.89	30,489.06	46,209.09	0.03	15,720.03
231.000 NBT BANCORP INC 628778102	40.56	5,058.90	9,369.36	0.01	4,310.46
943.000 NCR CORP 62886E108	35.16	17,200.32	33,155.88	0.02	15,955.56
1,909.000 NRG ENERGY INC 629377508	39.75	31,352.17	75,882.75	0.05	44,530.58
22.000 NVR INC 62944T105	3,808.41	15,137.32	83,785.02	0.05	68,647.70
55.000 NACCO INDUSTRIES INC 629579103	46.83	525.67	2,575.65	0.00	2,049.98
790.000 NASDAQ INC 631103108	107.10	26,129.25	84,609.00	0.05	58,479.75
211.000 NATIONAL HEALTHCARE CORP 635906100	86.43	9,881.13	18,236.73	0.01	8,355.60
1,486.000 NATIONAL OILWELL VARCO INC 637071101	25.05	30,297.11	37,224.30	0.02	6,927.19

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695.000 NATIONAL RETAIL PROPERTIES INC 637417106	53.62	24,729.17	37,265.90	0.02	12,536.73
1,062.000 NATIONAL STORAGE AFFILIATES TR 637870106	33.62	21,760.38	35,704.44	0.02	13,944.06
1,849.000 NEKTAR THERAPEUTICS 640268108	21.59	22,650.25	39,910.67	0.03	17,260.42
233.000 NELNET INC 64031N108	58.24	5,039.79	13,569.92	0.01	8,530.13
1,268.000 NETAPP INC 64110D104	62.25	56,295.88	78,933.00	0.05	22,637.12
2,163.000 NETFLIX INC 64110L106	323.57	17,285.46	699,881.91	0.44	682,596.45
858.000 NEUROCRINE BIOSCIENCES INC 64125C109	107.49	39,193.44	92,226.42	0.06	53,032.98
220.000 NEW JERSEY RESOURCES CORP 646025106	44.57	4,907.10	9,805.40	0.01	4,898.30
2,013.000 NEW RESIDENTIAL INVESTMENT COR 64828T201	16.11	28,821.09	32,429.43	0.02	3,608.34
1,492.000 NEW YORK TIMES CO/THE 650111107	32.17	11,785.88	47,997.64	0.03	36,211.76

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,980.000 NEWELL BRANDS INC 651229106	19.22	28,546.70	38,055.60	0.02	9,508.90
1,455.000 NEWMARK GROUP INC 65158N102	13.46	3,800.03	19,577.03	0.01	15,777.00
2,043.000 NEWMONT CORP 651639106	43.45	51,261.74	88,768.35	0.06	37,506.61
2,841.000 NEWS CORP 65249B109	14.14	25,202.85	40,171.74	0.03	14,968.89
496.000 NEWSSTAR FINANCIAL INCCVR 652CVR994 CONTRA	0.00	0.00	0.00	0.00	0.00
2,655.000 NEXTERA ENERGY INC 65339F101	242.16	122,289.36	642,934.80	0.41	520,645.44
2,134.000 NEXTGEN HEALTHCARE INC 65343C102	16.07	29,507.55	34,293.38	0.02	4,785.83
4,940.000 NIKE INC 654106103	101.31	55,773.43	500,471.40	0.32	444,697.97
1,797.000 NISOURCE INC 65473P105	27.84	14,563.49	50,028.48	0.03	35,464.99
2,366.000 NOBLE ENERGY INC 655044105	24.84	44,568.61	58,771.44	0.04	14,202.83

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,940.000 NORFOLK SOUTHERN CORP 655844108	194.13	83,550.56	376,612.20	0.24	293,061.64
341.000 NORTHERN TRUST CORP 665859104	106.24	30,308.08	36,227.84	0.02	5,919.76
506.000 NORTHFIELD BANCORP INC 66611T108	16.96	5,089.21	8,581.76	0.01	3,492.55
1,159.000 NORTHROP GRUMMAN CORP 666807102	343.97	70,886.75	398,661.23	0.25	327,774.48
127.000 NORTHWESTERN CORP 668074305	71.67	4,991.10	9,102.09	0.01	4,110.99
1,305.000 NORTONLIFELOCK INC 668771108	25.52	28,290.87	33,303.60	0.02	5,012.73
465.000 NUCOR CORP 670346105	56.28	21,616.76	26,170.20	0.02	4,553.44
1,036.000 NUTANIX INC 67059N108	31.26	30,587.72	32,385.36	0.02	1,797.64
2,625.000 NVIDIA CORP 67066G104	235.30	144,893.70	617,662.50	0.39	472,768.80
1,505.000 OGE ENERGY CORP 670837103	44.47	44,817.98	66,927.35	0.04	22,109.37

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
254.000 O'REILLY AUTOMOTIVE INC 67103H107	438.26	23,530.56	111,318.04	0.07	87,787.48
10,882.000 OASIS PETROLEUM INC 674215108	3.26	28,570.25	35,475.32	0.02	6,905.07
933.000 OCCIDENTAL PETROLEUM CORP 674599105	41.21	42,943.67	38,448.93	0.02	-4,494.74
2,152.000 OCEANEERING INTERNATIONAL INC 675232102	14.91	25,108.08	32,086.32	0.02	6,978.24
784.000 OCEANFIRST FINANCIAL CORP 675234108	25.54	10,339.79	20,023.36	0.01	9,683.57
1,096.000 OFFICE PROPERTIES INCOME TRUST 67623C109	32.14	28,933.92	35,225.44	0.02	6,291.52
609.000 OKTA INC 679295105	115.37	60,027.24	70,260.33	0.04	10,233.09
207.000 OLD DOMINION FREIGHT LINE INC 679580100	189.78	4,987.32	39,284.46	0.02	34,297.14
563.000 OLD NATIONAL BANCORP/IN 680033107	18.29	5,804.53	10,297.27	0.01	4,492.74
2,881.000 OLD REPUBLIC INTERNATIONAL COR 680223104	22.37	26,706.87	64,447.97	0.04	37,741.10

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456.000 OLLIE'S BARGAIN OUTLET HOLDING 681116109	65.31	29,475.84	29,781.36	0.02	305.52
1,197.000 OMNICOM GROUP INC 681919106	81.02	56,002.42	96,980.94	0.06	40,978.52
1,711.000 OMEGA HEALTHCARE INVESTORS INC 681936100	42.35	42,276.07	72,460.85	0.05	30,184.78
1,997.000 ON SEMICONDUCTOR CORP 682189105	24.38	16,013.97	48,686.86	0.03	32,672.89
391.000 ONE GAS INC 68235P108	93.57	4,511.97	36,585.87	0.02	32,073.90
316.000 ONE LIBERTY PROPERTIES INC 682406103	27.19	4,964.36	8,592.04	0.01	3,627.68
2,485.000 1-800-FLOWERS.COM INC 68243Q106	14.50	14,288.75	36,032.50	0.02	21,743.75
1,562.000 ONEOK INC 682680103	75.67	31,937.21	118,196.54	0.08	86,259.33
2,436.000 ONEMAIN HOLDINGS INC 68268W103	42.15	63,889.10	102,677.40	0.07	38,788.30
13,629.000 ORACLE CORP 68389X105	52.98	243,514.78	722,064.42	0.46	478,549.64

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502.000 ORMAT TECHNOLOGIES INC 686688102	74.52	9,957.56	37,409.04	0.02	27,451.48
216.000 OSHKOSH CORP 688239201	94.65	8,340.48	20,444.40	0.01	12,103.92
922.000 OWENS CORNING 690742101	65.12	27,927.17	60,040.64	0.04	32,113.47
5,992.000 PG&E CORP 69331C108	10.87	36,825.84	65,133.04	0.04	28,307.20
1,667.000 PNC FINANCIAL SERVICES GROUP I 693475105	159.63	121,542.13	266,103.21	0.17	144,561.08
1,383.000 PNM RESOURCES INC 69349H107	50.71	25,490.37	70,131.93	0.04	44,641.56
1,500.000 PPG INDUSTRIES INC 693506107	133.49	50,790.90	200,235.00	0.13	149,444.10
1,234.000 PRA GROUP INC 69354N106	36.30	29,355.69	44,794.20	0.03	15,438.51
333.000 PVH CORP 693656100	105.15	21,428.55	35,014.95	0.02	13,586.40
708.000 PTC INC 69370C100	74.89	16,156.56	53,022.12	0.03	36,865.56

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2,393.000 PACCAR INC 693718108	79.10	90,780.85	189,286.30	0.12	98,505.45
303.000 PACKAGING CORP OF AMERICA 695156109	111.99	10,062.45	33,932.97	0.02	23,870.52
840.000 PACWEST BANCORP 695263103	38.27	17,935.17	32,146.80	0.02	14,211.63
577.000 PALO ALTO NETWORKS INC 697435105	231.25	47,888.74	133,431.25	0.08	85,542.51
8,291.000 PAN AMERICAN SILVER CORP 697900132 RTS	0.69	0.00	5,720.79	0.00	5,720.79
2,611.000 PANHANDLE OIL AND GAS INC 698477106	11.21	29,711.39	29,269.31	0.02	-442.08
253.000 PARK-OHIO HOLDINGS CORP 700666100	33.65	5,039.76	8,513.45	0.01	3,473.69
1,007.000 PARKER-HANNIFIN CORP 701094104	205.82	52,493.70	207,260.74	0.13	154,767.04
1,929.000 PARSLEY ENERGY INC 701877102	18.91	28,930.35	36,477.39	0.02	7,547.04
3,280.000 PATTERSON-UTI ENERGY INC 703481101	10.50	27,803.00	34,440.00	0.02	6,637.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,787.000 PAYCHEX INC 704326107	85.06	56,823.68	152,002.22	0.10	95,178.54
481.000 PAYCOM SOFTWARE INC 70432V102	264.76	16,873.48	127,349.56	0.08	110,476.08
6,217.000 PAYPAL HOLDINGS INC 70450Y103	108.17	110,955.68	672,492.89	0.43	561,537.21
628.000 PENN NATIONAL GAMING INC 707569109	25.56	9,868.34	16,051.68	0.01	6,183.34
265.000 PENSKE AUTOMOTIVE GROUP INC 70959W103	50.22	5,708.10	13,308.30	0.01	7,600.20
1,268.000 PEOPLE'S UNITED FINANCIAL INC 712704105	16.90	5,163.35	21,429.20	0.01	16,265.85
5,825.000 PEPSICO INC 713448108	136.67	420,010.37	796,102.75	0.51	376,092.38
441.000 PERKINELMER INC 714046109	97.10	14,886.81	42,821.10	0.03	27,934.29
704.000 PERSPECTA INC 715347100	26.44	5,552.93	18,613.76	0.01	13,060.83
25,992.000 PFIZER INC 717081103	39.18	737,351.65	1,018,366.56	0.65	281,014.91

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
7,892.000 PHILIP MORRIS INTERNATIONAL IN 718172109	85.09	325,549.66	671,530.28	0.43	345,980.62
3,437.000 PHILLIPS 66 718546104	111.41	93,106.65	382,916.17	0.24	289,809.52
5,112.000 PHYSICIANS REALTY TRUST 71943U104	18.94	77,784.08	96,821.28	0.06	19,037.20
1,117.000 PILGRIM'S PRIDE CORP 72147K108	32.72	5,683.25	36,542.66	0.02	30,859.41
322.000 PINNACLE FINANCIAL PARTNERS IN 72346Q104	64.00	4,842.88	20,608.00	0.01	15,765.12
454.000 PINNACLE WEST CAPITAL CORP 723484101	89.93	19,893.33	40,828.22	0.03	20,934.89
599.000 PIONEER NATURAL RESOURCES CO 723787107	151.37	69,922.42	90,670.63	0.06	20,748.21
560.000 PLANET FITNESS INC 72703H101	74.68	29,153.60	41,820.80	0.03	12,667.20
2,622.000 PLAYAGS INC 72814N104	12.13	29,699.15	31,804.86	0.02	2,105.71
158.000 PLEXUS CORP 729132100	76.94	5,040.20	12,156.52	0.01	7,116.32

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517.000 POLARIS INC 731068102	101.70	31,479.88	52,578.90	0.03	21,099.02
409.000 POLYONE CORP 73179P106	36.79	9,742.38	15,047.11	0.01	5,304.73
286.000 POOL CORP 73278L105	212.38	8,196.76	60,740.68	0.04	52,543.92
1,034.000 POPULAR INC 733174700	58.75	24,703.68	60,747.50	0.04	36,043.82
423.000 PORTLAND GENERAL ELECTRIC CO 736508847	55.79	15,174.91	23,599.17	0.01	8,424.26
434.000 POST HOLDINGS INC 737446104	109.10	18,659.63	47,349.40	0.03	28,689.77
2,318.000 PREFERRED APARTMENT COMMUNITIE 74039L103	13.32	25,988.95	30,875.76	0.02	4,886.81
938.000 PREMIER INC 74051N102	37.88	30,241.12	35,531.44	0.02	5,290.32
1,069.000 PRESTIGE CONSUMER HEALTHCARE I 74112D101	40.50	30,273.73	43,294.50	0.03	13,020.77
1,884.000 T ROWE PRICE GROUP INC 74144T108	121.84	89,739.25	229,546.56	0.15	139,807.31

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506.000 PRICESMART INC 741511109	71.02	29,499.80	35,936.12	0.02	6,436.32
2,143.000 PRINCIPAL FINANCIAL GROUP INC 74251V102	55.00	75,066.97	117,865.00	0.07	42,798.03
10,953.000 PROCTER & GAMBLE CO/THE 742718109	124.90	703,725.15	1,368,029.70	0.87	664,304.55
2,268.000 PROGRESSIVE CORP/THE 743315103	72.39	44,656.92	164,180.52	0.10	119,523.60
3,074.000 PROLOGIS INC 74340W103	89.14	83,210.04	274,016.36	0.17	190,806.32
471.000 PROSPERITY BANCSHARES INC 743606105	71.89	16,733.67	33,860.19	0.02	17,126.52
359.000 PROVIDENT FINANCIAL SERVICES I 74386T105	24.65	4,957.79	8,849.35	0.01	3,891.56
1,144.000 PRUDENTIAL FINANCIAL INC 744320102	93.74	79,658.80	107,238.56	0.07	27,579.76
3,279.000 PUBLIC SERVICE ENTERPRISE GROU 744573106	59.05	100,870.89	193,624.95	0.12	92,754.06
597.000 PUBLIC STORAGE 74460D109	212.96	55,830.28	127,137.12	0.08	71,306.84

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8,125.000 QEP RESOURCES INC 74733V100	4.50	27,345.62	36,562.50	0.02	9,216.88
1,804.000 QTS REALTY TRUST INC 74736A103	54.27	51,594.40	97,903.08	0.06	46,308.68
991.000 QORVO INC 74736K101	116.23	11,289.87	115,183.93	0.07	103,894.06
5,949.000 QUALCOMM INC 747525103	88.23	218,908.92	524,880.27	0.33	305,971.35
1,366.000 QUANTA SERVICES INC 74762E102	40.71	31,598.99	55,609.86	0.04	24,010.87
3,067.000 QURATE RETAIL INC 74915M100	8.43	29,616.88	25,854.81	0.02	-3,762.07
6,610.000 RPC INC 749660106	5.24	27,535.65	34,636.40	0.02	7,100.75
20.000 RMR GROUP INC/THE 74967R106	45.64	260.00	912.80	0.00	652.80
859.000 RPM INTERNATIONAL INC 749685103	76.76	24,731.52	65,936.84	0.04	41,205.32
933.000 RADIAN GROUP INC 750236101	25.16	9,665.88	23,474.28	0.01	13,808.40

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366.000 RALPH LAUREN CORP 751212101	117.22	30,625.05	42,902.52	0.03	12,277.47
6,913.000 RANGE RESOURCES CORP 75281A109	4.85	30,733.28	33,528.05	0.02	2,794.77
609.000 RAYMOND JAMES FINANCIAL INC 754730109	89.46	18,702.39	54,481.14	0.03	35,778.75
1,787.000 RAYTHEON CO 755111507	219.74	85,851.23	392,675.38	0.25	306,824.15
938.000 REALTY INCOME CORP 756109104	73.63	52,176.24	69,064.94	0.04	16,888.70
5,483.000 RECRO PHARMA INC 75629F109	18.33	29,528.73	100,503.39	0.06	70,974.66
531.000 REGENCY CENTERS CORP 758849103	63.09	21,824.10	33,500.79	0.02	11,676.69
217.000 REGENERON PHARMACEUTICALS INC 75886F107	375.48	67,489.17	81,479.16	0.05	13,989.99
7,014.000 REGIONS FINANCIAL CORP 7591EP100	17.16	48,588.92	120,360.24	0.08	71,771.32
345.000 REINSURANCE GROUP OF AMERICA I 759351604	163.06	18,554.10	56,255.70	0.04	37,701.60

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447.000 RELIANCE STEEL & ALUMINUM CO 759509102	119.76	22,028.16	53,532.72	0.03	31,504.56
345.000 RENASANT CORP 75970E107	35.42	4,988.70	12,219.90	0.01	7,231.20
1,866.000 REPUBLIC SERVICES INC 760759100	89.63	46,899.63	167,249.58	0.11	120,349.95
915.000 RESMED INC 761152107	154.97	23,601.94	141,797.55	0.09	118,195.61
766.000 RESIDEO TECHNOLOGIES INC 76118Y104	11.93	5,547.94	9,138.38	0.01	3,590.44
418.000 RESOURCES CONNECTION INC 76122Q105	16.33	5,082.88	6,825.94	0.00	1,743.06
2,391.000 REVANCE THERAPEUTICS INC 761330109	16.23	28,661.13	38,805.93	0.02	10,144.80
1,228.000 RINGCENTRAL INC 76680R206	168.67	16,504.32	207,126.76	0.13	190,622.44
1,001.000 ROCKWELL AUTOMATION INC 773903109	202.67	57,419.76	202,872.67	0.13	145,452.91
110.000 ROGERS CORP 775133101	124.73	4,951.10	13,720.30	0.01	8,769.20

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245.000 ROPER TECHNOLOGIES INC 776696106	354.23	47,541.83	86,786.35	0.06	39,244.52
708.000 ROSETTA STONE INC 777780107	18.14	5,210.88	12,843.12	0.01	7,632.24
1,217.000 ROSS STORES INC 778296103	116.42	67,260.19	141,683.14	0.09	74,422.95
350.000 ROYAL GOLD INC 780287108	122.25	19,143.81	42,787.50	0.03	23,643.69
488.000 RYMAN HOSPITALITY PROPERTIES I 78377T107	86.66	13,519.13	42,290.08	0.03	28,770.95
281.000 S&T BANCORP INC 783859101	40.29	4,979.32	11,321.49	0.01	6,342.17
692.000 S&P GLOBAL INC 78409V104	273.05	50,880.28	188,950.60	0.12	138,070.32
577.000 SBA COMMUNICATIONS CORP 78410G104	240.99	21,135.51	139,051.23	0.09	117,915.72
872.000 SEI INVESTMENTS CO 784117103	65.48	14,640.88	57,098.56	0.04	42,457.68
214.000 SJW GROUP 784305104	71.06	4,962.66	15,206.84	0.01	10,244.18

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
686.000 SL GREEN REALTY CORP 78440X101	91.88	39,657.66	63,029.68	0.04	23,372.02
3,528.000 SLM CORP 78442P106	8.91	20,584.41	31,434.48	0.02	10,850.07
679.000 SS&C TECHNOLOGIES HOLDINGS INC 78467J100	61.40	30,568.58	41,690.60	0.03	11,122.02
483.000 SP PLUS CORP 78469C103	42.43	10,007.76	20,493.69	0.01	10,485.93
255.000 SVB FINANCIAL GROUP 78486Q101	251.04	14,614.05	64,015.20	0.04	49,401.15
1,422.000 SABRA HEALTH CARE REIT INC 78573L106	21.34	29,987.87	30,345.48	0.02	357.61
323.000 SAGE THERAPEUTICS INC 78667J108	72.19	27,361.33	23,317.37	0.01	-4,043.96
3,398.000 SALESFORCE.COM INC 79466L302	162.64	131,723.77	552,650.72	0.35	420,926.95
109.000 SANDERSON FARMS INC 800013104	176.22	5,261.43	19,207.98	0.01	13,946.55
276.000 SANDY SPRING BANCORP INC 800363103	37.88	4,832.76	10,454.88	0.01	5,622.12

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1,333.000 SANMINA CORP 801056102	34.24	12,210.93	45,641.92	0.03	33,430.99
399.000 SAREPTA THERAPEUTICS INC 803607100	129.04	29,514.03	51,486.96	0.03	21,972.93
130.000 SAUL CENTERS INC 804395101	52.78	4,982.90	6,861.40	0.00	1,878.50
1,030.000 HENRY SCHEIN INC 806407102	66.72	31,687.52	68,721.60	0.04	37,034.08
2,620.000 SCHLUMBERGER LTD 806857108	40.20	94,860.16	105,324.00	0.07	10,463.84
194.000 SCHOLASTIC CORP 807066105	38.45	4,834.48	7,459.30	0.00	2,624.82
6,043.000 CHARLES SCHWAB CORP/THE 808513105	47.56	106,767.19	287,405.08	0.18	180,637.89
165.000 SCIENCE APPLICATIONS INTERNATI 808625107	87.02	4,839.30	14,358.30	0.01	9,519.00
515.000 SCIENTIFIC GAMES CORP 80874P109	26.78	5,000.65	13,791.70	0.01	8,791.05
1,023.000 EW SCRIPPS CO/THE 811054402	15.71	7,948.87	16,071.33	0.01	8,122.46

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621.000 SEACOAST BANKING CORP OF FLORI 811707801	30.57	4,685.76	18,983.97	0.01	14,298.21
899.000 SEALED AIR CORP 81211K100	39.83	19,824.16	35,807.17	0.02	15,983.01
886.000 SEATTLE GENETICS INC 812578102	114.26	19,069.78	101,234.36	0.06	82,164.58
2,267.000 SEAWORLD ENTERTAINMENT INC 81282V100	31.71	29,850.05	71,886.57	0.05	42,036.52
600.000 SELECT MEDICAL HOLDINGS CORP 81619Q105	23.34	5,106.00	14,004.00	0.01	8,898.00
321.000 SELECTIVE INSURANCE GROUP INC 816300107	65.19	5,091.06	20,925.99	0.01	15,834.93
1,416.000 SEMPRA ENERGY 816851109	151.48	75,155.45	214,495.68	0.14	139,340.23
3,417.000 SENIOR HOUSING PROPERTIES TRUS 81721M109	8.44	30,365.04	28,839.48	0.02	-1,525.56
136.000 SENSIENT TECHNOLOGIES CORP 81725T100	66.09	4,944.96	8,988.24	0.01	4,043.28
1,420.000 SERVICE CORP INTERNATIONAL/US 817565104	46.03	15,804.60	65,362.60	0.04	49,558.00

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581.000 SERVICENOW INC 81762P102	282.32	17,406.76	164,027.92	0.10	146,621.16
153.000 SHERWIN-WILLIAMS CO/THE 824348106	583.54	51,114.33	89,281.62	0.06	38,167.29
246.000 SIGNATURE BANK/NEW YORK NY 82669G104	136.61	13,731.72	33,606.06	0.02	19,874.34
248.000 SILICON LABORATORIES INC 826919102	115.98	9,936.20	28,763.04	0.02	18,826.84
588.000 SILGAN HOLDINGS INC 827048109	31.08	11,780.58	18,275.04	0.01	6,494.46
404.000 SIMMONS FIRST NATIONAL CORP 828730200	26.79	4,930.82	10,823.16	0.01	5,892.34
1,380.000 SIMON PROPERTY GROUP INC 828806109	148.96	117,345.95	205,564.80	0.13	88,218.85
168.000 SIMPSON MANUFACTURING CO INC 829073105	80.23	4,935.84	13,478.64	0.01	8,542.80
22,006.000 SIRIUS XM HOLDINGS INC 82968B103	7.15	43,119.42	157,342.90	0.10	114,223.48
2,399.000 SITE CENTERS CORP 82981J109	14.02	27,101.69	33,633.98	0.02	6,532.29

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394.000 SITEONE LANDSCAPE SUPPLY INC 82982L103	90.65	30,062.20	35,716.10	0.02	5,653.90
148.000 SIX FLAGS ENTERTAINMENT CORP 83001A102	45.11	4,997.96	6,676.28	0.00	1,678.32
1,053.000 SKECHERS USA INC 830566105	43.19	4,794.66	45,479.07	0.03	40,684.41
1,709.000 SKYWORKS SOLUTIONS INC 83088M102	120.88	27,531.54	206,583.92	0.13	179,052.38
1,824.000 A O SMITH CORP 831865209	47.64	28,189.92	86,895.36	0.06	58,705.44
312.000 J M SMUCKER CO/THE 832696405	104.13	27,727.44	32,488.56	0.02	4,761.12
159.000 SNAP-ON INC 833034101	169.40	9,926.66	26,934.60	0.02	17,007.94
534.000 SONOCO PRODUCTS CO 835495102	61.72	17,336.55	32,958.48	0.02	15,621.93
1,020.000 SOUTH JERSEY INDUSTRIES INC 838518108	32.98	29,131.10	33,639.60	0.02	4,508.50
174.000 SOUTH STATE CORP 840441109	86.75	4,840.68	15,094.50	0.01	10,253.82

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3,986.000 SOUTHERN CO/THE 842587107	63.70	145,383.68	253,908.20	0.16	108,524.52
345.000 SOUTHSIDE BANCSHARES INC 84470P109	37.14	5,037.90	12,813.30	0.01	7,775.40
3,352.000 SOUTHWEST AIRLINES CO 844741108	53.98	36,835.99	180,940.96	0.12	144,104.97
272.000 SOUTHWEST GAS HOLDINGS INC 844895102	75.97	10,194.56	20,663.84	0.01	10,469.28
39.000 SPECTRUM BRANDS HOLDINGS INC 84790A105	64.29	1,950.00	2,507.31	0.00	557.31
1,117.000 SPIRIT AEROSYSTEMS HOLDINGS IN 848574109	72.88	22,330.82	81,406.96	0.05	59,076.14
415.000 SPIRIT AIRLINES INC 848577102	40.31	4,988.47	16,728.65	0.01	11,740.18
384.000 SPIRE INC 84857L101	83.31	22,282.34	31,991.04	0.02	9,708.70
671.000 SPLUNK INC 848637104	149.77	33,438.80	100,495.67	0.06	67,056.87
1,176.000 SQUARE INC 852234103	62.56	28,058.48	73,570.56	0.05	45,512.08

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Report ID : IACS0005
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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,186.000 STANLEY BLACK & DECKER INC 854502101	165.74	68,473.54	196,567.64	0.12	128,094.10
7,342.000 STARBUCKS CORP 855244109	87.92	125,724.04	645,508.64	0.41	519,784.60
1,416.000 STARWOOD PROPERTY TRUST INC 85571B105	24.86	28,303.76	35,201.76	0.02	6,898.00
1,291.000 STEEL DYNAMICS INC 858119100	34.04	19,704.08	43,945.64	0.03	24,241.56
776.000 STERICYCLE INC 858912108	63.81	29,387.12	49,516.56	0.03	20,129.44
1,202.000 STERLING BANCORP/DE 85917A100	21.08	9,804.58	25,338.16	0.02	15,533.58
827.000 STIFEL FINANCIAL CORP 860630102	60.65	32,320.81	50,157.55	0.03	17,836.74
327.000 STOCK YARDS BANCORP INC 861025104	41.06	4,907.18	13,426.62	0.01	8,519.44
1,507.000 STORE CAPITAL CORP 862121100	37.24	39,609.42	56,120.68	0.04	16,511.26
2,020.000 STRYKER CORP 863667101	209.94	100,430.20	424,078.80	0.27	323,648.60

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Report ID : IACS0005
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PARAMETRIC US PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
79.000 STURM RUGER & CO INC 864159108	47.03	2,193.04	3,715.37	0.00	1,522.33
2,886.000 SUMMIT MATERIALS INC 86614U100	23.90	34,738.01	68,975.40	0.04	34,237.39
355.000 SUN COMMUNITIES INC 866674104	150.10	22,741.35	53,285.50	0.03	30,544.15
1,431.000 SUNSTONE HOTEL INVESTORS INC 867892101	13.92	11,913.91	19,919.52	0.01	8,005.61
194.000 SYNAPTICS INC 87157D109	65.77	4,855.82	12,759.38	0.01	7,903.56
342.000 SYNOPSYS INC 871607107	139.20	9,919.68	47,606.40	0.03	37,686.72
1,368.000 SYNOVUS FINANCIAL CORP 87161C501	39.20	17,524.08	53,625.60	0.03	36,101.52
273.000 SYNNEX CORP 87162W100	128.80	17,630.99	35,162.40	0.02	17,531.41
2,102.000 SYNCHRONY FINANCIAL 87165B103	36.01	64,693.02	75,693.02	0.05	11,000.00
804.000 SYNEOS HEALTH INC 87166B102	59.48	29,595.24	47,817.90	0.03	18,222.66

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,052.000 SYSCO CORP 871829107	85.54	32,864.48	89,988.08	0.06	57,123.60
1,371.000 TCF FINANCIAL CORP 872307103	46.80	27,034.36	64,162.80	0.04	37,128.44
1,514.000 TD AMERITRADE HOLDING CORP 87236Y108	49.70	28,160.40	75,245.80	0.05	47,085.40
5,294.000 TJX COS INC/THE 872540109	61.06	65,432.64	323,251.64	0.21	257,819.00
2,525.000 T-MOBILE US INC 872590104	78.42	55,914.29	198,010.50	0.13	142,096.21
437.000 TAKE-TWO INTERACTIVE SOFTWARE 874054109	122.43	6,471.97	53,501.91	0.03	47,029.94
1,187.000 TAPESTRY INC 876030107	26.97	29,899.59	32,013.39	0.02	2,113.80
2,698.000 TARGET CORP 87612E106	128.21	151,033.77	345,910.58	0.22	194,876.81
1,066.000 TARGA RESOURCES CORP 87612G101	40.83	35,366.84	43,524.78	0.03	8,157.94
277.000 TECH DATA CORP 878237106	143.60	12,772.47	39,777.20	0.03	27,004.73

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,000.000 TEGNA INC 87901J105	16.69	13,706.07	33,380.00	0.02	19,673.93
754.000 TELADOC HEALTH INC 87918A105	83.72	24,625.64	63,124.88	0.04	38,499.24
102.000 TELEDYNE TECHNOLOGIES INC 879360105	346.54	4,876.62	35,347.08	0.02	30,470.46
144.000 TELEFLEX INC 879369106	376.44	9,796.02	54,207.36	0.03	44,411.34
1,482.000 TELEPHONE & DATA SYSTEMS INC 879433829	25.43	34,775.24	37,687.26	0.02	2,912.02
5,736.000 TELLURIAN INC 87968A104	7.28	31,868.48	41,758.08	0.03	9,889.60
388.000 TEMPUR SEALY INTERNATIONAL INC 88023U101	87.06	15,357.04	33,779.28	0.02	18,422.24
1,973.000 TENET HEALTHCARE CORP 88033G407	38.03	28,860.12	75,033.19	0.05	46,173.07
106.000 TENNANT CO 880345103	77.92	4,983.06	8,259.52	0.01	3,276.46
2,052.000 TENNECO INC 880349105	13.10	28,558.58	26,881.20	0.02	-1,677.38

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,170.000 TERADYNE INC 880770102	68.19	16,169.40	79,782.30	0.05	63,612.90
2,392.000 TERRENO REALTY CORP 88146M101	54.14	42,955.92	129,502.88	0.08	86,546.96
657.000 TESLA INC 88160R101	418.33	42,299.96	274,842.81	0.17	232,542.85
370.000 TETRA TECH INC 88162G103	86.16	8,376.80	31,879.20	0.02	23,502.40
5,720.000 TEXAS INSTRUMENTS INC 882508104	128.29	191,821.34	733,818.80	0.47	541,997.46
513.000 TEXTRON INC 883203101	44.60	13,270.05	22,879.80	0.01	9,609.75
196.000 TRADE DESK INC/THE 88339J105	259.78	29,664.60	50,916.88	0.03	21,252.28
2,426.000 THERMO FISHER SCIENTIFIC INC 883556102	324.87	95,415.26	788,134.62	0.50	692,719.36
264.000 THOR INDUSTRIES INC 885160101	74.29	6,293.76	19,612.56	0.01	13,318.80
3,021.000 3M CO 88579Y101	176.42	226,057.80	532,964.82	0.34	306,907.02

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,767.000 TIDEWATER INC 88642R109	19.28	29,027.97	34,067.76	0.02	5,039.79
906.000 TIFFANY & CO 886547108	133.65	30,337.41	121,086.90	0.08	90,749.49
3,797.000 TILLY'S INC 886885102	12.25	29,742.79	46,513.25	0.03	16,770.46
820.000 TIVITY HEALTH INC 88870R102	20.35	5,584.20	16,682.90	0.01	11,098.70
1,241.000 TOLL BROTHERS INC 889478103	39.51	27,612.41	49,031.91	0.03	21,419.50
130.000 TOMPKINS FINANCIAL CORP 890110109	91.50	5,062.20	11,895.00	0.01	6,832.80
310.000 TOPBUILD CORP 89055F103	103.08	4,479.13	31,954.80	0.02	27,475.67
736.000 TORO CO/THE 891092108	79.67	10,992.16	58,637.12	0.04	47,644.96
249.000 TOWNE BANK/PORTSMOUTH VA 89214P109	27.82	3,215.24	6,927.18	0.00	3,711.94
453.000 TRACTOR SUPPLY CO 892356106	93.44	14,704.38	42,328.32	0.03	27,623.94

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60.000 TRANSDIGM GROUP INC 893641100	560.00	6,535.83	33,600.00	0.02	27,064.17
2,086.000 TRAVELERS COS INC/THE 89417E109	136.95	96,978.76	285,677.70	0.18	188,698.94
1,953.000 TREDEGAR CORP 894650100	22.35	30,325.32	43,649.55	0.03	13,324.23
4.000 TREX CO INC 89531P105	89.88	25.86	359.52	0.00	333.66
422.000 TRICO BANCSHARES 896095106	40.81	6,055.70	17,221.82	0.01	11,166.12
1,458.000 TRIMBLE INC 896239100	41.69	27,024.03	60,784.02	0.04	33,759.99
1,299.000 TRINITY INDUSTRIES INC 896522109	22.15	14,506.61	28,772.85	0.02	14,266.24
9,107.000 TRUECAR INC 89785L107	4.75	30,149.17	43,258.25	0.03	13,109.08
345.000 TRUEBLUE INC 89785X101	24.06	5,023.20	8,300.70	0.01	3,277.50
7,143.000 TRUIST FINANCIAL CORP 89832Q109	56.32	178,024.99	402,293.76	0.26	224,268.77

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
150.000 TRUSTMARK CORP 898402102	34.51	3,406.50	5,176.50	0.00	1,770.00
392.000 TWILIO INC 90138F102	98.28	29,846.88	38,525.76	0.02	8,678.88
3,246.000 TWITTER INC 90184L102	32.05	53,618.38	104,034.30	0.07	50,415.92
1,978.000 2U INC 90214J101	23.99	29,645.33	47,452.22	0.03	17,806.89
86.000 TYLER TECHNOLOGIES INC 902252105	300.02	4,999.18	25,801.72	0.02	20,802.54
2,338.000 TYSON FOODS INC 902494103	91.04	38,339.08	212,851.52	0.14	174,512.44
1,181.000 UDR INC 902653104	46.70	26,938.61	55,152.70	0.04	28,214.09
626.000 UGI CORP 902681105	45.16	22,293.84	28,270.16	0.02	5,976.32
190.000 UMB FINANCIAL CORP 902788108	68.64	7,607.60	13,041.60	0.01	5,434.00
4,506.000 US BANCORP 902973304	59.29	140,292.46	267,160.74	0.17	126,868.28

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,244.000 UMH PROPERTIES INC 903002103	15.73	21,205.80	35,298.12	0.02	14,092.32
366.000 USANA HEALTH SCIENCES INC 90328M107	78.55	14,231.91	28,749.30	0.02	14,517.39
269.000 ULTA BEAUTY INC 90384S303	253.14	16,901.27	68,094.66	0.04	51,193.39
2,104.000 UMPQUA HOLDINGS CORP 904214103	17.70	22,409.37	37,240.80	0.02	14,831.43
1,681.000 UNDER ARMOUR INC 904311107	21.60	18,815.96	36,309.60	0.02	17,493.64
2,513.000 UNDER ARMOUR INC 904311206	19.18	29,244.11	48,199.34	0.03	18,955.23
97.000 UNIFIRST CORP/MA 904708104	201.98	4,938.27	19,592.06	0.01	14,653.79
3,469.000 UNION PACIFIC CORP 907818108	180.79	75,723.76	627,160.51	0.40	551,436.75
773.000 UNITED COMMUNITY BANKS INC/GA 90984P303	30.88	5,094.07	23,870.24	0.02	18,776.17
586.000 UNITED BANKSHARES INC/WV 909907107	38.66	10,942.20	22,654.76	0.01	11,712.56

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,594.000 UNITED AIRLINES HOLDINGS INC 910047109	88.09	37,962.17	140,415.46	0.09	102,453.29
277.000 UNITED FIRE GROUP INC 910340108	43.73	4,855.81	12,113.21	0.01	7,257.40
2,477.000 UNITED PARCEL SERVICE INC 911312106	117.06	193,695.47	289,957.62	0.18	96,262.15
789.000 UNITED RENTALS INC 911363109	166.77	27,392.69	131,581.53	0.08	104,188.84
4,169.000 UNITED TECHNOLOGIES CORP 913017109	149.76	265,483.16	624,349.44	0.40	358,866.28
548.000 UNITED THERAPEUTICS CORP 91307C102	88.08	24,908.59	48,267.84	0.03	23,359.25
5,046.000 UNITEDHEALTH GROUP INC 91324P102	293.98	249,528.52	1,483,423.08	0.94	1,233,894.56
537.000 UNITIL CORP 913259107	61.82	14,936.01	33,197.34	0.02	18,261.33
300.000 UNIVERSAL DISPLAY CORP 91347P105	206.07	25,518.00	61,821.00	0.04	36,303.00
552.000 UNIVERSAL FOREST PRODUCTS INC 913543104	47.70	4,852.08	26,330.40	0.02	21,478.32

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
451.000 UNIVERSAL HEALTH REALTY INCOME 91359E105	117.36	21,738.20	52,929.36	0.03	31,191.16
410.000 UNIVERSAL HEALTH SERVICES INC 913903100	143.46	24,507.64	58,818.60	0.04	34,310.96
2,183.000 UNUM GROUP 91529Y106	29.16	42,731.57	63,656.28	0.04	20,924.71
166.000 URBAN EDGE PROPERTIES 91704F104	19.18	2,591.56	3,183.88	0.00	592.32
2,752.000 URSTADT BIDDLE PROPERTIES INC 917286205	24.84	52,526.92	68,359.68	0.04	15,832.76
1,653.000 VF CORP 918204108	99.66	59,449.38	164,737.98	0.10	105,288.60
370.000 VSE CORP 918284100	38.04	4,713.80	14,074.80	0.01	9,361.00
208.000 VAIL RESORTS INC 91879Q109	239.83	9,195.68	49,884.64	0.03	40,688.96
2,657.000 VALERO ENERGY CORP 91913Y100	93.65	76,545.87	248,828.05	0.16	172,282.18
630.000 VALLEY NATIONAL BANCORP 919794107	11.45	4,984.88	7,213.50	0.00	2,228.62

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187.000 VALMONT INDUSTRIES INC 920253101	149.78	19,106.48	28,008.86	0.02	8,902.38
1,589.000 VALVOLINE INC 92047W101	21.41	15,933.02	34,020.49	0.02	18,087.47
399.000 VAREX IMAGING CORP 92214X106	29.81	5,758.51	11,894.19	0.01	6,135.68
998.000 VARIAN MEDICAL SYSTEMS INC 92220P105	142.01	42,646.59	141,725.98	0.09	99,079.39
1,725.000 VENTAS INC 92276F100	57.74	78,727.59	99,601.50	0.06	20,873.91
1,177.000 VERISIGN INC 92343E102	192.68	27,710.35	226,784.36	0.14	199,074.01
18,019.000 VERIZON COMMUNICATIONS INC 92343V104	61.40	639,840.56	1,106,366.60	0.70	466,526.04
145.000 VERINT SYSTEMS INC 92343X100	55.36	5,067.75	8,027.20	0.01	2,959.45
740.000 VERISK ANALYTICS INC 92345Y106	149.34	36,444.00	110,511.60	0.07	74,067.60
1,450.000 VERTEX PHARMACEUTICALS INC 92532F100	218.95	59,787.33	317,477.50	0.20	257,690.17

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2,998.000 VICI PROPERTIES INC 925652109	25.55	58,804.55	76,598.90	0.05	17,794.35
8,474.000 VISA INC 92826C839	187.90	188,440.58	1,592,264.60	1.01	1,403,824.02
1,523.000 VISHAY INTERTECHNOLOGY INC 928298108	21.29	14,377.12	32,424.67	0.02	18,047.55
85.000 VISTEON CORP 92839U206	86.59	4,961.45	7,360.15	0.00	2,398.70
304.000 VLASIC FOODS INTL INC COM 928559103	0.00	3,211.50	0.00	0.00	-3,211.50
5,930.000 VONAGE HOLDINGS CORP 92886T201	7.41	11,207.70	43,941.30	0.03	32,733.60
773.000 VOYA FINANCIAL INC 929089100	60.98	22,123.26	47,137.54	0.03	25,014.28
664.000 VULCAN MATERIALS CO 929160109	143.99	36,410.98	95,609.36	0.06	59,198.38
90.000 WD-40 CO 929236107	194.14	4,888.80	17,472.60	0.01	12,583.80
213.000 WABCO HOLDINGS INC 92927K102	135.50	14,611.56	28,861.50	0.02	14,249.94

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587.000 WSFS FINANCIAL CORP 929328102	43.99	9,817.89	25,822.13	0.02	16,004.24
2,104.000 WEC ENERGY GROUP INC 92939U106	92.23	46,908.39	194,051.92	0.12	147,143.53
1,221.000 WABASH NATIONAL CORP 929566107	14.69	10,036.73	17,936.49	0.01	7,899.76
440.000 WESTINGHOUSE AIR BRAKE TECHNOL 929740108	77.80	29,519.60	34,232.00	0.02	4,712.40
5,769.000 WALMART INC 931142103	118.84	299,537.97	685,587.96	0.44	386,049.99
4,127.000 WALGREENS BOOTS ALLIANCE INC 931427108	58.96	184,909.82	243,327.92	0.15	58,418.10
664.000 WASHINGTON FEDERAL INC 938824109	36.65	13,638.56	24,335.60	0.02	10,697.04
8,334.000 WASHINGTON PRIME GROUP INC 93964W108	3.64	30,215.75	30,335.76	0.02	120.01
218.000 WASHINGTON TRUST BANCORP INC 940610108	53.79	4,848.32	11,726.22	0.01	6,877.90
1,158.000 WASTE MANAGEMENT INC 94106L109	113.96	72,678.95	131,965.68	0.08	59,286.73

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70.000 WATSCO INC 942622200	180.15	5,804.40	12,610.50	0.01	6,806.10
149.000 WATTS WATER TECHNOLOGIES INC 942749102	99.76	4,936.37	14,864.24	0.01	9,927.87
696.000 WEBSTER FINANCIAL CORP 947890109	53.36	13,671.32	37,138.56	0.02	23,467.24
780.000 WEINGARTEN REALTY INVESTORS 948741103	31.24	18,166.20	24,367.20	0.02	6,201.00
1,365.000 WELBILT INC 949090104	15.61	13,182.40	21,307.65	0.01	8,125.25
168.000 WELLCARE HEALTH PLANS INC 94946T106	330.21	8,247.12	55,475.28	0.04	47,228.16
19,163.000 WELLS FARGO & CO 949746101	53.80	659,275.92	1,030,969.40	0.66	371,693.48
1,894.000 WELLTOWER INC 95040Q104	81.78	100,041.48	154,891.32	0.10	54,849.84
3,177.000 WENDY'S CO/THE 95058W100	22.21	14,804.82	70,561.17	0.04	55,756.35
261.000 WESBANCO INC 950810101	37.79	4,909.41	9,863.19	0.01	4,953.78

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
551.000 WESCO INTERNATIONAL INC 95082P105	59.39	19,494.38	32,723.89	0.02	13,229.51
368.000 WEST PHARMACEUTICAL SERVICES I 955306105	150.33	25,605.54	55,321.44	0.04	29,715.90
729.000 WESTERN ALLIANCE BANCORP 957638109	57.00	4,891.59	41,553.00	0.03	36,661.41
1,752.000 WESTERN DIGITAL CORP 958102105	63.47	50,390.92	111,199.44	0.07	60,808.52
472.000 WESTLAKE CHEMICAL CORP 960413102	70.15	18,799.76	33,110.80	0.02	14,311.04
1,557.000 WESTROCK CO 96145D105	42.91	44,296.54	66,810.87	0.04	22,514.33
229.000 WEX INC 96208T104	209.46	11,216.42	47,966.34	0.03	36,749.92
4,346.000 WEYERHAEUSER CO 962166104	30.20	74,342.04	131,249.20	0.08	56,907.16
453.000 WHIRLPOOL CORP 963320106	147.53	38,455.39	66,831.09	0.04	28,375.70
5,995.000 WILLIAMS COS INC/THE 969457100	23.72	122,115.81	142,201.40	0.09	20,085.59

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
553.000 WILLIAMS-SONOMA INC 969904101	73.44	19,887.91	40,612.32	0.03	20,724.41
390.000 WINTRUST FINANCIAL CORP 97650W108	70.90	11,633.70	27,651.00	0.02	16,017.30
248.000 WOLVERINE WORLD WIDE INC 978097103	33.74	5,023.24	8,367.52	0.01	3,344.28
365.000 WOODWARD INC 980745103	118.44	11,815.05	43,230.60	0.03	31,415.55
490.000 WORKDAY INC 98138H101	164.45	39,316.22	80,580.50	0.05	41,264.28
342.000 WORTHINGTON INDUSTRIES INC 981811102	42.18	6,730.56	14,425.56	0.01	7,695.00
2,918.000 WPX ENERGY INC 98212B103	13.74	29,754.01	40,093.32	0.03	10,339.31
1,042.000 WYNDHAM DESTINATIONS INC 98310W108	51.69	16,898.56	53,860.98	0.03	36,962.42
1,042.000 WYNDHAM HOTELS & RESORTS INC 98311A105	62.81	20,555.30	65,448.02	0.04	44,892.72
450.000 WYNN RESORTS LTD 983134107	138.87	42,630.70	62,491.50	0.04	19,860.80

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
896.000 XPO LOGISTICS INC 983793100	79.70	20,590.08	71,411.20	0.05	50,821.12
1,678.000 XILINX INC 983919101	97.77	42,099.64	164,058.06	0.10	121,958.42
950.000 XYLEM INC/NY 98419M100	78.79	24,870.03	74,850.50	0.05	49,980.47
1,777.000 XPERI CORP 98421B100	18.50	31,004.76	32,874.50	0.02	1,869.74
1,910.000 YELP INC 985817105	34.83	47,864.60	66,525.30	0.04	18,660.70
503.000 YORK WATER CO/THE 987184108	46.11	8,910.09	23,193.33	0.01	14,283.24
1,130.000 YUM! BRANDS INC 988498101	100.73	21,133.89	113,824.90	0.07	92,691.01
1,359.000 YUM CHINA HOLDINGS INC 98850P109	48.01	10,352.57	65,245.59	0.04	54,893.02
1,343.000 ZAYO GROUP HOLDINGS INC 98919V105	34.65	28,698.19	46,534.95	0.03	17,836.76
745.000 ZEBRA TECHNOLOGIES CORP 989207105	255.44	22,305.30	190,302.80	0.12	167,997.50

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644.000 ZILLOW GROUP INC 98954M200	45.94	13,458.53	29,585.36	0.02	16,126.83
1,270.000 ZIMMER BIOMET HOLDINGS INC 98956P102	149.68	82,266.71	190,093.60	0.12	107,826.89
1,713.000 ZIONS BANCORP NA 989701107	51.92	26,568.63	88,938.96	0.06	62,370.33
829.000 ZOGENIX INC 98978L204	52.13	30,855.38	43,215.77	0.03	12,360.39
1,826.000 ZOETIS INC 98978V103	132.35	106,145.11	241,671.10	0.15	135,525.99
699.000 ZSCALER INC 98980G102	46.50	31,573.83	32,503.50	0.02	929.67
2,135.000 ZUORA INC 98983V106	14.33	29,564.07	30,594.55	0.02	1,030.48
3,400.000 ZYNGA INC 98986T108	6.12	8,364.00	20,808.00	0.01	12,444.00
401.000 AIRCASTLE LTD G0129K104	32.01	4,896.21	12,836.01	0.01	7,939.80
978.000 ALKERMES PLC G01767105	20.40	17,198.90	19,951.20	0.01	2,752.30

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726.000 ALLEGION PLC G0176J109	124.54	15,000.95	90,416.04	0.06	75,415.09
1,704.000 ALLERGAN PLC G0177J108	191.17	223,373.60	325,753.68	0.21	102,380.08
3,437.000 AMCOR PLC G0250X107	10.84	22,287.87	37,257.08	0.02	14,969.21
985.000 AMDOCS LTD G02602103	72.19	29,981.22	71,107.15	0.05	41,125.93
1,851.000 AON PLC/UK G0408V102	208.29	90,717.51	385,544.79	0.25	294,827.28
4,209.000 ARCH CAPITAL GROUP LTD G0450A105	42.89	35,251.56	180,524.01	0.11	145,272.45
261.000 ARGO GROUP INTERNATIONAL HOLDI G0464B107	65.75	4,844.35	17,160.75	0.01	12,316.40
1,919.000 ASSURED GUARANTY LTD G0585R106	49.02	26,139.79	94,069.38	0.06	67,929.59
370.000 ATLASSIAN CORP PLC G06242104	120.34	30,436.20	44,525.80	0.03	14,089.60
770.000 AXIS CAPITAL HOLDINGS LTD G0692U109	59.44	23,669.80	45,768.80	0.03	22,099.00

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3,133.000 ACCENTURE PLC G1151C101	210.57	130,710.66	659,715.81	0.42	529,005.15
150.000 CIMPRESS PLC G2143T103	125.77	5,083.50	18,865.50	0.01	13,782.00
551.000 CONSOLIDATED WATER CO LTD G23773107	16.30	5,052.67	8,981.30	0.01	3,928.63
2,412.000 EATON CORP PLC G29183103	94.72	124,169.75	228,464.64	0.15	104,294.89
50.000 ENSTAR GROUP LTD G3075P101	206.86	5,024.00	10,343.00	0.01	5,319.00
268.000 EVEREST RE GROUP LTD G3223R108	276.84	24,972.24	74,193.12	0.05	49,220.88
6,462.000 FRONTLINE LTD/BERMUDA G3682E192	12.86	28,922.45	83,101.32	0.05	54,178.87
2,546.000 FRUIT OF THE LOOM INC CL A G3682L105	0.00	21,603.27	0.00	0.00	-21,603.27
183.000 HELEN OF TROY LTD G4388N106	179.79	5,927.37	32,901.57	0.02	26,974.20
1,306.000 HERBALIFE NUTRITION LTD G4412G101	47.67	24,980.22	62,257.02	0.04	37,276.80

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1,592.000 JANUS HENDERSON GROUP PLC G4474Y214	24.45	29,385.36	38,924.40	0.02	9,539.04
1,628.000 HORIZON THERAPEUTICS PLC G46188101	36.20	30,766.06	58,933.60	0.04	28,167.54
1,340.000 IHS MARKIT LTD G47567105	75.35	48,153.63	100,969.00	0.06	52,815.37
2,177.000 INGERSOLL-RAND PLC G47791101	132.92	59,317.31	289,366.84	0.18	230,049.53
246.000 JAZZ PHARMACEUTICALS PLC G50871105	149.28	30,587.64	36,722.88	0.02	6,135.24
1,937.000 JOHNSON CONTROLS INTERNATIONAL G51502105	40.71	54,477.43	78,855.27	0.05	24,377.84
1,927.000 LINDE PLC G5494J103	212.90	118,932.99	410,258.30	0.26	291,325.31
2,368.000 MARVELL TECHNOLOGY GROUP LTD G5876H105	26.56	23,621.38	62,894.08	0.04	39,272.70
5,240.000 MEDTRONIC PLC G5960L103	113.45	396,741.42	594,478.00	0.38	197,736.58
1,495.000 APTIV PLC G6095L109	94.97	43,486.00	141,980.15	0.09	98,494.15

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1,215.000 NORWEGIAN CRUISE LINE HOLDINGS G66721104	58.41	52,288.25	70,968.15	0.05	18,679.90
1,399.000 NVENT ELECTRIC PLC G6700G107	25.58	17,314.78	35,786.42	0.02	18,471.64
1,284.000 SFL CORP LTD G7738W106	14.54	13,969.92	18,669.36	0.01	4,699.44
992.000 PENTAIR PLC G7S00T104	45.87	22,304.84	45,503.04	0.03	23,198.20
824.000 SENSATA TECHNOLOGIES HOLDING P G8060N102	53.87	34,797.52	44,388.88	0.03	9,591.36
4,376.000 TRONOX HOLDINGS PLC G9087Q102	11.42	24,243.04	49,973.92	0.03	25,730.88
1,275.000 CHUBB LTD H1467J104	155.66	81,245.54	198,466.50	0.13	117,220.96
15.000 GARMIN LTD H2906T109	97.56	471.00	1,463.40	0.00	992.40
6,929.000 TRANSOCEAN LTD H8817H100	6.88	30,111.50	47,671.52	0.03	17,560.02
440.000 SPOTIFY TECHNOLOGY SA L8681T102	149.55	61,802.40	65,802.00	0.04	3,999.60

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,497.000 LYONDELLBASELL INDUSTRIES NV N53745100	94.48	68,057.05	141,436.56	0.09	73,379.51
1,540.000 MYLAN NV N59465109	20.10	29,472.90	30,954.00	0.02	1,481.10
919.000 ROYAL CARIBBEAN CRUISES LTD V7780T103	133.51	24,280.67	122,695.69	0.08	98,415.02
6,361.000 ARDMORE SHIPPING CORP Y0207T100	9.05	31,969.66	57,567.05	0.04	25,597.39
1,405.000 WAVE LIFE SCIENCES LTD Y95308105	8.02	29,517.02	11,261.08	0.01	-18,255.94
TOTAL EQUITY U.S. DOLLAR		**54,427,297.93**	**157,012,302.42**	**99.79**	**102,585,004.49**
TOTAL ASSETS U.S. DOLLAR		**54,754,645.60**	**157,339,650.09**	**100.00**	**102,585,004.49**
TOTAL ASSETS		**54,754,645.60**	**157,339,650.09**	**100.00**	**102,585,004.49**

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Security ID	Shares/Par Description	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
AUSTRALIAN DOLLAR						
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		21,508.48	21,966.52	0.04	458.04
EQUITY						
AA6041997	1,065.000 RAMSAY HEALTH CARE LTD	50.98	40,493.77	54,298.99	0.09	13,805.22
AA6065582	8,758.000 AUSTRALIA & NEW ZEALAND BANKIN	17.31	153,635.83	151,633.02	0.24	-2,002.81
AA6076142	10,227.000 WESTPAC BANKING CORP	17.03	202,404.80	174,191.16	0.28	-28,213.64
AA6086257	13,747.000 FORTESCUE METALS GROUP LTD	7.51	37,319.16	103,302.32	0.17	65,983.16
AA6087289	19,064.000 TELSTRA CORP LTD	2.49	39,855.44	47,439.68	0.08	7,584.24
AA6129222	689.000 ASX LTD	55.12	21,512.80	37,976.52	0.06	16,463.72
AA6144692	12,537.000 BHP GROUP LTD	27.36	256,644.78	342,997.45	0.55	86,352.67
AA6161506	1,569.000 CALTEX AUSTRALIA LTD	23.87	25,176.25	37,444.42	0.06	12,268.17

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17,186.000 MIRVAC GROUP AA6161977	2.24	24,413.99	38,417.26	0.06	14,003.27
3,485.000 COMPUTERSHARE LTD AA6180415	11.80	29,580.61	41,107.32	0.07	11,526.71
2,222.000 CSL LTD AA6185497	193.85	74,106.89	430,724.68	0.69	356,617.79
818.000 REA GROUP LTD AA6198573	72.83	29,597.06	59,571.36	0.10	29,974.30
14,158.000 TRANSURBAN GROUP AA6200882	10.48	92,279.61	148,389.78	0.24	56,110.17
226.000 COCHLEAR LTD AA6211798	157.97	15,087.34	35,702.11	0.06	20,614.77
9,058.000 ORIGIN ENERGY LTD AA6214867	5.94	40,631.41	53,803.86	0.09	13,172.45
8,417.000 COMMONWEALTH BANK OF AUSTRALIA AA6215039	56.17	431,812.35	472,746.74	0.76	40,934.39
1,783.000 RIO TINTO LTD AA6220104	70.58	88,993.39	125,837.33	0.20	36,843.94
5,092.000 APA GROUP AA6247305	7.80	29,345.80	39,731.58	0.06	10,385.78

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3,015.000 ARISTOCRAT LEISURE LTD AA6253980	23.67	30,333.42	71,360.00	0.11	41,026.58
8,113.000 INSURANCE AUSTRALIA GROUP LTD AA6271024	5.38	30,021.58	43,685.24	0.07	13,663.66
12,878.000 GPT GROUP/THE AA6365867	3.94	39,479.76	50,694.50	0.08	11,214.74
2,429.000 LENDLEASE CORP LTD AA6512005	12.37	27,638.61	30,051.39	0.05	2,412.78
3,082.000 BLUESCOPE STEEL LTD AA6533233	10.59	25,190.92	32,627.37	0.05	7,436.45
4,368.000 WORLEY LTD AA6562471	10.76	36,696.64	47,009.13	0.08	10,312.49
6,175.000 SUNCORP GROUP LTD AA6585084	9.11	52,244.61	56,255.68	0.09	4,011.07
7,983.000 NATIONAL AUSTRALIA BANK LTD AA6624602	17.31	142,762.12	138,214.94	0.22	-4,547.18
4,156.000 NEWCREST MINING LTD AA6637109	21.26	45,678.53	88,374.17	0.14	42,695.64
12,836.000 INCITEC PIVOT LTD AA6673047	2.24	27,271.81	28,693.35	0.05	1,421.54

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24,809.000 AMP LTD AA6709957	1.35	27,526.37	33,396.62	0.05	5,870.25
5,341.000 QANTAS AIRWAYS LTD AA6710344	5.00	14,882.68	26,694.18	0.04	11,811.50
4,876.000 QBE INSURANCE GROUP LTD AA6715749	9.05	36,180.97	44,147.28	0.07	7,966.31
12,601.000 SANTOS LTD AA6776709	5.75	54,329.47	72,457.40	0.12	18,127.93
2,195.000 SONIC HEALTHCARE LTD AA6821125	20.21	31,317.86	44,360.54	0.07	13,042.68
2,009.000 WASHINGTON H SOUL PATTINSON & AA6821802	15.11	27,697.11	30,362.87	0.05	2,665.76
10,101.000 STOCKLAND AA6850850	3.25	26,828.44	32,804.30	0.05	5,975.86
2,762.000 WESFARMERS LTD AA6948837	29.10	68,965.11	80,380.08	0.13	11,414.97
2,438.000 WOODSIDE PETROLEUM LTD AA6979725	24.17	56,357.56	58,920.17	0.09	2,562.61
5,016.000 WOOLWORTHS GROUP LTD AA6981234	25.42	104,823.25	127,500.06	0.20	22,676.81

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3,380.000	DEXUS AAB033YN9	8.22	15,136.42	27,798.86	0.04	12,662.44
5,024.000	GOODMAN GROUP AAB03FYZ5	9.40	15,159.49	47,217.77	0.08	32,058.28
3,704.000	BRAMBLES LTD AAB1FJ0C0	8.24	26,713.12	30,515.68	0.05	3,802.56
1,634.000	MACQUARIE GROUP LTD AAB28YTC2	96.90	63,116.65	158,337.31	0.25	95,220.66
1,986.000	CROWN RESORTS LTD AAB29LCJ2	8.44	14,820.75	16,766.66	0.03	1,945.91
2,284.000	JAMES HARDIE INDUSTRIES PLC AAB60QWJ9	19.59	15,066.60	44,746.34	0.07	29,679.74
2,473.000	TREASURY WINE ESTATES LTD AAB61JC64	11.42	8,589.51	28,231.54	0.05	19,642.03
7,766.000	SYDNEY AIRPORT AAB70DWB3	6.09	22,111.86	47,275.89	0.08	25,164.03
297.000	ONEMARKET LTD AABFM70D5	0.68	342.33	202.51	0.00	-139.82
10,374.000	SCENTRE GROUP AABLZH0Z7	2.69	29,477.93	27,929.90	0.04	-1,548.03

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
31,650.000	AUSNET SERVICES AABPXR7J7	1.20	36,417.01	37,822.22	0.06	1,405.21
12,129.000	MEDIBANK PVT LTD AABRTNNQ3	2.22	27,787.44	26,942.41	0.04	-845.03
2,825.000	AGL ENERGY LTD AABSS7GP7	14.43	29,511.17	40,769.17	0.07	11,258.00
16,422.000	SOUTH32 LTD AABWSW5D2	1.90	28,108.00	31,168.38	0.05	3,060.38
16,290.000	VICINITY CENTRES AABY7QXS0	1.75	27,907.98	28,513.13	0.05	605.15
4,735.000	COLES GROUP LTD AABYWR0T4	10.43	42,902.17	49,394.47	0.08	6,492.30
	TOTAL EQUITY AUSTRALIAN DOLLAR		**2,942,286.53**	**4,176,937.09**	**6.68**	**1,234,650.56**
	TOTAL ASSETS AUSTRALIAN DOLLAR		**2,963,795.01**	**4,198,903.61**	**6.72**	**1,235,108.60**
DANISH KRONE						
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		5,026.60	5,043.00	0.01	16.40
EQUITY						
359.000	CARLSBERG AS SD4169217	149.29	40,186.46	53,593.84	0.09	13,407.38

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6,741.000 DANSKE BANK A/S SD4588820	16.19	88,858.72	109,160.25	0.17	20,301.53
176.000 GENMAB A/S SD4595734	222.55	21,282.63	39,168.39	0.06	17,885.76
796.000 VESTAS WIND SYSTEMS A/S SD5964657	101.13	29,535.87	80,496.80	0.13	50,960.93
1,267.000 DSV PANALPINA A/S SDB1WT5G0	115.34	23,660.81	146,132.28	0.23	122,471.47
837.000 PANDORA A/S SDB44XTX3	43.53	28,541.39	36,437.22	0.06	7,895.83
1,000.000 NOVOZYMES A/S SDB798FW3	48.97	26,215.68	48,971.01	0.08	22,755.33
500.000 COLOPLAST A/S SDB8FMRX8	124.14	14,432.49	62,070.00	0.10	47,637.51
8,083.000 NOVO NORDISK A/S SDBHC8X98	58.08	128,617.99	469,474.53	0.75	340,856.54
369.000 ORSTED A/S SDBYT16L1	103.50	28,727.12	38,191.53	0.06	9,464.41
TOTAL EQUITY DANISH KRONE		**430,059.16**	**1,083,695.85**	**1.73**	**653,636.69**
TOTAL ASSETS DANISH KRONE		**435,085.76**	**1,088,738.85**	**1.74**	**653,653.09**

EURO CURRENCY UNIT

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		41,385.23	41,751.06	0.07	365.83
EQUITY						
1,285.000 EA4651454	OMV AG	56.21	44,222.28	72,236.02	0.12	28,013.74
2,277.000 EA5289833	ERSTE GROUP BANK AG	37.67	60,057.76	85,777.09	0.14	25,719.33
1,286.000 EAB0704T7	RAIFFEISEN BANK INTERNATIONAL	25.13	28,336.55	32,320.75	0.05	3,984.20
24.000 EABFZ5BQ0	IMMOFINANZ AG	26.83	0.00	643.87	0.00	643.87
1,990.000 EB4497740	KBC GROUP NV	75.27	106,830.02	149,796.95	0.24	42,966.93
369.000 EB5596995	UCB SA	79.59	16,023.06	29,366.96	0.05	13,343.90
294.000 EB7097323	GROUPE BRUXELLES LAMBERT SA	105.47	27,239.81	31,008.21	0.05	3,768.40
1,737.000 EBB86S2N3	AGEAS SA/NV	59.13	59,674.89	102,714.54	0.16	43,039.65

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844.000 UMICORE SA EBBF44467	48.67	15,349.46	41,078.83	0.07	25,729.37
3,229.000 ANHEUSER-BUSCH INBEV SA/NV EBBYYHL24	81.62	166,276.98	263,541.21	0.42	97,264.23
937.000 ADIDAS AG ED4031974	325.30	55,706.68	304,806.57	0.49	249,099.89
1,998.000 FRESENIUS SE & CO KGAA ED4352099	56.33	57,849.16	112,541.45	0.18	54,692.29
980.000 UNITED INTERNET AG ED4354137	32.87	15,204.65	32,209.46	0.05	17,004.81
302.000 HANNOVER RUECK SE ED4511801	193.41	15,281.62	58,408.84	0.09	43,127.22
656.000 GEA GROUP AG ED4557101	33.09	15,646.56	21,707.89	0.03	6,061.33
249.000 CONTINENTAL AG ED4598584	129.38	19,098.92	32,215.46	0.05	13,116.54
4,273.000 DEUTSCHE POST AG ED4617855	38.18	86,892.44	163,127.01	0.26	76,234.57
561.000 MERCK KGAA ED4741846	118.26	36,308.31	66,341.27	0.11	30,032.96

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1,641.000 RWE AG ED4768963	30.70	36,916.66	50,379.32	0.08	13,462.66
3,662.000 SAP SE ED4846280	135.06	195,540.75	494,586.79	0.79	299,046.04
3,848.000 E.ON SE ED4942907	10.69	29,552.83	41,137.77	0.07	11,584.94
520.000 HENKEL AG & CO KGAA ED5002461	94.29	24,485.06	49,030.80	0.08	24,545.74
3,795.000 BAYER AG ED5069213	81.73	262,327.78	310,162.41	0.50	47,834.63
3,672.000 BASF SE ED5086571	75.60	233,752.41	277,604.58	0.44	43,852.17
234.000 BEIERSDORF AG ED5107401	119.71	27,209.97	28,013.22	0.04	803.25
180.000 HOCHTIEF AG ED5108664	127.63	15,546.92	22,973.09	0.04	7,426.17
957.000 HEIDELBERGCEMENT AG ED5120677	72.92	58,700.27	69,782.14	0.11	11,081.87
971.000 FRESENIUS MEDICAL CARE AG & CO ED5129074	74.04	54,716.77	71,892.94	0.12	17,176.17

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1,815.000	ALLIANZ SE ED5231482	245.15	231,078.78	444,954.51	0.71	213,875.73
823.000	MUENCHENER RUECKVERSICHERUNGS- ED5294126	295.22	135,814.45	242,964.00	0.39	107,149.55
68.000	VOLKSWAGEN AG ED5497109	194.47	6,594.43	13,224.17	0.02	6,629.74
3,426.000	DAIMLER AG ED5529026	55.42	164,288.64	189,861.47	0.30	25,572.83
3,367.000	SIEMENS AG ED5727976	130.82	325,362.48	440,457.98	0.70	115,095.50
10,601.000	DEUTSCHE BANK AG ED5750358	7.76	77,340.35	82,309.69	0.13	4,969.34
1,471.000	BAYERISCHE MOTOREN WERKE AG ED5756025	82.10	72,862.77	120,768.59	0.19	47,905.82
14,152.000	DEUTSCHE TELEKOM AG ED5842353	16.35	199,476.04	231,453.48	0.37	31,977.44
6,285.000	INFINEON TECHNOLOGIES AG ED5889503	22.80	54,946.54	143,285.27	0.23	88,338.73
494.000	DEUTSCHE BOERSE AG ED7021964	157.32	60,760.20	77,715.28	0.12	16,955.08

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308.000 WIRECARD AG ED7508929	120.67	36,441.45	37,165.98	0.06	724.53
631.000 LANXESS AG EDB05M8B0	67.15	29,060.45	42,370.36	0.07	13,309.91
160.000 MTU AERO ENGINES AG EDB09DHL4	285.79	38,772.01	45,726.16	0.07	6,954.15
1,907.000 DEUTSCHE WOHNEN SE EDB0YZ0Z4	40.88	37,687.83	77,960.93	0.12	40,273.10
506.000 SYMRISE AG EDB1JB4K1	105.29	43,126.14	53,276.99	0.09	10,150.85
747.000 BRENNTAG AG EDB4YVF55	54.42	29,709.92	40,650.84	0.07	10,940.92
1,661.000 EVONIK INDUSTRIES AG EDB5ZQ9D2	30.54	41,484.00	50,732.30	0.08	9,248.30
14,466.000 TELEFONICA DEUTSCHLAND HOLDING EDB7VG6L9	2.90	36,724.34	41,959.21	0.07	5,234.87
400.000 HUGO BOSS AG EDB88MHC8	48.56	17,849.17	19,423.74	0.03	1,574.57
2,905.000 VONOVIA SE EDBBJPFY6	53.88	94,028.23	156,521.40	0.25	62,493.17

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1,993.000 METRO AG EDBD6QT86	16.11	27,473.78	32,102.99	0.05	4,629.21
578.000 INNOGY SE EDBDCFZS2	50.06	25,702.76	28,936.70	0.05	3,233.94
3,376.000 AROUNDTOWN SA EDBF0CK46	8.96	27,795.32	30,255.84	0.05	2,460.52
354.000 OSRAM LICHT AG EDBKMJP33	45.52	10,258.82	16,113.15	0.03	5,854.33
897.000 ZALANDO SE EDBQV0SV6	50.71	27,631.67	45,490.95	0.07	17,859.28
142.000 LINDE PLC EDBYWD9S8	214.17	19,613.98	30,412.57	0.05	10,798.59
889.000 QIAGEN NV EDBYXS699	34.19	21,513.07	30,396.11	0.05	8,883.04
974.000 UNIPER SE EDBZ6CZ40	33.12	27,301.18	32,263.73	0.05	4,962.55
751.000 DELIVERY HERO SE EDBZCNB45	79.20	24,812.17	59,481.90	0.10	34,669.73
2,355.000 ENDESA SA EE5271783	26.70	44,418.51	62,888.57	0.10	18,470.06

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
32,871.000 BANCO BILBAO VIZCAYA ARGENTARI EE5501908	5.59	162,062.33	183,861.22	0.29	21,798.89
922.000 NATURGY ENERGY GROUP SA EE5650424	25.14	16,606.98	23,182.77	0.04	6,575.79
4,476.000 REPSOL SA EE5669358	15.64	70,003.80	69,988.64	0.11	-15.16
51,267.000 BANCO SANTANDER SA EE5705947	4.19	252,233.38	214,651.08	0.34	-37,582.30
9,141.000 TELEFONICA SA EE5732529	6.99	67,644.81	63,893.83	0.10	-3,750.98
562.000 ENAGAS SA EE7383073	25.53	12,616.70	14,345.42	0.02	1,728.72
720.000 ACS ACTIVIDADES DE CONSTRUCCIO EEB01FLQ9	40.02	27,607.28	28,812.33	0.05	1,205.05
3,827.000 FERROVIAL SA EEB038516	30.27	55,955.83	115,857.93	0.19	59,902.10
27,513.000 IBERDROLA SA EEB288C92	10.30	187,461.13	283,509.08	0.45	96,047.95
1,668.000 AMADEUS IT GROUP SA EEB3MSM24	81.72	60,683.03	136,305.62	0.22	75,622.59

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8,036.000 INTERNATIONAL CONSOLIDATED AIR EEB5282K7	8.10	33,255.99	65,127.36	0.10	31,871.37
3,004.000 RED ELECTRICA CORP SA EEBD6FXN0	20.12	34,763.94	60,442.92	0.10	25,678.98
4,476.000 REPSOL SA EEBK80VN7 RTS	0.47	2,116.73	2,125.29	0.00	8.56
5,512.000 INDUSTRIA DE DISENO TEXTIL SA EEBP9DL99	35.30	78,389.29	194,588.07	0.31	116,198.78
350.000 AENA SME SA EEBVRZ8L5	191.39	29,942.47	66,985.19	0.11	37,042.72
2,182.000 GRIFOLS SA EEBYY3DX0	35.28	16,827.35	76,981.34	0.12	60,153.99
31,448.000 BANKIA SA EEBZ3C3Q7	2.14	57,481.20	67,158.97	0.11	9,677.77
830.000 BOUYGUES SA EF4002129	42.52	28,105.69	35,291.85	0.06	7,186.16
2,791.000 AIRBUS SE EF4012250	146.46	97,762.91	408,780.47	0.65	311,017.56
4,319.000 VEOLIA ENVIRONNEMENT SA EF4031870	26.61	73,901.70	114,947.92	0.18	41,046.22

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1,070.000 L'OREAL SA EF4057800	296.34	129,297.08	317,083.80	0.51	187,786.72
1,249.000 LVMH MOET HENNESSY LOUIS VUITT EF4061414	464.94	159,381.12	580,709.44	0.93	421,328.32
377.000 THALES SA EF4162790	103.85	15,183.26	39,152.84	0.06	23,969.58
809.000 CAPGEMINI SE EF4163434	122.24	40,722.86	98,892.36	0.16	58,169.50
894.000 CASINO GUICHARD PERRACHON SA EF4178416	46.81	33,313.34	41,846.58	0.07	8,533.24
463.000 INGENICO GROUP SA EF4196897	108.66	27,691.71	50,308.65	0.08	22,616.94
685.000 PUBLICIS GROUPE SA EF4380426	45.30	30,576.06	31,033.31	0.05	457.25
831.000 CIE GENERALE DES ETABLISSEMENT EF4588366	122.46	65,493.15	101,768.21	0.16	36,275.06
931.000 PERNOD RICARD SA EF4682326	178.93	89,689.78	166,580.57	0.27	76,890.79
649.000 RENAULT SA EF4712792	47.35	31,205.32	30,728.24	0.05	-477.08

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1,886.000 SCHNEIDER ELECTRIC SE EF4834109	102.71	112,216.96	193,708.70	0.31	81,491.74
4,303.000 VIVENDI SA EF4834778	28.98	93,367.36	124,713.63	0.20	31,346.27
5,065.000 ORANGE SA EF5176179	14.73	75,949.35	74,593.27	0.12	-1,356.08
113.000 HERMES INTERNATIONAL EF5253978	747.81	43,131.50	84,502.47	0.14	41,370.97
640.000 DASSAULT SYSTEMES SE EF5330040	164.50	19,313.04	105,281.52	0.17	85,968.48
403.000 KERING SA EF5505070	656.89	61,526.31	264,725.46	0.42	203,199.15
2,471.000 CARREFOUR SA EF5641560	16.78	42,121.26	41,466.78	0.07	-654.48
388.000 ATOS SE EF5654787	83.42	22,426.57	32,368.59	0.05	9,942.02
4,143.000 SANOFI EF5671732	100.60	317,630.91	416,779.38	0.67	99,148.47
496.000 ACCOR SA EF5852845	46.86	20,448.75	23,244.73	0.04	2,795.98

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4,216.000	NOKIA OYJ EF5946456	3.71	27,418.81	15,650.24	0.03	-11,768.57
3,696.000	STMICROELECTRONICS NV EF5962339	26.91	48,133.82	99,445.78	0.16	51,311.96
5,296.000	SOCIETE GENERALE SA EF5966512	34.81	128,186.69	184,376.73	0.29	56,190.04
71.000	EUROFINS SCIENTIFIC SE EF5972643	554.74	29,016.30	39,386.50	0.06	10,370.20
180.000	TELEPERFORMANCE EF5999331	244.03	27,499.99	43,925.67	0.07	16,425.68
396.000	EURAZEO SE EF7042395	68.47	26,956.58	27,115.11	0.04	158.53
376.000	SODEXO SA EF7062716	118.59	22,942.37	44,590.64	0.07	21,648.27
8,804.000	AXA SA EF7088422	28.19	200,731.94	248,149.32	0.40	47,417.38
4,097.000	PEUGEOT SA EF7103528	23.91	59,025.69	97,956.20	0.16	38,930.51
1,061.000	ESSILORLUXOTTICA SA EF7212477	152.44	83,892.42	161,734.07	0.26	77,841.65

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9,644.000	CREDIT AGRICOLE SA EF7262613	14.51	108,927.42	139,918.17	0.22	30,990.75
3,664.000	BNP PARIBAS SA EF7309687	59.30	177,093.14	217,281.34	0.35	40,188.20
1,907.000	CIE DE SAINT-GOBAIN EF7380480	40.97	62,595.98	78,132.17	0.12	15,536.19
332.000	WENDEL SE EF7390117	133.02	36,231.34	44,161.40	0.07	7,930.06
1,132.000	KLEPIERRE SA EF7582556	38.00	36,038.84	43,012.18	0.07	6,973.34
200.000	GECINA SA EF7742465	179.15	25,515.54	35,830.20	0.06	10,314.66
1,803.000	SES SA EFB00ZQQ8	14.03	27,750.54	25,298.34	0.04	-2,452.20
1,219.000	SAFRAN SA EFB058TZ0	154.51	77,277.63	188,350.28	0.30	111,072.65
6,525.000	ENGIE SA EFB0C2CQ3	16.16	89,645.56	105,470.10	0.17	15,824.54
673.000	ALSTOM SA EFB0DJ8Q0	47.40	27,018.64	31,902.34	0.05	4,883.70

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Base Currency : USD
Status : FINAL

PARAMETRIC EAFE PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,482.000 ELECTRICITE DE FRANCE SA EFB0NJJ12	11.14	15,119.84	16,515.68	0.03	1,395.84
470.000 ARKEMA SA EFB0Z5YZ7	106.30	31,027.95	49,961.35	0.08	18,933.40
1,000.000 LEGRAND SA EFB11ZRK7	81.54	45,852.70	81,538.40	0.13	35,685.70
399.000 EIFFAGE SA EFB13X011	114.50	25,885.21	45,683.51	0.07	19,798.30
10,262.000 TOTAL SE EFB15C551	55.23	532,801.30	566,739.47	0.91	33,938.17
187.000 AEROPORTS DE PARIS EFB164FY4	197.67	15,622.18	36,964.71	0.06	21,342.53
7,471.000 NATIXIS SA EFB1HDJL6	4.44	29,052.75	33,192.57	0.05	4,139.82
662.000 SCOR SE EFB1LB9P7	42.00	16,982.19	27,806.61	0.04	10,824.42
2,602.000 VINCI SA EFB1XH021	111.13	154,439.34	289,153.76	0.46	134,714.42
2,644.000 DANONE SA EFB1Y9TB7	82.95	174,071.32	219,327.07	0.35	45,255.75

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PARAMETRIC EAFE PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,653.000 AIR LIQUIDE SA EFB1YXBJ6	141.66	129,639.35	234,163.15	0.37	104,523.80
1,628.000 BUREAU VERITAS SA EFB28DTJ8	26.11	29,434.12	42,506.02	0.07	13,071.90
1,907.000 GETLINK SE EFB292JQ6	17.41	27,002.48	33,200.82	0.05	6,198.34
2,055.000 EDENRED EFB62G1B5	51.75	43,833.44	106,340.60	0.17	62,507.16
388.000 BIOMERIEUX EFBF0LBX7	89.07	25,927.39	34,559.31	0.06	8,631.92
363.000 UNIBAIL-RODAMCO-WESTFIELD EFBF2PQ02	157.88	54,875.86	57,310.30	0.09	2,434.44
154.000 WORLDLINE SA/FRANCE EFBNFWR47	70.89	9,720.93	10,916.42	0.02	1,195.49
479.000 AMUNDI SA EFBYZR017	78.46	27,168.14	37,583.66	0.06	10,415.52
3,537.000 ASSICURAZIONI GENERALI SPA EI4056715	20.65	61,611.93	73,033.35	0.12	11,421.42
40,611.000 INTESA SANPAOLO SPA EI4076838	2.64	93,551.05	107,058.36	0.17	13,507.31

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PARAMETRIC EAFE PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6,409.000 MEDIOBANCA BANCA DI CREDITO FI EI4574816	11.02	59,868.88	70,602.93	0.11	10,734.05
41,059.000 ENEL SPA EI7144567	7.94	186,604.43	325,939.48	0.52	139,335.05
11,000.000 ENI SPA EI7145051	15.54	169,177.60	170,963.49	0.27	1,785.89
11,422.000 SNAM SPA EI7251479	5.26	49,698.93	60,080.12	0.10	10,381.19
25,299.000 TELECOM ITALIA SPA/MILANO EI7634393	0.62	14,816.13	15,800.71	0.03	984.58
1,975.000 ATLANTIA SPA EI7667161	23.34	42,270.72	46,090.13	0.07	3,819.41
13,145.000 TERNA RETE ELETTRICA NAZIONALE EIB01BN53	6.68	58,592.17	87,852.83	0.14	29,260.66
1,306.000 PRYSMIAN SPA EIB1W4V62	24.12	20,667.44	31,504.02	0.05	10,836.58
415.000 FERRARI NV EIBD6G500	166.02	37,941.43	68,897.37	0.11	30,955.94
4,508.000 CNH INDUSTRIAL NV EIBDSV2V8	10.99	38,242.29	49,539.65	0.08	11,297.36

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
785.000 MONCLER SPA EIBGLP233	44.98	27,333.09	35,308.18	0.06	7,975.09
4,410.000 FINECOBANK BANCA FINECO SPA EIBNGN9Z1	12.00	45,638.84	52,917.91	0.08	7,279.07
7,151.000 FIAT CHRYSLER AUTOMOBILES NV EIBRJFWP2	14.81	61,742.92	105,908.20	0.17	44,165.28
4,038.000 UNICREDIT SPA EIBYMXPS6	14.61	47,746.18	59,015.17	0.09	11,268.99
727.000 EXOR NV EIBYSLCX9	77.54	29,454.72	56,373.25	0.09	26,918.53
793.000 RANDSTAD NV EN5228650	61.11	37,544.28	48,459.36	0.08	10,915.08
1,113.000 WOLTERS KLUWER NV EN5671511	72.98	24,519.12	81,232.25	0.13	56,713.13
661.000 KONINKLIJKE VOPAK NV EN5809426	54.25	30,766.52	35,859.53	0.06	5,093.01
13,995.000 KONINKLIJKE KPN NV EN5956078	2.95	44,466.39	41,331.40	0.07	-3,134.99
3,764.000 KONINKLIJKE PHILIPS NV EN5986620	48.85	135,221.21	183,875.92	0.29	48,654.71

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,136.000 HEINEKEN NV EN7792554	106.55	68,679.75	121,038.19	0.19	52,358.44
1,154.000 KONINKLIJKE DSM NV ENB0HZL96	130.32	54,840.45	150,391.88	0.24	95,551.43
6,144.000 UNILEVER NV ENB1527V7	57.51	201,877.35	353,314.87	0.57	151,437.52
1,554.000 ASML HOLDING NV ENB929F49	296.00	87,437.95	459,989.05	0.74	372,551.10
5,882.000 KONINKLIJKE AHOLD DELHAIZE NV ENBD0Q396	25.03	94,071.11	147,203.74	0.24	53,132.63
932.000 AKZO NOBEL NV ENBJ2KSG1	101.74	63,675.31	94,824.85	0.15	31,149.54
1,247.000 PROSUS NV ENBJDS7L4	74.68	93,343.69	93,125.87	0.15	-217.82
4,873.000 ABN AMRO BANK NV ENBYQP139	18.21	84,639.39	88,722.47	0.14	4,083.08
4,451.000 RELX PLC ENBYWLC62	25.21	35,469.91	112,215.72	0.18	76,745.81
15,241.000 ING GROEP NV ENBZ57394	12.00	164,721.31	182,850.55	0.29	18,129.24

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,864.000	BANCO ESPIRITO SANTO SA EP4058061	0.00	10,159.42	0.00	0.00	-10,159.42
3,134.000	JERONIMO MARTINS SGPS SA EPB1Y1SQ0	16.46	35,524.44	51,590.22	0.08	16,065.78
3,594.000	CRH PLC EZ4182240	40.04	91,733.03	143,902.23	0.23	52,169.20
476.000	DCC ORD EURO0.25 EZ4189476	95.94	40,395.47	45,667.48	0.07	5,272.01
626.000	KINGSPAN GROUP PLC EZ4491237	61.12	25,016.50	38,261.20	0.06	13,244.70
805.000	KERRY GROUP PLC EZ4519573	124.71	25,659.93	100,391.35	0.16	74,731.42
1,039.000	SMURFIT KAPPA GROUP PLC EZB1RR824	38.46	26,869.24	39,956.67	0.06	13,087.43
10,230.000	BANK OF IRELAND GROUP PLC EZBD1RP68	5.48	39,386.64	56,060.86	0.09	16,674.22
387.000	FLUTTER ENTERTAINMENT PLC EZBWT6H87	121.62	27,989.24	47,068.05	0.08	19,078.81
2,016.000	WARTSILA OYJ ABP SF4525181	11.06	17,489.02	22,290.16	0.04	4,801.14

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,469.000 UPM-KYMMENE OYJ SF5051252	34.70	38,067.83	85,665.60	0.14	47,597.77
2,779.000 STORA ENSO OYJ SF5072670	14.55	21,925.24	40,443.38	0.06	18,518.14
1,485.000 SAMPO OYJ SF5226037	43.68	45,395.80	64,859.57	0.10	19,463.77
729.000 ELISA OYJ SF5701518	55.28	15,096.99	40,301.40	0.06	25,204.41
511.000 NELES OYJ SF5713422	39.49	13,530.68	20,179.16	0.03	6,648.48
18,123.000 NOKIA OYJ SF5902942	3.70	85,681.33	67,050.75	0.11	-18,630.58
2,586.000 NESTE OYJ SFB06YV43	34.82	15,247.76	90,044.39	0.14	74,796.63
578.000 NOKIAN RENKAAT OYJ SFB07G375	28.77	15,030.89	16,628.87	0.03	1,597.98
1,447.000 KONE OYJ SFB09M9D1	65.42	36,002.98	94,661.73	0.15	58,658.75
912.000 ORION OYJ SFB17NY41	46.33	24,830.27	42,248.92	0.07	17,418.65

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
197.000 NORDEA BANK ABP SFBFM0SV0	8.13	1,249.84	1,601.00	0.00	351.16
TOTAL EQUITY EURO CURRENCY UNIT		**12,179,657.04**	**19,498,200.11**	**31.19**	**7,318,543.07**
PREFERRED SECURITIES					
784.000 FUCHS PETROLUB SE ED4354350	49.57	26,879.23	38,862.57	0.06	11,983.34
713.000 HENKEL AG & CO KGAA ED5076705	103.49	39,255.97	73,791.58	0.12	34,535.61
660.000 VOLKSWAGEN AG ED5497166	197.83	79,029.42	130,567.40	0.21	51,537.98
438.000 BAYERISCHE MOTOREN WERKE AG ED5756033	61.79	15,786.09	27,065.61	0.04	11,279.52
824.000 PORSCHE AUTOMOBIL HOLDING SE ED7101063	74.80	51,415.59	61,638.00	0.10	10,222.41
TOTAL PREFERRED SECURITIES EURO CURRENCY UNIT		**212,366.30**	**331,925.16**	**0.53**	**119,558.86**
TOTAL ASSETS EURO CURRENCY UNIT		**12,433,408.57**	**19,871,876.33**	**31.79**	**7,438,467.76**
HONG KONG DOLLAR					
CASH & CASH EQUIVALENTS					
NON-BASE CURRENCY		5,535.33	5,552.16	0.01	16.83
EQUITY					

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
16,000.000 HANG LUNG PROPERTIES LTD FH6030503 HK/00101	2.19	29,692.24	35,113.84	0.06	5,421.60
21,000.000 BANK OF EAST ASIA LTD/THE FH6075649 HK/00023	2.23	53,402.56	46,895.45	0.08	-6,507.11
8,500.000 CLP HOLDINGS LTD FH6097015 HK/00002	10.51	61,660.43	89,343.93	0.14	27,683.50
4,700.000 HONG KONG EXCHANGES & CLEARING FH6267352 HK/00388	32.47	80,061.03	152,609.15	0.24	72,548.12
8,000.000 MTR CORP LTD FH6290057 HK/00066	5.91	32,630.95	47,280.47	0.08	14,649.52
3,200.000 HANG SENG BANK LTD FH6408378 HK/00011	20.66	63,147.61	66,120.79	0.11	2,973.18
9,883.000 HENDERSON LAND DEVELOPMENT CO FH6420530 HK/00012	4.91	35,839.84	48,515.72	0.08	12,675.88
6,000.000 POWER ASSETS HOLDINGS LTD FH6435322 HK/00006	7.32	35,939.52	43,892.30	0.07	7,952.78
13,000.000 WHARF HOLDINGS LTD/THE FH6435579 HK/00004	2.54	29,109.01	33,068.10	0.05	3,959.09
41,826.000 HONG KONG & CHINA GAS CO LTD FH6436551 HK/00003	1.95	41,290.02	81,700.21	0.13	40,410.19

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
10,000.000 GALAXY ENTERTAINMENT GROUP LTD FH6465873 HK/00027	7.37	18,442.23	73,667.19	0.12	55,224.96
8,000.000 KERRY PROPERTIES LTD FH6486317 HK/00683	3.18	26,409.48	25,411.33	0.04	-998.15
15,000.000 BOC HONG KONG HOLDINGS LTD FH6536111 HK/02388	3.47	36,200.02	52,073.98	0.08	15,873.96
28,000.000 NEW WORLD DEVELOPMENT CO LTD FH6633769 HK/00017	1.37	36,064.68	38,378.81	0.06	2,314.13
40,000.000 SHANGRI-LA ASIA LTD FH6771031 HK/00069	1.04	41,016.18	41,787.52	0.07	771.34
20,000.000 SINO LAND CO LTD FH6810425 HK/00083	1.45	29,310.64	29,056.19	0.05	-254.45
6,000.000 SUN HUNG KAI PROPERTIES LTD FH6859927 HK/00016	15.31	77,930.64	91,865.81	0.15	13,935.17
8,000.000 WHEELOCK & CO LTD FH6981481 HK/00020	6.67	33,310.61	53,338.12	0.09	20,027.51
9,000.000 TECHTRONIC INDUSTRIES CO LTD FHB0190C9 HK/00669	8.16	30,343.27	73,404.09	0.12	43,060.82
13,360.000 LINK REIT FHB0PB4M2 HK/00823	10.59	57,751.01	141,456.40	0.23	83,705.39

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PARAMETRIC EAFE PI1 - [redacted] **12/31/2019**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
12,800.000 WYNN MACAU LTD FHB4JSTL9 HK/01128	2.46	26,914.35	31,540.85	0.05	4,626.50
47,800.000 AIA GROUP LTD FHB4TX8S5 HK/01299	10.50	150,684.05	501,814.73	0.80	351,130.68
21,000.000 HKT TRUST & HKT LTD FHB4TXDZ3 HK/06823	1.41	26,479.55	29,592.65	0.05	3,113.10
10,000.000 SANDS CHINA LTD FHB5B23W5 HK/01928	5.35	16,457.09	53,453.63	0.09	36,996.54
2,100.000 SWIRE PROPERTIES LTD FHB67C2G2 HK/01972	3.32	3,862.12	6,966.94	0.01	3,104.82
34,500.000 WH GROUP LTD FHBLLHKZ0 HK/00288	1.03	26,069.69	35,643.24	0.06	9,573.55
13,392.000 CK HUTCHISON HOLDINGS LTD FHBW9P811 HK/00001	9.54	102,627.94	127,701.64	0.20	25,073.70
4,000.000 CK INFRASTRUCTURE HOLDINGS LTD FHBYVS6J9 HK/01038	7.12	18,780.87	28,465.82	0.05	9,684.95
12,392.000 CK ASSET HOLDINGS LTD FHBYZQ071 HK/01113	7.22	54,195.47	89,459.43	0.14	35,263.96
TOTAL EQUITY HONG KONG DOLLAR		**1,275,623.10**	**2,169,618.33**	**3.47**	**893,995.23**
TOTAL ASSETS HONG KONG DOLLAR		**1,281,158.43**	**2,175,170.49**	**3.48**	**894,012.06**

ISRAELI SHEKEL

BNY MELLON

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PARAMETRIC EAFE PI1 - [redacted] **12/31/2019**

Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		802.86	809.99	0.00	7.13
EQUITY						
7,360.000 FZ6075805	BANK HAPOALIM BM	8.29	38,113.05	61,049.22	0.10	22,936.17
9,298.000 FZ6076423	BANK LEUMI LE-ISRAEL BM	7.28	57,126.47	67,675.66	0.11	10,549.19
7,209.000 FZ6451279	ISRAEL DISCOUNT BANK LTD	4.64	29,402.90	33,415.20	0.05	4,012.30
562.000 FZ6647132	NICE LTD	155.07	16,066.45	87,147.42	0.14	71,080.97
1,506.000 FZ6916701	MIZRAHI TEFAHOT BANK LTD	26.64	26,544.05	40,113.49	0.06	13,569.44
	TOTAL EQUITY ISRAELI SHEKEL		**167,252.92**	**289,400.99**	**0.46**	**122,148.07**
	TOTAL ASSETS ISRAELI SHEKEL		**168,055.78**	**290,210.98**	**0.46**	**122,155.20**
JAPANESE YEN						
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		117,549.42	117,799.90	0.19	250.48
EQUITY						
1,200.000 FJ6010709	AISIN SEIKI CO LTD	37.45	35,341.53	44,941.34	0.07	9,599.81

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3,000.000 AJINOMOTO CO INC FJ6010907	16.70	29,769.06	50,103.52	0.08	20,334.46
1,700.000 ALPS ALPINE CO LTD FJ6021508	22.93	27,784.05	38,982.29	0.06	11,198.24
2,000.000 AMADA CO LTD FJ6022100	11.50	17,141.70	23,004.37	0.04	5,862.67
10,700.000 ACOM CO LTD FJ6049780	4.57	30,200.49	48,933.98	0.08	18,733.49
1,600.000 ASAHI GROUP HOLDINGS LTD FJ6054400	45.85	29,760.53	73,363.70	0.12	43,603.17
6,000.000 ASAHI KASEI CORP FJ6054608	11.35	32,835.39	68,129.74	0.11	35,294.35
1,200.000 AGC INC/JAPAN FJ6055209	36.16	31,762.44	43,395.44	0.07	11,633.00
12,500.000 Z HOLDINGS CORP FJ6084845	4.24	31,315.60	53,025.07	0.08	21,709.47
600.000 TREND MICRO INC/JAPAN FJ6125283	51.53	28,568.17	30,917.87	0.05	2,349.70
3,000.000 NTT DATA CORP FJ6125630	13.50	19,803.45	40,496.89	0.06	20,693.44

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6,700.000 NTT DOCOMO INC FJ6129277	27.95	102,969.54	187,297.90	0.30	84,328.36
2,500.000 BRIDGESTONE CORP FJ6132107	37.45	41,736.30	93,627.79	0.15	51,891.49
300.000 OBIC CO LTD FJ6136744	135.82	23,613.29	40,745.34	0.07	17,132.05
400.000 ORACLE CORP JAPAN FJ6141686	91.56	24,519.44	36,622.96	0.06	12,103.52
1,300.000 BROTHER INDUSTRIES LTD FJ6146503	20.90	15,765.03	27,166.32	0.04	11,401.29
1,500.000 USS CO LTD FJ6171493	19.01	25,518.88	28,516.22	0.05	2,997.34
2,400.000 CANON INC FJ6172327	27.48	66,507.25	65,954.45	0.11	-552.80
700.000 CENTRAL JAPAN RAILWAY CO FJ6183555	202.44	53,139.24	141,706.92	0.23	88,567.68
13,700.000 CHIBA BANK LTD/THE FJ6190568	5.82	66,913.19	79,798.48	0.13	12,885.29
200.000 KOSE CORP FJ6194461	147.23	31,681.03	29,445.59	0.05	-2,235.44

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,700.000 CHUBU ELECTRIC POWER CO INC FJ6195609	14.18	38,396.94	38,298.14	0.06	-98.80
1,400.000 CHUGOKU ELECTRIC POWER CO INC/ FJ6195906	13.16	15,157.52	18,421.90	0.03	3,264.38
900.000 CHUGAI PHARMACEUTICAL CO LTD FJ6196409	92.75	17,152.34	83,478.26	0.13	66,325.92
2,900.000 RAKUTEN INC FJ6229598	8.60	20,995.91	24,950.54	0.04	3,954.63
7,200.000 KDDI CORP FJ6248994	29.93	62,221.16	215,519.66	0.34	153,298.50
400.000 DAITO TRUST CONSTRUCTION CO LT FJ6250503	124.04	19,398.86	49,615.83	0.08	30,216.97
3,700.000 DAICEL CORP FJ6250545	9.65	27,998.49	35,714.74	0.06	7,716.25
1,000.000 DAIKIN INDUSTRIES LTD FJ6250727	142.17	42,055.71	142,167.01	0.23	100,111.30
1,600.000 DAI NIPPON PRINTING CO LTD FJ6250909	27.24	34,024.84	43,579.48	0.07	9,554.64
3,000.000 DAIWA HOUSE INDUSTRY CO LTD FJ6251360	31.19	33,953.32	93,581.78	0.15	59,628.46

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
8,700.000 DAIWA SECURITIES GROUP INC FJ6251444	5.09	36,607.50	44,270.53	0.07	7,663.03
200.000 LAWSON INC FJ6266913	56.96	8,549.55	11,391.76	0.02	2,842.21
4,200.000 MITSUBISHI UFJ LEASE & FINANCE FJ6268976	6.50	15,159.21	27,285.02	0.04	12,125.81
1,100.000 EAST JAPAN RAILWAY CO FJ6298544	90.71	89,082.95	99,781.91	0.16	10,698.96
1,100.000 EISAI CO LTD FJ6307204	75.49	39,468.48	83,040.25	0.13	43,571.77
1,200.000 FAMILYMART CO LTD FJ6331279	24.15	25,640.95	28,985.51	0.05	3,344.56
200.000 FAST RETAILING CO LTD FJ6332434	598.11	35,539.73	119,622.72	0.19	84,082.99
41,400.000 MITSUBISHI UFJ FINANCIAL GROUP FJ6335171	5.46	212,337.13	225,980.94	0.36	13,643.81
4,100.000 SUBARU CORP FJ6356409	24.97	39,604.73	102,372.67	0.16	62,767.94
1,200.000 FUJIFILM HOLDINGS CORP FJ6356524	48.13	41,136.46	57,750.17	0.09	16,613.71

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800.000 FANUC CORP FJ6356938	187.07	99,130.35	149,657.23	0.24	50,526.88
700.000 FUJITSU LTD FJ6356946	94.50	46,501.68	66,151.37	0.11	19,649.69
2,541.000 NOMURA RESEARCH INSTITUTE LTD FJ6390929	21.51	15,949.23	54,666.28	0.09	38,717.05
6.000 NIPPON BUILDING FUND INC FJ6396801	7,315.39	25,552.84	43,892.34	0.07	18,339.50
3.000 JAPAN REAL ESTATE INVESTMENT C FJ6397585	6,625.26	12,568.81	19,875.78	0.03	7,306.97
1,400.000 HAMAMATSU PHOTONICS KK FJ6405875	41.36	31,350.22	57,906.60	0.09	26,556.38
1,000.000 HANKYU HANSHIN HOLDINGS INC FJ6408663	43.06	23,104.03	43,064.18	0.07	19,960.15
1,000.000 DENTSU GROUP INC FJ6416286	34.74	29,343.22	34,736.60	0.06	5,393.38
23,200.000 RESONA HOLDINGS INC FJ6421559	4.41	88,414.70	102,257.19	0.16	13,842.49
3,900.000 HITACHI LTD FJ6429107	42.57	80,040.71	166,012.42	0.27	85,971.71

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,700.000 HITACHI METALS LTD FJ6429206	14.84	27,955.99	40,074.53	0.06	12,118.54
5,500.000 HONDA MOTOR CO LTD FJ6435146	28.52	138,158.67	156,839.19	0.25	18,680.52
1,700.000 AIR WATER INC FJ6441466	14.72	28,908.27	25,028.75	0.04	-3,879.52
1,700.000 HOYA CORP FJ6441508	96.16	46,372.00	163,469.05	0.26	117,097.05
900.000 IHI CORP FJ6466984	23.69	16,385.75	21,316.77	0.03	4,931.02
3,000.000 ISUZU MOTORS LTD FJ6467107	11.95	16,353.81	35,859.21	0.06	19,505.40
8,100.000 ITOCHU CORP FJ6467800	23.32	76,343.35	188,906.83	0.30	112,563.48
5,300.000 JAPAN TOBACCO INC FJ6474533	22.38	104,534.69	118,631.24	0.19	14,096.55
3,200.000 AEON CO LTD FJ6480043	20.75	40,629.98	66,414.54	0.11	25,784.56
3,500.000 KAJIMA CORP FJ6481322	13.42	17,290.75	46,956.52	0.08	29,665.77

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1,300.000 KANEKA CORP FJ6483369	32.39	39,547.44	42,107.20	0.07	2,559.76
3,300.000 KANSAI ELECTRIC POWER CO INC/T FJ6483484	11.64	31,643.91	38,397.51	0.06	6,753.60
2,700.000 KAO CORP FJ6483807	83.05	74,073.77	224,223.59	0.36	150,149.82
1,500.000 KAWASAKI HEAVY INDUSTRIES LTD FJ6484623	22.16	29,021.63	33,236.71	0.05	4,215.08
1,600.000 KIKKOMAN CORP FJ6490802	49.41	18,823.92	79,061.42	0.13	60,237.50
880.000 KEYENCE CORP FJ6490992	354.18	48,358.74	311,674.25	0.50	263,315.51
700.000 KINTETSU GROUP HOLDINGS CO LTD FJ6492964	54.47	21,687.96	38,132.04	0.06	16,444.08
3,000.000 KIRIN HOLDINGS CO LTD FJ6493749	21.99	66,357.06	65,976.53	0.11	-380.53
3,000.000 KOMATSU LTD FJ6496585	24.31	63,051.62	72,933.05	0.12	9,881.43
800.000 KONAMI HOLDINGS CORP FJ6496684	41.27	15,527.61	33,015.87	0.05	17,488.26

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
5,000.000 KUBOTA CORP FJ6497500	15.88	46,048.34	79,411.09	0.13	33,362.75
2,500.000 KURARAY CO LTD FJ6497666	12.25	28,435.91	30,618.82	0.05	2,182.91
700.000 KYOCERA CORP FJ6499266	68.83	35,327.25	48,180.35	0.08	12,853.10
2,700.000 KYOWA KIRIN CO LTD FJ6499555	23.68	30,956.67	63,925.46	0.10	32,968.79
2,900.000 TOKIO MARINE HOLDINGS INC FJ6513124	56.31	80,865.14	163,285.94	0.26	82,420.80
900.000 AEON MALL CO LTD FJ6534203	17.83	14,038.58	16,049.69	0.03	2,011.11
6,100.000 JFE HOLDINGS INC FJ6543790	12.98	69,124.29	79,200.37	0.13	10,076.08
1,000.000 MAKITA CORP FJ6555802	35.06	16,981.98	35,058.66	0.06	18,076.68
5,200.000 SUMITOMO MITSUI FINANCIAL GROU FJ6563020	37.16	170,799.42	193,214.62	0.31	22,415.20
1,100.000 MARUICHI STEEL TUBE LTD FJ6569506	28.34	26,696.68	31,175.52	0.05	4,478.84

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,100.000 MARUI GROUP CO LTD FJ6569522	24.55	15,628.74	51,555.55	0.08	35,926.81
6,800.000 PANASONIC CORP FJ6572708	9.47	52,433.17	64,417.76	0.10	11,984.59
68,700.000 MIZUHO FINANCIAL GROUP INC FJ6591013	1.55	105,400.37	106,392.54	0.17	992.17
1,300.000 MISUMI GROUP INC FJ6595170	25.05	25,794.57	32,561.31	0.05	6,766.74
3,700.000 MITSUBISHI ESTATE CO LTD FJ6596723	19.23	62,010.12	71,140.09	0.11	9,129.97
5,900.000 MITSUBISHI CORP FJ6596780	26.69	122,280.09	157,441.91	0.25	35,161.82
8,000.000 MITSUBISHI ELECTRIC CORP FJ6597044	13.79	73,251.46	110,310.56	0.18	37,059.10
1,300.000 MITSUBISHI HEAVY INDUSTRIES LT FJ6597069	39.09	48,569.77	50,815.73	0.08	2,245.96
1,500.000 MITSUBISHI MATERIALS CORP FJ6597085	27.39	36,021.97	41,090.41	0.07	5,068.44
5,200.000 MITSUI & CO LTD FJ6597309	17.91	76,693.56	93,114.33	0.15	16,420.77

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,500.000 MITSUI CHEMICALS INC FJ6597366	24.66	25,885.43	36,991.03	0.06	11,105.60
1,100.000 MITSUI OSK LINES LTD FJ6597580	27.84	25,046.26	30,618.82	0.05	5,572.56
3,400.000 MITSUI FUDOSAN CO LTD FJ6597606	24.59	60,476.46	83,596.04	0.13	23,119.58
3,000.000 MURATA MANUFACTURING CO LTD FJ6610409	62.07	62,714.16	186,224.98	0.30	123,510.82
2,000.000 SEIKO EPSON CORP FJ6616505	15.23	15,832.11	30,457.79	0.05	14,625.68
11,600.000 RENESAS ELECTRONICS CORP FJ6635679	6.90	58,741.19	80,055.21	0.13	21,314.02
600.000 NINTENDO CO LTD FJ6639556	404.60	73,591.25	242,760.52	0.39	169,169.27
1,900.000 DENSO CORP FJ6640380	45.70	56,338.67	86,822.17	0.14	30,483.50
1,000.000 NEC CORP FJ6640406	41.59	28,225.04	41,591.90	0.07	13,366.86
800.000 NIDEC CORP FJ6640687	138.07	42,375.12	110,457.78	0.18	68,082.66

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
800.000 NH FOODS LTD FJ6640760	41.50	23,728.30	33,199.91	0.05	9,471.61
1,210.000 NISSHIN SEIFUN GROUP INC FJ6640968	17.54	13,074.53	21,221.62	0.03	8,147.09
7,600.000 NIPPON TELEGRAPH & TELEPHONE C FJ6641370	25.37	80,007.00	192,806.07	0.31	112,799.07
1,000.000 NISSAN CHEMICAL CORP FJ6641586	42.28	14,192.47	42,282.03	0.07	28,089.56
400.000 NISSIN FOODS HOLDINGS CO LTD FJ6641768	74.72	13,330.06	29,887.28	0.05	16,557.22
800.000 NITTO DENKO CORP FJ6641800	56.87	33,472.90	45,493.44	0.07	12,020.54
300.000 NIPPON EXPRESS CO LTD FJ6642121	59.08	13,127.77	17,722.57	0.03	4,594.80
1,100.000 YAMAHA CORP FJ6642386	55.95	14,440.55	61,541.29	0.10	47,100.74
2,000.000 MINEBEA MITSUMI INC FJ6642402	20.95	12,329.24	41,904.76	0.07	29,575.52
2,700.000 NIPPON STEEL CORP FJ6642568	15.22	37,745.93	41,093.17	0.07	3,347.24

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11,000.000 NISSAN MOTOR CO LTD FJ6642865	5.85	67,380.82	64,385.55	0.10	-2,995.27
15,700.000 NOMURA HOLDINGS INC FJ6643103	5.18	61,716.03	81,392.96	0.13	19,676.93
1,900.000 NIPPON YUSEN KK FJ6643962	18.23	29,663.74	34,634.46	0.06	4,970.72
300.000 NITORI HOLDINGS CO LTD FJ6644804	158.50	11,339.06	47,550.03	0.08	36,210.97
800.000 ORIENTAL LAND CO LTD/JAPAN FJ6648896	136.92	13,841.12	109,537.61	0.18	95,696.49
3,000.000 OBAYASHI CORP FJ6656402	11.20	13,255.53	33,595.58	0.05	20,340.05
5,300.000 OJI HOLDINGS CORP FJ6657707	5.48	23,863.65	29,017.71	0.05	5,154.06
5,200.000 OLYMPUS CORP FJ6658804	15.54	34,099.39	80,817.11	0.13	46,717.72
1,100.000 OMRON CORP FJ6659422	59.08	29,898.80	64,982.74	0.10	35,083.94
1,900.000 ONO PHARMACEUTICAL CO LTD FJ6660107	23.02	21,909.51	43,743.27	0.07	21,833.76

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6,500.000 ORIX CORP FJ6661147	16.66	66,734.81	108,318.38	0.17	41,583.57
1,400.000 OSAKA GAS CO LTD FJ6661766	19.24	24,818.19	26,937.20	0.04	2,119.01
2,200.000 ALFRESA HOLDINGS CORP FJ6687217	20.50	35,883.18	45,103.29	0.07	9,220.11
2,800.000 SHINSEI BANK LTD FJ6730934	15.41	37,332.20	43,156.20	0.07	5,824.00
2,000.000 JAPAN EXCHANGE GROUP INC FJ6743887	17.76	23,115.52	35,518.75	0.06	12,403.23
2,900.000 T&D HOLDINGS INC FJ6744299	12.84	27,711.78	37,225.67	0.06	9,513.89
400.000 ROHM CO LTD FJ6747201	80.79	25,738.09	32,316.54	0.05	6,578.45
200.000 SMC CORP/JAPAN FJ6763968	462.76	27,128.60	92,551.18	0.15	65,422.58
7,800.000 SOFTBANK GROUP CORP FJ6770625	43.76	108,500.70	341,355.41	0.55	232,854.71
2,000.000 SANTEN PHARMACEUTICAL CO LTD FJ6776606	19.19	12,031.12	38,389.69	0.06	26,358.57

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700.000 SECOM CO LTD FJ6791597	89.97	30,855.05	62,975.84	0.10	32,120.79
2,000.000 SEKISUI CHEMICAL CO LTD FJ6793825	17.52	13,670.77	35,040.26	0.06	21,369.49
2,700.000 SEKISUI HOUSE LTD FJ6793908	21.47	29,835.84	57,975.15	0.09	28,139.31
1,000.000 SHIMADZU CORP FJ6804366	31.65	8,070.43	31,654.01	0.05	23,583.58
3,000.000 SHIMIZU CORP FJ6804408	10.27	12,520.89	30,807.45	0.05	18,286.56
1,400.000 SHIN-ETSU CHEMICAL CO LTD FJ6804580	110.97	98,026.22	155,362.31	0.25	57,336.09
1,900.000 SHIONOGI & CO LTD FJ6804689	62.27	45,108.18	118,309.63	0.19	73,201.45
300.000 SHIMANO INC FJ6804820	163.52	13,351.35	49,054.52	0.08	35,703.17
1,500.000 SHISEIDO CO LTD FJ6805264	71.61	80,806.03	107,412.00	0.17	26,605.97
10,100.000 SHIZUOKA BANK LTD/THE FJ6805322	7.53	66,791.32	76,023.00	0.12	9,231.68

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1,100.000 SHOWA DENKO KK FJ6805462	26.68	27,351.37	29,343.45	0.05	1,992.08
5,000.000 SONY CORP FJ6821501	68.10	196,790.65	340,510.68	0.54	143,720.03
700.000 STANLEY ELECTRIC CO LTD FJ6841103	29.26	13,467.41	20,483.09	0.03	7,015.68
800.000 SUMITOMO HEAVY INDUSTRIES LTD FJ6858735	28.80	23,677.20	23,041.18	0.04	-636.02
1,600.000 SUMITOMO METAL MINING CO LTD FJ6858842	32.61	44,300.22	52,177.59	0.08	7,877.37
1,220.000 SUMITOMO REALTY & DEVELOPMENT FJ6858909	35.08	29,587.24	42,794.02	0.07	13,206.78
7,400.000 SUMITOMO CORP FJ6858941	14.94	81,714.63	110,582.93	0.18	28,868.30
2,100.000 SUMITOMO RUBBER INDUSTRIES LTD FJ6858990	12.30	22,012.72	25,835.75	0.04	3,823.03
1,400.000 SUZUKI MOTOR CORP FJ6865508	42.02	31,182.97	58,834.14	0.09	27,651.17
1,200.000 THK CO LTD FJ6869138	27.31	27,737.67	32,772.95	0.05	5,035.28

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BNY MELLON

Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

PARAMETRIC EAFE PI1 - [redacted]

12/31/2019

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
400.000 TDK CORP FJ6869302	114.01	28,476.19	45,603.86	0.07	17,127.67
1,200.000 TAISEI CORP FJ6870102	41.82	13,223.59	50,186.33	0.08	36,962.74
4,946.000 TAKEDA PHARMACEUTICAL CO LTD FJ6870441	39.86	184,873.03	197,157.32	0.32	12,284.29
700.000 ADVANTEST CORP FJ6870490	56.68	27,146.37	39,677.94	0.06	12,531.57
800.000 SYSMEX CORP FJ6883808	68.54	26,540.74	54,835.06	0.09	28,294.32
2,000.000 TERUMO CORP FJ6885076	35.75	51,797.21	71,497.58	0.11	19,700.37
1,000.000 TOBU RAILWAY CO LTD FJ6895166	36.39	27,202.72	36,392.91	0.06	9,190.19
900.000 TOHO CO LTD/TOKYO FJ6895208	41.82	14,383.04	37,639.75	0.06	23,256.71
6,100.000 TOKYO ELECTRIC POWER CO HOLDIN FJ6895406	4.30	29,101.93	26,213.02	0.04	-2,888.91
1,800.000 TOKYO GAS CO LTD FJ6895448	24.40	39,670.78	43,917.18	0.07	4,246.40

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
900.000 TOKYO ELECTRON LTD FJ6895679	220.15	62,500.89	198,136.64	0.32	135,635.75
3,963.000 TOKYU CORP FJ6896545	18.58	36,585.38	73,625.92	0.12	37,040.54
1,800.000 TOPPAN PRINTING CO LTD FJ6897022	20.81	28,186.68	37,449.27	0.06	9,262.59
9,000.000 TORAY INDUSTRIES INC FJ6897147	6.82	54,538.06	61,374.74	0.10	6,836.68
2,500.000 TOSHIBA CORP FJ6897212	34.09	70,012.46	85,231.19	0.14	15,218.73
1,000.000 TOTO LTD FJ6897469	42.70	13,670.77	42,696.11	0.07	29,025.34
2,200.000 LIXIL GROUP CORP FJ6900214	17.38	26,013.71	38,240.62	0.06	12,226.91
2,000.000 TOYO SEIKAN GROUP HOLDINGS LTD FJ6900263	17.39	28,681.53	34,782.61	0.06	6,101.08
3,200.000 MAZDA MOTOR CORP FJ6900305	8.63	29,024.65	27,619.97	0.04	-1,404.68
700.000 TOYOTA INDUSTRIES CORP FJ6900545	58.25	19,884.36	40,772.95	0.07	20,888.59

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900.000 TOYOTA TSUSHO CORP FJ6900586	35.52	14,287.22	31,966.87	0.05	17,679.65
9,960.000 TOYOTA MOTOR CORP FJ6900644	70.98	393,630.78	706,983.55	1.13	313,352.77
1,200.000 UNICHARM CORP FJ6911484	34.05	19,030.54	40,855.76	0.07	21,825.22
800.000 WEST JAPAN RAILWAY CO FJ6957990	86.87	33,680.36	69,498.96	0.11	35,818.60
8,400.000 YAMADA DENKI CO LTD FJ6985025	5.32	32,761.71	44,676.33	0.07	11,914.62
500.000 YAKULT HONSHA CO LTD FJ6985116	55.49	13,228.91	27,743.27	0.04	14,514.36
1,400.000 YAMAHA MOTOR CO LTD FJ6985264	20.27	23,372.45	28,380.03	0.05	5,007.58
9,000.000 ASTELLAS PHARMA INC FJ6985389	17.21	65,447.20	154,865.42	0.25	89,418.22
2,200.000 YAMATO HOLDINGS CO LTD FJ6985561	17.18	34,284.57	37,795.26	0.06	3,510.69
1,000.000 YASKAWA ELECTRIC CORP FJ6986049	38.37	9,294.84	38,371.29	0.06	29,076.45

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,700.000 YOKOGAWA ELECTRIC CORP FJ6986429	17.75	15,004.83	30,175.29	0.05	15,170.46
1,800.000 M3 INC FJB02K2M5	30.41	25,644.99	54,741.20	0.09	29,096.21
1,200.000 SEGA SAMMY HOLDINGS INC FJB02RK08	14.57	14,488.46	17,479.64	0.03	2,991.18
3,300.000 SEVEN & I HOLDINGS CO LTD FJB0FS5D1	36.83	84,702.15	121,554.17	0.19	36,852.02
2,200.000 DAIICHI SANKYO CO LTD FJB0J7D93	66.51	86,385.77	146,322.52	0.23	59,936.75
1,500.000 BANDAI NAMCO HOLDINGS INC FJB0JDQD7	61.02	28,614.24	91,525.19	0.15	62,910.95
4,500.000 MITSUBISHI CHEMICAL HOLDINGS C FJB0JQTJ2	7.52	23,285.01	33,850.93	0.05	10,565.92
2,300.000 SUMCO CORP FJB0M0C87	16.80	28,416.33	38,645.50	0.06	10,229.17
1,700.000 NOMURA REAL ESTATE HOLDINGS IN FJB1CWJM8	24.11	28,832.35	40,984.59	0.07	12,152.24
1,189.000 IDEMITSU KOSAN CO LTD FJB1FF8P7	27.88	34,371.57	33,150.86	0.05	-1,220.71

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,200.000 AOZORA BANK LTD FJB1G1851	26.60	27,204.02	31,922.70	0.05	4,718.68
2,600.000 J FRONT RETAILING CO LTD FJB23TC16	14.08	30,304.52	36,604.55	0.06	6,300.03
1,600.000 ZOZO INC FJB292RC9	19.20	28,871.43	30,726.48	0.05	1,855.05
11,100.000 SEVEN BANK LTD FJB2NT8S0	3.29	29,696.48	36,565.91	0.06	6,869.43
1,700.000 MS&AD INSURANCE GROUP HOLDINGS FJB2Q4CS7	33.23	48,796.36	56,486.77	0.09	7,690.41
2,300.000 OTSUKA HOLDINGS CO LTD FJB5LTM91	44.93	65,923.65	103,343.91	0.17	37,420.26
6,300.000 DAI-ICHI LIFE HOLDINGS INC FJB601QS7	16.71	81,981.59	105,304.34	0.17	23,322.75
600.000 MEIJI HOLDINGS CO LTD FJB60DQV4	67.91	11,706.38	40,745.34	0.07	29,038.96
15,100.000 ENEOS HOLDINGS INC FJB627LW8	4.58	58,226.84	69,181.41	0.11	10,954.57
1,100.000 SOMPO HOLDINGS INC FJB62G7K0	39.57	34,534.58	43,524.27	0.07	8,989.69

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PARAMETRIC EAFE PI1 - [redacted] **12/31/2019**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,100.000 NEXON CO LTD FJB63QM79	13.34	26,243.21	28,019.32	0.04	1,776.11
300.000 JAPAN AIRLINES CO LTD FJB8BRV41	31.26	7,510.23	9,377.50	0.02	1,867.27
700.000 SUNTORY BEVERAGE & FOOD LTD FJBBD7Q83	41.82	27,038.26	29,275.36	0.05	2,237.10
900.000 KYUSHU RAILWAY CO FJBD2BST4	33.59	27,207.78	30,227.74	0.05	3,019.96
6,500.000 SOFTBANK CORP FJBF5M0K1	13.43	85,131.94	87,294.68	0.14	2,162.74
4,680.000 MEBUKI FINANCIAL GROUP INC FJBH0VTS4	2.58	17,332.47	12,057.97	0.02	-5,274.50
4,200.000 RECRUIT HOLDINGS CO LTD FJBQRRZ08	37.72	61,588.87	158,415.45	0.25	96,826.58
12.000 NOMURA REAL ESTATE MASTER FUND FJBYSJJF3	1,707.84	14,991.73	20,494.13	0.03	5,502.40
8,900.000 JAPAN POST HOLDINGS CO LTD FJBYT8140	9.44	80,548.25	84,024.84	0.13	3,476.59
TOTAL EQUITY JAPANESE YEN		**9,014,079.57**	**15,205,878.43**	**24.33**	**6,191,798.86**
TOTAL ASSETS JAPANESE YEN		**9,131,628.99**	**15,323,678.33**	**24.52**	**6,192,049.34**

NEW ZEALAND DOLLAR

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PARAMETRIC EAFE PI1 - [redacted]

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		582.66	613.82	0.00	31.16
EQUITY						
9,783.000 AN6881436	SPARK NEW ZEALAND LTD	2.92	11,456.03	28,578.44	0.05	17,122.41
6,947.000 ANBKX3XG0	AUCKLAND INTERNATIONAL AIRPORT	5.90	25,143.09	41,009.44	0.07	15,866.35
13,355.000 ANBWFD052	MERIDIAN ENERGY LTD	3.37	26,745.27	45,049.75	0.07	18,304.48
	TOTAL EQUITY NEW ZEALAND DOLLAR		**63,344.39**	**114,637.63**	**0.18**	**51,293.24**
	TOTAL ASSETS NEW ZEALAND DOLLAR		**63,927.05**	**115,251.45**	**0.18**	**51,324.40**
NORWEGIAN KRONE						
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		554.17	576.50	0.00	22.33
EQUITY						
5,776.000 SN4263307	DNB ASA	18.66	78,233.98	107,799.21	0.17	29,565.23
2,350.000 SN4732491	TELENOR ASA	17.92	45,183.52	42,107.08	0.07	-3,076.44
1,727.000 SN4790531	SCHIBSTED ASA	30.19	35,852.13	52,140.37	0.08	16,288.24

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Report ID : IACS0005
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Status : FINAL

PARAMETRIC EAFE PI1 - [redacted] **12/31/2019**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,541.000 EQUINOR ASA SN7133606	19.97	45,846.79	50,748.87	0.08	4,902.08
2,410.000 MOWI ASA SNB02L489	25.97	42,549.31	62,586.01	0.10	20,036.70
10,605.000 NORSK HYDRO ASA SNB11HK30	3.71	31,918.45	39,391.76	0.06	7,473.31
1,052.000 AKER BP ASA SNB1L95G4	32.77	26,687.35	34,478.85	0.06	7,791.50
1,698.000 GJENSIDIGE FORSIKRING ASA SNB4PH0C0	20.97	26,020.54	35,603.26	0.06	9,582.72
1,727.000 ADEVINTA ASA SNBJ0DP44	11.84	17,646.56	20,439.50	0.03	2,792.94
TOTAL EQUITY NORWEGIAN KRONE		**349,938.63**	**445,294.91**	**0.71**	**95,356.28**
TOTAL ASSETS NORWEGIAN KRONE		**350,492.80**	**445,871.41**	**0.71**	**95,378.61**
POUND STERLING					
CASH & CASH EQUIVALENTS					
NON-BASE CURRENCY		24,334.79	24,703.63	0.04	368.84
EQUITY					
2,396.000 BARRICK GOLD CORP EX0028368	18.62	31,193.39	44,608.81	0.07	13,415.42

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PARAMETRIC EAFE PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6,159.000 ANTOFAGASTA PLC EX0045610	12.15	58,010.69	74,802.95	0.12	16,792.26
2,263.000 ASHTEAD GROUP PLC EX0053671	31.98	39,620.01	72,369.53	0.12	32,749.52
4,033.000 BARRATT DEVELOPMENTS PLC EX0081185	9.89	28,992.07	39,888.73	0.06	10,896.66
6,222.000 AVIVA PLC EX0216237	5.55	29,294.12	34,511.74	0.06	5,217.62
10,869.000 DIAGEO PLC EX0237407	42.40	202,517.59	460,830.65	0.74	258,313.06
1,038.000 SCHRODERS PLC EX0240542	44.17	25,607.56	45,845.52	0.07	20,237.96
14,373.000 BAE SYSTEMS PLC EX0263494	7.48	82,941.11	107,541.48	0.17	24,600.37
10,112.000 BRITISH AMERICAN TOBACCO PLC EX0287584	42.81	353,081.82	432,887.60	0.69	79,805.78
8,348.000 STANDARD CHARTERED PLC EX0408289	9.44	62,618.92	78,784.41	0.13	16,165.49
714.000 IMPERIAL BRANDS PLC EX0454499	24.76	18,082.42	17,678.34	0.03	-404.08

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74,197.000 HSBC HOLDINGS PLC EX0540529	7.84	607,124.88	581,793.16	0.93	-25,331.72
36,054.000 LEGAL & GENERAL GROUP PLC EX0560394	4.01	66,446.13	144,720.49	0.23	78,274.36
4,415.000 MEGGITT PLC EX0575806	8.70	26,989.06	38,414.73	0.06	11,425.67
1,920.000 ASSOCIATED BRITISH FOODS PLC EX0673122	34.42	35,252.21	66,080.65	0.11	30,828.44
1,848.000 PEARSON PLC EX0677602	8.44	16,623.19	15,594.64	0.02	-1,028.55
2,780.000 PERSIMMON PLC EX0682537	35.70	60,240.03	99,251.59	0.16	39,011.56
12,615.000 PRUDENTIAL PLC EX0709959	19.20	110,647.13	242,152.84	0.39	131,505.71
4,178.000 RIO TINTO PLC EX0718877	59.65	181,804.59	249,232.29	0.40	67,427.70
2,410.000 ST JAMES'S PLACE PLC EX0766934	15.43	27,553.51	37,178.38	0.06	9,624.87
3,567.000 SSE PLC EX0790876	19.06	48,145.63	67,974.64	0.11	19,829.01

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80,949.000 BP PLC EX0798051	6.25	516,682.11	505,730.57	0.81	-10,951.54
329,019.000 LLOYDS BANKING GROUP PLC EX0870611	0.83	211,037.92	272,417.46	0.44	61,379.54
23,577.000 TESCO PLC EX0884703	3.38	58,152.45	79,708.22	0.13	21,555.77
4,149.000 SMITH & NEPHEW PLC EX0922321	24.28	45,470.76	100,721.31	0.16	55,250.55
20,256.000 GLAXOSMITHKLINE PLC EX0925282	23.57	389,764.43	477,379.28	0.76	87,614.85
1,524.000 WEIR GROUP PLC/THE EX0946585	20.00	25,821.58	30,475.58	0.05	4,654.00
5,310.000 ASTRAZENECA PLC EX0989528	100.77	240,384.40	535,108.52	0.86	294,724.12
59,561.000 BT GROUP PLC EX3091355	2.55	122,629.69	151,841.77	0.24	29,212.08
300.000 CARNIVAL PLC EX3121525	48.27	12,525.97	14,482.17	0.02	1,956.20
14,309.000 MARKS & SPENCER GROUP PLC EX3127480	2.83	33,188.17	40,470.74	0.06	7,282.57

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44,067.000 BARCLAYS PLC EX3134866	2.38	82,801.25	104,869.81	0.17	22,068.56
1,452.000 INTERTEK GROUP PLC EX3163832	77.52	49,553.74	112,565.39	0.18	63,011.65
1,734.000 BURBERRY GROUP PLC EX3174300	29.21	19,319.59	50,651.42	0.08	31,331.83
788.000 NEXT PLC EX3208983	92.97	26,435.13	73,261.11	0.12	46,825.98
11,266.000 KINGFISHER PLC EX3319525	2.87	29,017.06	32,386.45	0.05	3,369.39
22,151.000 ITV PLC EX3398644	2.00	20,171.78	44,310.25	0.07	24,138.47
22,828.000 J SAINSBURY PLC EXB019KW9	3.05	55,330.61	69,524.96	0.11	14,194.35
17,270.000 G4S PLC EXB01FLG9	2.89	40,200.73	49,874.98	0.08	9,674.25
1,426.000 BERKELEY GROUP HOLDINGS PLC EXB02L3W0	64.37	51,251.82	91,791.05	0.15	40,539.23
34,306.000 CENTRICA PLC EXB033F22	1.18	28,463.76	40,584.06	0.06	12,120.30

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16,763.000 ROYAL DUTCH SHELL PLC EXB03MLX5 A SHS	29.61	483,183.21	496,321.63	0.79	13,138.42
16,484.000 ROYAL DUTCH SHELL PLC EXB03MM48 B SHS	29.67	398,522.09	489,043.62	0.78	90,521.53
1,362.000 BUNZL PLC EXB0744B8	27.36	15,489.17	37,258.99	0.06	21,769.82
1,083.000 LONDON STOCK EXCHANGE GROUP PL EXB0SWJX9	102.67	45,850.45	111,189.58	0.18	65,339.13
5,131.000 UNILEVER PLC EXB10RZP7	57.63	155,721.97	295,716.21	0.47	139,994.24
5,567.000 EXPERIAN PLC EXB19NLV9	33.81	65,067.19	188,207.02	0.30	123,139.83
2,802.000 MONDI PLC EXB1CRLC8	23.48	56,607.12	65,794.30	0.11	9,187.18
1,824.000 SEVERN TRENT PLC EXB1FH8J7	33.32	38,956.23	60,771.05	0.10	21,814.82
700.000 WHITBREAD PLC EXB1KJJ48	64.20	16,104.15	44,938.17	0.07	28,834.02
1,144.000 HARGREAVES LANSDOWN PLC EXB1VZ0M0	25.63	25,928.93	29,325.20	0.05	3,396.27

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2,172.000 SMITHS GROUP PLC EXB1WY232	22.35	37,979.52	48,541.01	0.08	10,561.49
2,140.000 ANGLO AMERICAN PLC EXB1XZS89	28.79	42,605.31	61,603.79	0.10	18,998.48
3,510.000 3I GROUP PLC EXB1YW440	14.55	15,826.38	51,055.60	0.08	35,229.22
2,980.000 RECKITT BENCKISER GROUP PLC EXB24CGK6	81.19	162,486.31	241,957.90	0.39	79,471.59
4,848.000 RELX PLC EXB2B0DG6	25.24	39,186.98	122,378.60	0.20	83,191.62
6,236.000 UNITED UTILITIES GROUP PLC EXB39J2M5	12.50	55,989.08	77,935.60	0.12	21,946.52
1,853.000 OCADO GROUP PLC EXB3MBS72	16.94	26,714.65	31,396.40	0.05	4,681.75
32,664.000 GLENCORE PLC EXB4T3BW4	3.12	82,390.28	101,839.79	0.16	19,449.51
4,599.000 JOHN WOOD GROUP PLC EXB5N0P81	5.28	22,048.27	24,278.72	0.04	2,230.45
3,687.000 GVC HOLDINGS PLC EXB5VQMV7	11.71	27,860.36	43,187.45	0.07	15,327.09

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Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

PARAMETRIC EAFE PI1 - [redacted]

12/31/2019

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6,750.000 SEGRO PLC EXB5ZN1N1	11.89	35,908.15	80,228.18	0.13	44,320.03
7,413.000 ROLLS-ROYCE HOLDINGS PLC EXB63H842	9.05	69,601.92	67,092.79	0.11	-2,509.13
2,569.000 EASYJET PLC EXB7KR2P8	18.87	28,864.51	48,479.77	0.08	19,615.26
9,431.000 NATWEST GROUP PLC EXB7T7729	3.18	27,038.49	30,022.40	0.05	2,983.91
6,432.000 SAGE GROUP PLC/THE EXB8C3BL7	9.92	29,356.21	63,820.73	0.10	34,464.52
5,771.000 WPP PLC EXB8KF9B6	14.13	61,921.12	81,535.34	0.13	19,614.22
839.000 COCA-COLA HBC AG EXB9895B6	33.98	26,085.00	28,509.08	0.05	2,424.08
6,710.000 COMPASS GROUP PLC EXBD6K458	25.04	60,562.08	168,003.47	0.27	107,441.39
12,565.000 NATIONAL GRID PLC EXBDR05C3	12.51	123,699.98	157,183.31	0.25	33,483.33
6,132.000 BHP GROUP PLC EXBH0P3Z9	23.54	117,566.44	144,335.99	0.23	26,769.55

BNY MELLON

Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

PARAMETRIC EAFE PI1 - [redacted]

12/31/2019

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
114,428.000 VODAFONE GROUP PLC EXBH4HKS0	1.94	218,319.43	222,471.27	0.36	4,151.84
1,471.000 INTERCONTINENTAL HOTELS GROUP EXBHJYC07	68.99	55,160.74	101,488.67	0.16	46,327.93
564.000 CRODA INTERNATIONAL PLC EXBJFFLV0	67.83	20,951.73	38,254.54	0.06	17,302.81
994.000 FERGUSON PLC EXBJVNSS5	90.75	27,819.99	90,200.90	0.14	62,380.91
12,615.000 M&G PLC EXBKFB1C0	3.14	18,392.42	39,640.20	0.06	21,247.78
7,077.000 RSA INSURANCE GROUP PLC EXBKKMKR6	7.49	45,255.28	53,026.44	0.08	7,771.16
4,900.000 INFORMA PLC EXBMJ6DW6	11.35	42,968.35	55,630.23	0.09	12,661.88
4,672.000 AUTO TRADER GROUP PLC EXBVYVFW2	7.88	26,518.86	36,801.17	0.06	10,282.31
25,629.000 MELROSE INDUSTRIES PLC EXBZ1G438	3.18	50,730.61	81,518.80	0.13	30,788.19
1,516.000 JOHNSON MATTHEY PLC EXBZ4BQC2	39.69	49,424.09	60,169.30	0.10	10,745.21

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PARETRIC EAFE PI1 - [redacted] **12/31/2019**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
TOTAL EQUITY POUND STERLING		**7,121,652.06**	**10,101,451.48**	**16.16**	**2,979,799.42**
TOTAL ASSETS POUND STERLING		**7,145,986.85**	**10,126,155.11**	**16.20**	**2,980,168.26**
SINGAPORE DOLLAR					
CASH & CASH EQUIVALENTS					
NON-BASE CURRENCY		4,663.09	4,730.49	0.01	67.40
EQUITY					
13,500.000 SINGAPORE TECHNOLOGIES ENGINEE FM6043216	2.93	32,233.32	39,556.76	0.06	7,323.44
10,100.000 DBS GROUP HOLDINGS LTD FM6175208	19.25	102,886.63	194,391.11	0.31	91,504.48
4,800.000 CITY DEVELOPMENTS LTD FM6197921	8.14	29,234.58	39,088.24	0.06	9,853.66
20,100.000 CAPITALAND LTD FM6309302	2.79	45,216.31	56,055.48	0.09	10,839.17
26,700.000 CAPITALAND MALL TRUST FM6420125	1.83	37,469.18	48,846.91	0.08	11,377.73
11,000.000 ASCENDAS REAL ESTATE INVESTMEN FM6563874	2.21	15,238.53	24,296.29	0.04	9,057.76
2,900.000 UNITED OVERSEAS BANK LTD FM6916783	19.64	49,444.24	56,958.32	0.09	7,514.08

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PARAMETRIC EAFE PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,600.000 VENTURE CORP LTD FM6927376	12.05	27,253.89	31,324.14	0.05	4,070.25
21,600.000 CAPITALAND COMMERCIAL TRUST FMB011YD6	1.48	27,100.67	31,966.68	0.05	4,866.01
19,200.000 SINGAPORE PRESS HOLDINGS LTD FMB012892	1.62	26,714.63	31,127.80	0.05	4,413.17
12,100.000 SINGAPORE TELECOMMUNICATIONS L FMB02PY26	2.51	27,703.76	30,325.36	0.05	2,621.60
17,900.000 SEMBCORP INDUSTRIES LTD FMB08X160	1.70	26,196.27	30,484.51	0.05	4,288.24
9,400.000 OVERSEA-CHINESE BANKING CORP L FMB0F9V21	8.17	76,567.37	76,757.52	0.12	190.15
18,500.000 WILMAR INTERNATIONAL LTD FMB17KC65	3.06	41,220.89	56,683.90	0.09	15,463.01
11,800.000 KEPPEL CORP LTD FMB1VQ5C0	5.03	51,725.95	59,410.26	0.10	7,684.31
23,000.000 GENTING SINGAPORE LTD FMBDRTVP5	0.68	14,662.87	15,736.44	0.03	1,073.57
TOTAL EQUITY SINGAPORE DOLLAR		**630,869.09**	**823,009.72**	**1.32**	**192,140.63**
TOTAL ASSETS SINGAPORE DOLLAR		**635,532.18**	**827,740.21**	**1.32**	**192,208.03**

SWEDISH KRONA

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		57.70	59.57	0.00	1.87
EQUITY						
6,200.000 SS4813340	SKANDINAVISKA ENSKILDA BANKEN	9.41	40,284.08	58,337.05	0.09	18,052.97
2,500.000 SS4846522	SWEDBANK AB	14.90	26,108.25	37,242.08	0.06	11,133.83
1,200.000 SS5048565	SWEDISH MATCH AB	51.58	28,861.98	61,890.49	0.10	33,028.51
1,600.000 SS5554042	SECURITAS AB	17.25	17,211.22	27,595.19	0.04	10,383.97
2,888.000 SS5679591	INVESTOR AB	54.61	69,086.79	157,711.54	0.25	88,624.75
3,013.000 SS5687438	HENNES & MAURITZ AB	20.35	47,785.29	61,308.96	0.10	13,523.67
8,345.000 SS5959373	TELEFONAKTIEBOLAGET LM ERICSSO	8.71	49,967.64	72,707.46	0.12	22,739.82
9,382.000 SS5978381	TELIA CO AB	4.30	41,841.35	40,340.08	0.06	-1,501.27

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,310.000 LUNDIN ENERGY AB SS7187627	34.00	22,614.34	78,546.00	0.13	55,931.66
1,300.000 ALFA LAVAL AB SS7332686	25.20	19,539.70	32,760.21	0.05	13,220.51
41.000 MODERN TIMES GROUP MTG AB SSB151P43	11.93	598.60	489.01	0.00	-109.59
1,790.000 SKF AB SSB1Q3J35	20.23	26,576.71	36,216.66	0.06	9,639.95
7,547.000 VOLVO AB SSB1QH836	16.76	82,486.19	126,494.82	0.20	44,008.63
3,404.000 SANDVIK AB SSB1VQ251	19.51	48,919.46	66,417.83	0.11	17,498.37
3,038.000 INDUSTRIVARDEN AB SSB1VSK57	24.13	55,593.87	73,312.74	0.12	17,718.87
3,195.000 SVENSKA CELLULOSA AB SCA SSB1VVGZ9	10.15	12,396.56	32,424.25	0.05	20,027.69
1,159.000 HEXAGON AB SSB1XFTL9	56.08	19,908.24	65,000.72	0.10	45,092.48
2,142.000 TELE2 AB SSB97C732	14.51	26,986.15	31,085.26	0.05	4,099.11

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,600.000 ATLAS COPCO AB SSBD97BN3	39.91	29,584.31	103,766.14	0.17	74,181.83
1,661.000 ATLAS COPCO AB SSBD97BS2	34.74	19,141.93	57,702.63	0.09	38,560.70
1,173.000 INTERNATIONAL PETROLEUM CORP/S SSBDCT292	4.45	3,019.86	5,222.77	0.01	2,202.91
2,600.000 EPIROC AB SSBDZV110	12.22	8,730.05	31,760.33	0.05	23,030.28
1,661.000 EPIROC AB SSBDZV128	11.86	6,083.58	19,704.42	0.03	13,620.84
2,200.000 ESSITY AB SSBF1K7P7	32.24	24,712.88	70,927.94	0.11	46,215.06
41.000 NORDIC ENTERTAINMENT GROUP AB SSBHWV254	32.35	834.11	1,326.22	0.00	492.11
2,355.000 BOLIDEN AB SSBJV12J7	26.55	41,684.00	62,516.22	0.10	20,832.22
3,062.000 SVENSKA HANDELSBANKEN AB SSBXDZ9Q8	10.78	28,536.26	33,004.40	0.05	4,468.14
4,200.000 ASSA ABLOY AB SSBYPC1T6	23.39	27,660.10	98,258.21	0.16	70,598.11

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
17,767.000 NORDEA BANK ABP SSBYZF9J2	8.08	110,129.77	143,562.51	0.23	33,432.74
TOTAL EQUITY SWEDISH KRONA		**936,883.27**	**1,687,632.14**	**2.70**	**750,748.87**
TOTAL ASSETS SWEDISH KRONA		**936,940.97**	**1,687,691.71**	**2.70**	**750,750.74**
SWISS FRANC					
CASH & CASH EQUIVALENTS					
NON-BASE CURRENCY		650.91	664.36	0.00	13.45
EQUITY					
22.000 SGS SA ES4824771	2,737.65	31,118.38	60,228.22	0.10	29,109.84
161.000 SWISSCOM AG ES5533975	529.35	64,587.52	85,226.00	0.14	20,638.48
4.000 CHOCOLADEFABRIKEN LINDT & SPRU ES5962281	7,760.62	28,747.34	31,042.49	0.05	2,295.15
36.000 GIVAUDAN SA ES5980614	3,130.07	39,212.81	112,682.40	0.18	73,469.59
542.000 ZURICH INSURANCE GROUP AG ES5983816	410.08	153,334.21	222,262.82	0.36	68,928.61
8,991.000 NOVARTIS AG ES7103066	94.90	436,966.37	853,279.19	1.37	416,312.82

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
7,968.000 ABB LTD ES7108891	24.13	152,872.04	192,298.40	0.31	39,426.36
2,923.000 ROCHE HOLDING AG ES7110384	324.26	493,846.82	947,820.52	1.52	453,973.70
576.000 ADECCO GROUP AG ES7110723	63.22	26,148.73	36,415.26	0.06	10,266.53
1,021.000 LAFARGEHOLCIM LTD ES7110756	55.46	45,942.47	56,619.71	0.09	10,677.24
13,090.000 NESTLE SA ES7123874	108.20	697,012.34	1,416,399.24	2.27	719,386.90
199.000 BALOISE HOLDING AG ES7124591	180.72	18,010.91	35,963.24	0.06	17,952.33
220.000 TEMENOS AG ES7147899	158.21	25,916.16	34,805.60	0.06	8,889.44
396.000 SONOVA HOLDING AG ES7156031	228.74	61,215.86	90,580.88	0.14	29,365.02
38.000 STRAUMANN HOLDING AG ES7156833	981.46	27,250.35	37,295.61	0.06	10,045.26
6,648.000 CREDIT SUISSE GROUP AG ES7171584	13.53	76,991.08	89,969.58	0.14	12,978.50

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
108.000 SWATCH GROUP AG/THE ES7184728	278.82	29,177.00	30,113.08	0.05	936.08
421.000 LONZA GROUP AG ES7333374	364.74	34,970.24	153,557.29	0.25	118,587.05
112.000 SWISS LIFE HOLDING AG ES7437803	501.68	14,727.36	56,187.95	0.09	41,460.59
708.000 SWISS PRIME SITE AG ESB083BH9	115.56	55,792.61	81,814.63	0.13	26,022.02
839.000 PARGESA HOLDING SA ESB0CDLF5	83.08	54,987.44	69,703.67	0.11	14,716.23
391.000 DUFRY AG ESB0R80X4	99.16	32,163.07	38,770.92	0.06	6,607.85
115.000 PARTNERS GROUP HOLDING AG ESB119QG7	916.40	30,129.42	105,386.48	0.17	75,257.06
194.000 SCHINDLER HOLDING AG ESB11TCY9	254.25	17,521.30	49,323.90	0.08	31,802.60
201.000 KUEHNE + NAGEL INTERNATIONAL A ESB142S69	168.53	21,489.37	33,875.35	0.05	12,385.98
155.000 GEBERIT AG ESB1WGG94	560.95	28,368.29	86,947.90	0.14	58,579.61

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Asset Detail - By Currency

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
801.000 JULIUS BAER GROUP LTD ESB4R2R51	51.56	29,725.73	41,301.11	0.07	11,575.38
1,781.000 SWISS RE AG ESB545MG7	112.25	92,280.66	199,922.24	0.32	107,641.58
2,087.000 CIE FINANCIERE RICHEMONT SA ESBCRWZ17	78.55	82,975.22	163,925.46	0.26	80,950.24
592.000 IDORSIA LTD ESBF0YK60	30.92	4,747.52	18,303.80	0.03	13,556.28
600.000 SIKA AG ESBF2DSG4	187.79	18,597.62	112,676.20	0.18	94,078.58
2,056.000 ALCON INC ESBJT1GR2	56.59	71,536.40	116,351.32	0.19	44,814.92
9,787.000 UBS GROUP AG ESBRJL171	12.62	126,851.06	123,556.65	0.20	-3,294.41
202.000 VIFOR PHARMA AG ESBZ12TW9	182.42	28,811.70	36,849.59	0.06	8,037.89
TOTAL EQUITY SWISS FRANC		**3,154,025.40**	**5,821,456.70**	**9.31**	**2,667,431.30**
TOTAL ASSETS SWISS FRANC		**3,154,676.31**	**5,822,121.06**	**9.31**	**2,667,444.75**

U.S. DOLLAR
CASH & CASH EQUIVALENTS

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
90,438.340 996229696	BLACKROCK LIQ T FUND INSTL VAR RT 12/31/2049 DD 01/31/12	100.00	90,438.34	90,438.34	0.14	0.00
EQUITY						
2,696.000 585464100	MELCO RESORTS & ENTERTAINMENT ADR	24.17	45,414.12	65,162.32	0.10	19,748.20
5,306.000 881624209	TEVA PHARMACEUTICAL INDUSTRIES ADR	9.80	36,956.29	51,998.80	0.08	15,042.51
994.000 G25839104	COCA-COLA EUROPEAN PARTNERS PL	50.88	47,143.47	50,574.72	0.08	3,431.25
258.000 M22465104	CHECK POINT SOFTWARE TECHNOLOG	110.96	28,324.90	28,627.68	0.05	302.78
1,591.000 N00985106	AERCAP HOLDINGS NV	61.47	63,888.56	97,798.77	0.16	33,910.21
1,167.000 N6596X109	NXP SEMICONDUCTORS NV	127.26	95,661.21	148,512.42	0.24	52,851.21
	TOTAL EQUITY U.S. DOLLAR		**317,388.55**	**442,674.71**	**0.71**	**125,286.16**
	TOTAL ASSETS U.S. DOLLAR		**407,826.89**	**533,113.05**	**0.85**	**125,286.16**
	TOTAL ASSETS		**39,108,515.59**	**62,506,522.59**	**100.00**	**23,398,007.00**

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TOWNSEND OE PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
CASH		0.52	0.52	0.00	0.00
REAL ESTATE					
2,867,587.430 LION INDUSTRIAL TRUST 999151624		1,722,985.25	2,867,587.43	6.30	1,144,602.18
4,695,749.820 METLIFE CORE PROPERTY FUND 99VVA7NG4 L P		3,559,763.08	4,695,749.82	10.32	1,135,986.74
7,561,909.610 PRIME PROPERTY FUND LLC 99VVAE6C7		1,645,380.42	7,561,909.61	16.63	5,916,529.19
4,045,399.480 JAMESTOWN PREMIER PROPERTY 99VVARYK9		304,696.70	4,045,399.48	8.89	3,740,702.78
7,365,857.600 PRISA REAL ESTATE LP 99VVAWA08		4,478,953.42	7,365,857.60	16.19	2,886,904.18
2,143,032.770 USAA EAGLE REAL ESTATE LP 99VVAWAW8		189,400.65	2,143,032.77	4.71	1,953,632.12
2,978,283.000 INLAND RETAIL PROPERTY 99VVBEW60		2,672,264.35	2,978,283.00	6.55	306,018.65
3,355,467.650 HANCOCK US REAL ESTATE 99VVBHWS5		2,706,527.52	3,355,467.65	7.38	648,940.13

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,328,132.270 PROLOGIS TARGETED US LOGISTICS 99VVBPEY4 LP		2,773,113.15	3,328,132.27	7.32	555,019.12
3,059,873.000 CORTLAND GROWTH INCOME LP 99VVBUBJ9		2,687,082.00	3,059,873.00	6.73	372,791.00
4,081,884.340 BLACK CREEK INDUSTRIAL FUND LP 99VVBZSU5		4,049,848.34	4,081,884.34	8.97	32,036.00
TOTAL REAL ESTATE U.S. DOLLAR		**26,790,014.88**	**45,483,176.97**	**100.00**	**18,693,162.09**
TOTAL ASSETS U.S. DOLLAR		**26,790,015.40**	**45,483,177.49**	**100.00**	**18,693,162.09**
TOTAL ASSETS		**26,790,015.40**	**45,483,177.49**	**100.00**	**18,693,162.09**

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BNY MELLON

Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

WELLINGTON EMD PI1 - [redacted]

12/31/2019

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
FIXED INCOME SECURITIES					
3,095,049.494 WTC-CTF JPM PAG EMERGING 99VVAJY68 MARKETS DEBT	10.94	30,925,855.29	33,859,841.46	100.00	2,933,986.17

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BNY MELLON

Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

STEPSTONE PI1 - [redacted]

12/31/2019

Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR						
PRIVATE EQUITY						
53,523,301.310	STEPSTONE XL OPP FUND LP 99VVAKD50		37,125,510.47	53,523,301.31	63.37	16,397,790.84
19,433,666.000	STEPSTONE XL OP FUND II-A 99VVBMW13		17,472,157.80	19,433,666.00	23.01	1,961,508.20
11,508,948.000	STEPSTONE CAP PARTNERS IV LP 99VVBNR66		10,394,356.00	11,508,948.00	13.63	1,114,592.00
	TOTAL PRIVATE EQUITY U.S. DOLLAR		**64,992,024.27**	**84,465,915.31**	**100.00**	**19,473,891.04**
	TOTAL ASSETS U.S. DOLLAR		**64,992,024.27**	**84,465,915.31**	**100.00**	**19,473,891.04**
	TOTAL ASSETS		**64,992,024.27**	**84,465,915.31**	**100.00**	**19,473,891.04**

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BNY MELLON

Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

FIRST PRINCIPLES PI1 - [redacted]

12/31/2019

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
2,119,349.470 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	2,119,349.47	2,119,349.47	2.80	0.00
-80,000.000 SWAP COLLATERAL WITH BARCLAYS 99QAAAPN2	0.92	-73,226.18	-73,226.18	-0.10	0.00
CASH		0.31	0.31	0.00	0.00
TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**2,046,123.60**	**2,046,123.60**	**2.71**	**0.00**
FIXED INCOME SECURITIES					
350,000.000 AT&T INC 00206RBK7 4.350% 06/15/2045 DD 06/15/13	107.96	333,516.08	377,863.50	0.50	44,347.42
150,000.000 AT&T INC 00206RDH2 5.150% 03/15/2042 DD 03/15/16	116.85	147,121.82	175,273.50	0.23	28,151.68
750,000.000 AT&T INC 00206RDV1 VAR RT 07/15/2021 DD 05/19/17	100.95	756,145.78	757,140.00	1.00	994.22
375,000.000 AT&T INC 00206RHK1 4.850% 03/01/2039 DD 02/19/19	115.34	380,413.26	432,532.50	0.57	52,119.24
1,260,000.000 ABBVIE INC 144A 00287YBU2 2.950% 11/21/2026 DD 11/21/19	101.82	1,279,508.32	1,282,881.60	1.70	3,373.28

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Asset Detail - By Currency

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Status : FINAL

FIRST PRINCIPLES PI1 - [redacted] **12/31/2019**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
510,000.000 AERCAP IRELAND CAPITAL DAC / A 00774MAE5 3.875% 01/23/2028 DD 01/23/18	103.86	531,136.54	529,701.30	0.70	-1,435.24
525,000.000 AIR LEASE CORP 00912XAV6 3.625% 04/01/2027 DD 03/08/17	103.72	512,552.61	544,503.75	0.72	31,951.14
750,000.000 AIRCASTLE LTD 00928QAQ4 4.125% 05/01/2024 DD 03/20/17	105.07	788,910.12	788,032.50	1.04	-877.62
700,000.000 ALIBABA GROUP HOLDING LTD 01609WAT9 3.400% 12/06/2027 DD 12/06/17	104.19	730,827.90	729,337.00	0.96	-1,490.90
300,000.000 AMAZON.COM INC 023135BF2 3.875% 08/22/2037 DD 02/22/18	113.66	306,352.10	340,977.00	0.45	34,624.90
350,000.000 AMAZON.COM INC 023135BJ4 4.050% 08/22/2047 DD 02/22/18	117.69	365,388.64	411,897.50	0.54	46,508.86
300,000.000 AMERICAN EXPRESS CREDIT CORP 0258M0EH8 VAR RT 03/03/2022 DD 03/03/17	100.84	300,000.00	302,511.00	0.40	2,511.00
120,000.000 ANHEUSER-BUSCH INBEV WORLDWIDE 03523TBF4 8.200% 01/15/2039 DD 01/15/11	158.16	185,952.72	189,790.80	0.25	3,838.08
500,000.000 ANHEUSER-BUSCH INBEV FINANCE I 035242AN6 4.900% 02/01/2046 DD 01/25/16	118.12	570,072.04	590,610.00	0.78	20,537.96
288,000.000 APACHE CORP 037411BD6 2.625% 01/15/2023 DD 12/03/12	100.32	285,024.84	288,921.60	0.38	3,896.76

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Asset Detail - By Currency

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FIRST PRINCIPLES PI1 - [redacted]

12/31/2019

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
200,000.000 APPLE INC 037833DD9 3.750% 09/12/2047 DD 09/12/17	111.39	198,908.00	222,782.00	0.29	23,874.00
300,000.000 BP CAPITAL MARKETS PLC 05565QDH8 3.723% 11/28/2028 DD 11/28/16	109.06	310,940.30	327,183.00	0.43	16,242.70
600,000.000 BANK OF AMERICA CORP 06051GHS1 VAR RT 03/15/2050 DD 03/15/19	120.56	717,428.92	723,330.00	0.96	5,901.08
300,000.000 BECTON DICKINSON AND CO 075887BW8 3.700% 06/06/2027 DD 06/06/17	106.42	317,025.66	319,260.00	0.42	2,234.34
450,000.000 BOEING CO/THE 097023AS4 6.625% 02/15/2038 DD 02/24/98	140.50	619,313.92	632,241.00	0.84	12,927.08
300,000.000 BRISTOL-MYERS SQUIBB CO 144A 110122CC0 4.125% 06/15/2039 DD 05/16/19	115.43	321,978.27	346,275.00	0.46	24,296.73
250,000.000 BRISTOL-MYERS SQUIBB CO 144A 110122CD8 4.250% 10/26/2049 DD 05/16/19	118.73	266,474.69	296,820.00	0.39	30,345.31
200,000.000 BROADCOM CORP / BROADCOM CAYMA 11134LAP4 3.125% 01/15/2025 DD 10/17/17	101.22	199,959.03	202,438.00	0.27	2,478.97
175,000.000 BROADCOM INC 144A 11135FAE1 4.250% 04/15/2026 DD 04/05/19	106.22	172,872.99	185,879.75	0.25	13,006.76
1,320,000.000 CIT GROUP INC 125581GW2 5.250% 03/07/2025 DD 03/09/18	110.00	1,453,528.25	1,452,000.00	1.92	-1,528.25

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Asset Detail - By Currency

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Status : FINAL

FIRST PRINCIPLES PI1 - [redacted] **12/31/2019**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
250,000.000 CENTENE CORP 144A 15135BAQ4 4.250% 12/15/2027 DD 12/06/19	102.88	257,734.28	257,187.50	0.34	-546.78
300,000.000 CHARTER COMMUNICATIONS OPERATI 161175AY0 4.908% 07/23/2025 DD 07/23/16	110.12	310,976.88	330,354.00	0.44	19,377.12
700,000.000 CHARTER COMMUNICATIONS OPERATI 161175BJ2 3.750% 02/15/2028 DD 07/06/17	103.73	653,522.81	726,117.00	0.96	72,594.19
400,000.000 CITIGROUP INC 172967LP4 VAR RT 07/24/2028 DD 07/24/17	106.61	403,548.71	426,456.00	0.56	22,907.29
930,000.000 CITIGROUP INC 172967LS8 VAR RT 10/27/2028 DD 10/27/17	105.29	930,000.00	979,197.00	1.30	49,197.00
1,450,000.000 CITIGROUP INC 172967ME8 VAR RT 03/20/2030 DD 03/20/19	109.48	1,514,653.14	1,587,474.50	2.10	72,821.36
250,000.000 COMCAST CORP 20030NCE9 3.999% 11/01/2049 DD 10/19/17	110.89	261,233.93	277,235.00	0.37	16,001.07
175,000.000 CONOCOPHILLIPS CO 20826FAR7 5.950% 03/15/2046 DD 03/08/16	143.14	221,885.92	250,498.50	0.33	28,612.58
206,000.000 CONTINENTAL RESOURCES INC/OK 212015AH4 5.000% 09/15/2022 DD 03/08/12	100.72	206,041.35	207,477.02	0.27	1,435.67
680,000.000 CREDIT SUISSE AG 144A 22546DAA4 6.500% 08/08/2023 DD 08/08/13	111.38	757,708.81	757,350.00	1.00	-358.81

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Asset Detail - By Currency

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Status : FINAL

FIRST PRINCIPLES PI1 - [redacted]

12/31/2019

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
150,000.000 DAIMLER FINANCE NORTH AME 144A 233851CS1 2.850% 01/06/2022 DD 01/06/17	101.24	149,930.69	151,854.00	0.20	1,923.31
1,250,000.000 DAVITA 8/19 DELAYED DRAW TLA 23918VAW4	99.56	1,246,900.75	1,244,537.50	1.65	-2,363.25
730,000.000 DELL INTERNATIONAL LLC / 144A 24703DAY7 4.000% 07/15/2024 DD 03/20/19	104.77	766,152.48	764,835.60	1.01	-1,316.88
1,280,000.000 DELTA AIR LINES INC 247361ZU5 2.900% 10/28/2024 DD 10/28/19	100.04	1,272,548.48	1,280,550.40	1.69	8,001.92
300,000.000 DELL INTERNATIONAL LLC / 144A 25272KAK9 6.020% 06/15/2026 DD 06/01/16	115.12	315,006.11	345,360.00	0.46	30,353.89
480,000.000 DOMINION ENERGY INC 25746UCZ0 4.600% 03/15/2049 DD 03/13/19	116.25	534,665.43	557,995.20	0.74	23,329.77
250,000.000 DOW CHEMICAL CO/THE 260543CR2 5.550% 11/30/2048 DD 05/30/19	125.00	282,048.17	312,497.50	0.41	30,449.33
325,000.000 DUKE ENERGY CORP 26441CAS4 2.650% 09/01/2026 DD 08/12/16	100.49	313,820.17	326,582.75	0.43	12,762.58
450,000.000 DUKE ENERGY CORP 26441CBF1 4.200% 06/15/2049 DD 06/07/19	110.57	457,733.87	497,574.00	0.66	39,840.13
510,000.000 ENERGY TRANSFER OPERATING LP 29273RBD0 4.050% 03/15/2025 DD 03/12/15	105.14	533,390.52	536,203.80	0.71	2,813.28

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Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

FIRST PRINCIPLES PI1 - [redacted] **12/31/2019**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
360,000.000 ENERGY TRANSFER OPERATING LP 29278NAF0 4.950% 06/15/2028 DD 06/08/18	109.58	391,785.57	394,495.20	0.52	2,709.63
700,000.000 ENERGY TRANSFER OPERATING LP 29278NAN3 5.500% 06/01/2027 DD 12/01/18	112.43	779,249.83	786,982.00	1.04	7,732.17
175,000.000 ENTERPRISE PRODUCTS OPERATING 29379VBA0 4.850% 03/15/2044 DD 03/18/13	115.71	183,616.69	202,489.00	0.27	18,872.31
1,510,000.000 EQUINIX INC 29444UAR7 5.375% 05/15/2027 DD 03/22/17	108.60	1,630,534.94	1,639,905.30	2.17	9,370.36
325,000.000 FEDEX CORP 31428XBM7 3.300% 03/15/2027 DD 01/06/17	103.41	327,209.34	336,085.75	0.44	8,876.41
200,000.000 FORD MOTOR CREDIT CO LLC 345397WF6 4.250% 09/20/2022 DD 09/25/12	103.45	203,477.33	206,898.00	0.27	3,420.67
900,000.000 FORD MOTOR CREDIT CO LLC 345397YT4 3.815% 11/02/2027 DD 11/02/17	96.98	899,700.03	872,775.00	1.15	-26,925.03
300,000.000 FOX CORP 144A 35137LAC9 4.709% 01/25/2029 DD 01/25/19	114.04	334,271.30	342,114.00	0.45	7,842.70
250,000.000 GENERAL MOTORS FINANCIAL CO IN 37045XBR6 VAR RT 01/14/2022 DD 01/17/17	101.01	252,022.57	252,517.50	0.33	494.93
250,000.000 GENERAL MOTORS FINANCIAL CO IN 37045XCG9 3.850% 01/05/2028 DD 01/05/18	102.04	249,523.29	255,090.00	0.34	5,566.71

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Asset Detail - By Currency

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FIRST PRINCIPLES PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
5,000.000 GEORGIA-PACIFIC LLC 373298CF3 8.000% 01/15/2024 DD 12/11/03	121.54	5,808.33	6,076.85	0.01	268.52
1,000,000.000 GOLDMAN SACHS GROUP INC/THE 38141GFD1 6.750% 10/01/2037 DD 10/03/07	138.91	1,305,382.75	1,389,130.00	1.84	83,747.25
300,000.000 GOLDMAN SACHS GROUP INC/THE 38141GWM2 VAR RT 07/24/2023 DD 07/24/17	101.81	300,166.88	305,415.00	0.40	5,248.12
510,000.000 GOLDMAN SACHS GROUP INC/THE 38141GXD1 VAR RT 05/15/2026 DD 05/17/18	101.04	515,662.24	515,304.00	0.68	-358.24
350,000.000 HCA INC 404119BN8 5.000% 03/15/2024 DD 03/17/14	109.32	368,120.56	382,609.50	0.51	14,488.94
910,000.000 HCA INC 404119BQ1 5.250% 04/15/2025 DD 10/17/14	111.89	1,017,412.28	1,018,208.10	1.35	795.82
300,000.000 HCA INC 404119BU2 4.500% 02/15/2027 DD 08/15/16	107.85	305,235.97	323,547.00	0.43	18,311.03
400,000.000 HUNTINGTON INGALLS INDUST 144A 446413AH9 5.000% 11/15/2025 DD 11/17/15	104.50	415,918.57	418,000.00	0.55	2,081.43
200,000.000 HYUNDAI CAPITAL AMERICA 144A 44891AAR8 3.250% 09/20/2022 DD 09/20/17	101.93	199,994.54	203,864.00	0.27	3,869.46
300,000.000 INTERNATIONAL BUSINESS MACHINE 459200KC4 4.250% 05/15/2049 DD 05/15/19	114.45	306,857.98	343,338.00	0.45	36,480.02

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Asset Detail - By Currency

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FIRST PRINCIPLES PI1 - [redacted]

12/31/2019

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,060,000.000 JPMORGAN CHASE & CO 46625HLL2 4.950% 06/01/2045 DD 05/29/15	127.29	1,206,600.19	1,349,231.60	1.78	142,631.41
125,000.000 JPMORGAN CHASE & CO 46647PAJ5 VAR RT 07/24/2038 DD 07/24/17	110.69	125,000.00	138,366.25	0.18	13,366.25
300,000.000 JPMORGAN CHASE & CO 46647PAN6 VAR RT 01/23/2049 DD 01/23/18	112.55	300,000.00	337,644.00	0.45	37,644.00
300,000.000 JOHNSON & JOHNSON 478160CF9 3.625% 03/03/2037 DD 03/03/17	110.47	299,316.10	331,398.00	0.44	32,081.90
250,000.000 KINDER MORGAN INC 49456BAF8 4.300% 06/01/2025 DD 11/26/14	108.50	266,075.64	271,247.50	0.36	5,171.86
300,000.000 KROGER CO/THE 501044DE8 2.650% 10/15/2026 DD 10/03/16	100.68	284,103.96	302,049.00	0.40	17,945.04
1,342,914.860 LFS 2019A LLC A A 144A 50201NAA9 5.250% 05/15/2031 DD 05/30/19	100.00	1,342,914.86	1,342,914.86	1.78	0.00
1,170,000.000 LENNAR CORP 526057BZ6 4.500% 04/30/2024 DD 04/28/17	105.75	1,246,178.64	1,237,275.00	1.64	-8,903.64
375,000.000 LOWE'S COS INC 548661DS3 4.550% 04/05/2049 DD 04/05/19	118.07	378,125.97	442,755.00	0.59	64,629.03
360,000.000 MARATHON PETROLEUM CORP 56585ABC5 5.125% 12/15/2026 DD 12/15/18	113.28	389,371.33	407,822.40	0.54	18,451.07

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FIRST PRINCIPLES PI1 - [redacted] **12/31/2019**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
300,000.000 MCDONALD'S CORP 58013MFC3 4.450% 03/01/2047 DD 03/09/17	113.71	298,598.82	341,121.00	0.45	42,522.18
147,000.000 BERKSHIRE HATHAWAY ENERGY CO 59562VAM9 6.125% 04/01/2036 DD 10/01/06	137.37	187,676.79	201,933.90	0.27	14,257.11
300,000.000 MIZUHO FINANCIAL GROUP INC 60687YAK5 3.663% 02/28/2027 DD 02/28/17	106.24	300,000.00	318,711.00	0.42	18,711.00
620,000.000 MIZUHO FINANCIAL GROUP CA 144A 60688UAB2 4.600% 03/27/2024 DD 03/27/14	106.87	663,519.53	662,575.40	0.88	-944.13
700,000.000 MORGAN STANLEY 61744YAK4 VAR RT 07/22/2028 DD 07/24/17	106.33	705,283.01	744,317.00	0.98	39,033.99
490,000.000 MORGAN STANLEY 61746BEG7 4.375% 01/22/2047 DD 01/20/17	119.93	516,726.97	587,647.20	0.78	70,920.23
1,025,000.000 MOUNTAIN VIEW CLO X 2A B1 144A 62432PAL6 VAR RT 01/15/2033 DD 01/24/20	100.00	1,025,000.00	1,025,000.00	1.36	0.00
375,000.000 NATIONAL AUSTRALIA BANK L 144A 632525AS0 VAR RT 08/02/2034 DD 08/02/19	103.94	375,089.84	389,771.25	0.52	14,681.41
260,000.000 NORFOLK SOUTHERN CORP 655844BQ0 4.450% 06/15/2045 DD 06/02/15	115.43	271,333.34	300,118.00	0.40	28,784.66
300,000.000 NORTHROP GRUMMAN CORP 666807BJ0 3.850% 04/15/2045 DD 02/06/15	107.75	293,777.96	323,247.00	0.43	29,469.04

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Asset Detail - By Currency

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FIRST PRINCIPLES PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
200,000.000 OCCIDENTAL PETROLEUM CORP 674599DC6 5.550% 03/15/2026 DD 09/15/19	113.41	227,158.64	226,822.00	0.30	-336.64
250,000.000 ORACLE CORP 68389XBQ7 4.000% 11/15/2047 DD 11/09/17	111.88	260,091.08	279,692.50	0.37	19,601.42
250,000.000 PACIFICORP 695114CL0 6.000% 01/15/2039 DD 01/08/09	137.13	311,990.00	342,825.00	0.45	30,835.00
200,000.000 PFIZER INC 717081DE0 4.300% 06/15/2043 DD 06/03/13	117.44	217,091.99	234,882.00	0.31	17,790.01
475,000.000 PRUDENTIAL FINANCIAL INC 744320AY8 3.905% 12/07/2047 DD 12/07/17	107.69	487,527.73	511,503.75	0.68	23,976.02
330,000.000 REPUBLIC SERVICES INC 760759AP5 3.550% 06/01/2022 DD 05/21/12	103.32	337,354.56	340,939.50	0.45	3,584.94
200,000.000 SHELL INTERNATIONAL FINANCE BV 822582BQ4 4.000% 05/10/2046 DD 05/10/16	113.96	202,375.82	227,922.00	0.30	25,546.18
1,150,000.000 SPIRIT AEROSYSTEMS INC 85205TAK6 4.600% 06/15/2028 DD 05/30/18	105.54	1,256,938.83	1,213,687.00	1.61	-43,251.83
320,000.000 SUNOCO LOGISTICS PARTNERS OPER 86765BAU3 4.000% 10/01/2027 DD 09/21/17	103.47	318,671.70	331,088.00	0.44	12,416.30
1,290,000.000 SYNCHRONY FINANCIAL 87165BAG8 4.500% 07/23/2025 DD 07/23/15	107.90	1,386,098.55	1,391,922.90	1.84	5,824.35

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Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
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FIRST PRINCIPLES PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
797,351.502 US TREAS-CPI INFLAT 912810FQ6 3.375% 04/15/2032 DD 10/15/01	137.29	1,040,294.62	1,094,683.88	1.45	54,389.26
1,213,180.640 US TREAS-CPI INFLAT 912810QF8 2.125% 02/15/2040 DD 02/15/10	130.70	1,470,321.41	1,585,614.96	2.10	115,293.55
3,069,092.945 US TREAS-CPI INFLAT 912810QV3 0.750% 02/15/2042 DD 02/15/12	103.86	2,966,960.85	3,187,498.55	4.22	220,537.70
2,512,716.250 US TREAS-CPI INFLAT 912810RA8 0.625% 02/15/2043 DD 02/15/13	101.13	2,361,393.38	2,541,034.56	3.36	179,641.18
2,054,407.603 US TREAS-CPI INFLAT 912810RL4 0.750% 02/15/2045 DD 02/15/15	103.70	2,007,238.71	2,130,441.23	2.82	123,202.52
1,699,621.300 US TREAS-CPI INFLAT 912810RR1 1.000% 02/15/2046 DD 02/15/16	109.97	1,725,645.68	1,869,022.55	2.47	143,376.87
1,730,134.225 US TREAS-CPI INFLAT 912810RW0 0.875% 02/15/2047 DD 02/15/17	107.15	1,732,595.55	1,853,908.03	2.45	121,312.48
2,488,771.355 US TREAS-CPI INFLAT 912810SB5 1.000% 02/15/2048 DD 02/15/18	110.65	2,456,685.98	2,753,750.84	3.64	297,064.86
700,000.000 U S TREASURY BOND 912810SC3 3.125% 05/15/2048 DD 05/15/18	115.44	704,916.96	808,066.00	1.07	103,149.04
828,322.200 US TREAS-CPI INFLAT 912810SG4 1.000% 02/15/2049 DD 02/15/19	111.12	856,103.77	920,390.21	1.22	64,286.44

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FIRST PRINCIPLES PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
430,000.000 U S TREASURY BOND 912810SH2 2.875% 05/15/2049 DD 05/15/19	110.52	506,339.34	475,236.00	0.63	-31,103.34
125,000.000 U S TREASURY BOND 912810SJ8 2.250% 08/15/2049 DD 08/15/19	97.28	122,137.73	121,601.25	0.16	-536.48
380,000.000 RAYTHEON TECHNOLOGIES CORP 913017BT5 4.500% 06/01/2042 DD 06/01/12	119.89	419,283.05	455,589.60	0.60	36,306.55
200,000.000 UNITEDHEALTH GROUP INC 91324PCZ3 4.250% 04/15/2047 DD 03/13/17	115.78	209,561.29	231,558.00	0.31	21,996.71
315,000.000 UNITEDHEALTH GROUP INC 91324PDF6 3.750% 10/15/2047 DD 10/25/17	107.64	311,249.40	339,059.70	0.45	27,810.30
260,000.000 VERIZON COMMUNICATIONS INC 92343VCZ5 4.672% 03/15/2055 DD 03/13/15	123.56	271,823.15	321,250.80	0.42	49,427.65
200,000.000 VISA INC 92826CAJ1 3.650% 09/15/2047 DD 09/11/17	112.04	200,962.24	224,082.00	0.30	23,119.76
1,260,000.000 VISTRA OPERATIONS CO LLC 144A 92840VAD4 3.550% 07/15/2024 DD 06/11/19	101.30	1,275,844.35	1,276,405.20	1.69	560.85
225,000.000 WALGREENS BOOTS ALLIANCE INC 931427AH1 3.800% 11/18/2024 DD 11/18/14	104.24	229,828.61	234,540.00	0.31	4,711.39
240,000.000 WALGREENS BOOTS ALLIANCE INC 931427AQ1 3.450% 06/01/2026 DD 06/01/16	101.74	240,005.31	244,185.60	0.32	4,180.29

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FIRST PRINCIPLES PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
250,000.000 WELLS FARGO & CO 949746SH5 3.000% 10/23/2026 DD 10/25/16	102.49	246,433.56	256,225.00	0.34	9,791.44
-1,535,000.000 IRS R US0003M P 6.75% 99QACF2J3 2038 JUN 19 **SWPNDT00005**	0.00	0.00	0.00	0.00	0.00
1,535,000.000 IRS_R US0003M P 6.75% 99QACF2K0 2038 JUN 19 **SWPNDT00005**	0.00	49,580.50	23.00	0.00	-49,557.50
-3,000,000.000 IRS R US0003M P 6.75% 99QACLUY6 6.750% 01/27/2034 DD 01/23/14 **SWPPRAIRIEINDT00006**	0.00	0.00	0.00	0.00	0.00
3,000,000.000 IRS_R US0003M P 6.75% 99QACLUZ3 VAR RT 01/27/2034 DD 01/23/14 **SWPPRAIRIEINDT00006**	0.00	79,500.00	122.00	0.00	-79,378.00
TOTAL FIXED INCOME SECURITIES U.S. DOLLAR		**70,397,503.58**	**73,543,082.74**	**97.29**	**3,145,579.16**
TOTAL ASSETS U.S. DOLLAR		**72,443,627.18**	**75,589,206.34**	**100.00**	**3,145,579.16**
TOTAL ASSETS		**72,443,627.18**	**75,589,206.34**	**100.00**	**3,145,579.16**

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MARATHON EAFE PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
EQUITY					
13,526.828 MARATHON EAFE 99VVA3995	1,852.03	19,619,150.57	25,052,068.39	100.00	5,432,917.82

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Asset Detail - By Currency

Report ID : IACS0005
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EATON VANCE HY PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
EURO CURRENCY UNIT					
FIXED INCOME SECURITIES					
319,000.000 ARD FINANCE SA REGS ELBKDLTB8 5.000% 06/30/2027	113.13	353,260.60	360,870.50	0.58	7,609.90
200,000.000 VIVION INVESTMENTS SARL REGS ELBKLVKS9 3.000% 08/08/2024	114.48	220,447.10	228,952.28	0.37	8,505.18
150,000.000 ZIGGO BV REGS ENBYQ76G5 4.250% 01/15/2027	120.81	173,426.74	181,213.59	0.29	7,786.85
227,000.000 STANDARD INDUSTRIES INC/N 144A NABL4PZ32 2.250% 11/21/2026	115.56	249,734.05	262,318.20	0.42	12,584.15
116,000.000 PANTHER BF AGGREGATOR 2 LP NCBJ0M305 4.375% 15-MAY-2026 SECD REGS	117.66	131,515.00	136,486.12	0.22	4,971.12
TOTAL FIXED INCOME SECURITIES EURO CURRENCY UNIT		**1,128,383.49**	**1,169,840.69**	**1.88**	**41,457.20**
TOTAL ASSETS EURO CURRENCY UNIT		**1,128,383.49**	**1,169,840.69**	**1.88**	**41,457.20**
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
1,149,917.290 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	1,149,917.29	1,149,917.29	1.85	0.00
CASH		1,411.29	1,411.29	0.00	0.00
TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**1,151,328.58**	**1,151,328.58**	**1.85**	**0.00**
CONVERTIBLE OR EXCHANGEABLE SE					

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
95,000.000 NEXTERA ENERGY PARTNERS L 144A 65341BAA4 1.500% 09/15/2020 DD 09/11/17	104.27	94,294.86	99,058.40	0.16	4,763.54
130,000.000 PATTERN ENERGY GROUP INC 70338PAB6 VAR RT 07/15/2020 DD 07/28/15	100.50	137,800.00	130,644.80	0.21	-7,155.20
TOTAL CONVERTIBLE OR EXCHANGEABLE SE U.S. DOLLAR		**232,094.86**	**229,703.20**	**0.37**	**-2,391.66**
EQUITY					
1,962.000 CLEAR CHANNEL OUTDOOR HOLDINGS 18453H106	2.86	9,319.50	5,611.32	0.01	-3,708.18
351.000 IHEARTMEDIA INC 45174J509	16.84	21,980.39	5,910.84	0.01	-16,069.55
TOTAL EQUITY U.S. DOLLAR		**31,299.89**	**11,522.16**	**0.02**	**-19,777.73**
FIXED INCOME SECURITIES					
108,030.340 ADVANCED DISPOSAL 10/16 00100UAG7 COV-LITE TLB	100.30	108,030.34	108,354.43	0.17	324.09
86,000.000 AES CORP/VA 00130HBT1 4.875% 05/15/2023 DD 04/30/13	101.50	86,705.69	87,290.00	0.14	584.31
93,000.000 AES CORP/VA 00130HBW4 5.500% 04/15/2025 DD 04/06/15	103.25	92,447.68	96,022.50	0.15	3,574.82
134,000.000 AES CORP/THE 00130HBX2 6.000% 05/15/2026 DD 05/25/16	106.50	140,262.84	142,710.00	0.23	2,447.16

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
26,000.000 AES CORP/THE 00130HBY0 5.125% 09/01/2027 DD 08/28/17	106.75	27,644.48	27,755.00	0.04	110.52
53,000.000 AES CORP/THE 00130HBZ7 4.000% 03/15/2021 DD 03/15/18	101.38	53,000.00	53,728.75	0.09	728.75
130,000.000 AMC ENTERTAINMENT HOLDINGS INC 00165AAH1 5.750% 06/15/2025 DD 06/05/15	92.50	128,412.82	120,250.00	0.19	-8,162.82
130,000.000 AMC ENTERTAINMENT HOLDINGS INC 00165CAB0 5.875% 11/15/2026 DD 05/15/17	90.13	128,439.30	117,162.50	0.19	-11,276.80
135,000.000 ACADIA HEALTHCARE CO INC 00404AAM1 6.500% 03/01/2024 DD 02/16/16	103.63	139,234.81	139,893.75	0.23	658.94
24,000.000 ADVANCED DRAINAGE SYSTEMS 144A 00790RAA2 5.000% 09/30/2027 DD 09/23/19	103.13	24,000.00	24,750.00	0.04	750.00
50,000.000 ADVANCED DISPOSAL SERVICE 144A 00790XAA9 5.625% 11/15/2024 DD 11/10/16	104.00	50,000.00	52,000.00	0.08	2,000.00
300,000.000 AKER BP ASA 144A 00973RAC7 5.875% 03/31/2025 DD 03/22/18	106.25	307,446.07	318,750.00	0.51	11,303.93
94,000.000 ALBERTSONS COS INC / SAFE 144A 013092AB7 5.875% 02/15/2028 DD 08/15/19	106.25	94,000.00	99,875.00	0.16	5,875.00
276,446.700 ALIXPARTNERS 4/17 COV-LITE TLB 01642PAW6	100.47	274,763.94	277,743.24	0.45	2,979.30

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
150,000.000 ALLEGHENY LUDLUM LLC 016900AC6 6.950% 12/15/2025 DD 12/15/95	108.00	156,748.39	162,000.00	0.26	5,251.61
165,000.000 ALLEGHENY TECHNOLOGIES INC 01741RAF9 VAR RT 08/15/2023 DD 07/12/13	112.08	172,841.23	184,936.95	0.30	12,095.72
150,000.000 ALLEGHENY TECHNOLOGIES INC 01741RAH5 5.875% 12/01/2027 DD 11/22/19	105.00	150,000.00	157,500.00	0.25	7,500.00
104,000.000 ALLIANCE DATA SYSTEMS COR 144A 018581AK4 4.750% 12/15/2024 DD 12/20/19	99.75	104,000.00	103,740.00	0.17	-260.00
213,000.000 ALLIANT HOLDINGS INTERMED 144A 01883LAA1 6.750% 10/15/2027 DD 10/11/19	107.10	213,000.00	228,112.35	0.37	15,112.35
53,000.000 ALLIED UNIVERSAL HOLDCO L 144A 019576AA5 6.625% 07/15/2026 DD 07/12/19	107.47	53,000.00	56,959.10	0.09	3,959.10
10,000.000 ALLY FINANCIAL INC 02005NAJ9 7.500% 09/15/2020 DD 03/15/11	103.50	10,308.60	10,350.00	0.02	41.40
240,000.000 ALLY FINANCIAL INC 02005NBC3 4.625% 05/19/2022 DD 05/19/15	104.75	239,897.12	251,400.00	0.40	11,502.88
355,000.000 ALTICE FRANCE SA/FRANCE 144A 02156LAA9 8.125% 02/01/2027 DD 07/31/18	112.63	364,891.69	399,818.75	0.64	34,927.06
200,000.000 ALTICE FRANCE SA/FRANCE 144A 02156LAC5 5.500% 01/15/2028 DD 09/27/19	102.76	200,000.00	205,510.00	0.33	5,510.00

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Asset Detail - By Currency

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EATON VANCE HY PI1 - [redacted]

12/31/2019

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
200,000.000 AMERIGAS PARTNERS LP / AMERIGA 030981AJ3 5.875% 08/20/2026 DD 06/27/16	110.25	217,786.10	220,500.00	0.36	2,713.90
5,000.000 AMERIGAS PARTNERS LP / AMERIGA 030981AK0 5.500% 05/20/2025 DD 12/28/16	108.00	5,018.06	5,400.00	0.01	381.94
119,000.000 ANTERO MIDSTREAM PARTNERS 144A 03690AAD8 5.750% 03/01/2027 DD 02/25/19	87.94	119,000.00	104,646.22	0.17	-14,353.78
99,715.470 APPLIED SYSTEMS 9/17 COV-LITE 03827FAX9 TLB	100.30	100,463.63	100,017.61	0.16	-446.02
225,000.000 ARCHROCK PARTNERS LP / AR 144A 03959KAA8 6.875% 04/01/2027 DD 03/21/19	105.75	237,214.61	237,937.50	0.38	722.89
48,000.000 ARCHROCK PARTNERS LP / AR 144A 03959KAC4 6.250% 04/01/2028 DD 12/20/19	103.00	48,000.00	49,440.00	0.08	1,440.00
400,000.000 ARDAGH PACKAGING FINANCE 144A 03969AAP5 5.250% 08/15/2027 DD 08/12/19	105.25	406,161.45	421,008.00	0.68	14,846.55
60,000.000 ASCENT RESOURCES UTICA HO 144A 04364VAA1 10.000% 04/01/2022 DD 04/05/17	99.46	63,084.82	59,677.80	0.10	-3,407.02
160,000.000 ASCENT RESOURCES UTICA HO 144A 04364VAG8 7.000% 11/01/2026 DD 10/11/18	79.75	158,926.27	127,600.00	0.21	-31,326.27
500,000.000 ASURION 7/17 2ND LIEN TLB2 04649VAU4	101.15	504,564.62	505,750.00	0.81	1,185.38

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
115,000.000 AVOLON HOLDINGS FUNDING L 144A 05401AAB7 5.125% 10/01/2023 DD 09/17/18	107.79	115,000.00	123,956.20	0.20	8,956.20
147,000.000 AVOLON HOLDINGS FUNDING L 144A 05401AAD3 5.250% 05/15/2024 DD 03/01/19	109.16	147,000.00	160,462.26	0.26	13,462.26
100,000.000 BWX TECHNOLOGIES INC 144A 05605HAA8 5.375% 07/15/2026 DD 05/24/18	106.00	100,686.11	106,000.00	0.17	5,313.89
36,000.000 BAUSCH HEALTH COS INC 144A 071734AC1 5.750% 08/15/2027 DD 03/08/19	108.50	36,000.00	39,060.00	0.06	3,060.00
169,000.000 BAUSCH HEALTH COS INC 144A 071734AF4 7.250% 05/30/2029 DD 05/23/19	114.25	171,594.65	193,082.50	0.31	21,487.85
35,000.000 BERRY GLOBAL INC 144A 08576PAA9 4.500% 02/15/2026 DD 01/26/18	102.72	33,390.15	35,952.00	0.06	2,561.85
11,000.000 BERRY PETROLEUM CO LLC 144A 08580BAA4 7.000% 02/15/2026 DD 02/08/18	92.63	11,066.62	10,188.75	0.02	-877.87
100,000.000 BLUE RACER MIDSTREAM LLC 144A 095796AA6 6.125% 11/15/2022 DD 11/13/14	98.00	100,574.41	98,000.00	0.16	-2,574.41
39,000.000 BOMBARDIER INC 144A 097751BF7 6.125% 01/15/2023 DD 01/14/13	102.55	39,340.69	39,994.50	0.06	653.81
121,000.000 BOMBARDIER INC 144A 097751BJ9 6.000% 10/15/2022 DD 04/03/14	99.97	117,844.55	120,963.70	0.19	3,119.15

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
95,000.000 BOMBARDIER INC 144A 097751BT7 7.875% 04/15/2027 DD 03/07/19	102.88	94,340.04	97,731.25	0.16	3,391.21
141,000.000 BROOKFIELD PROPERTY REIT 144A 11284DAA3 5.750% 05/15/2026 DD 05/01/19	105.50	141,000.00	148,755.00	0.24	7,755.00
150,000.000 BUILDERS FIRSTSOURCE INC 144A 12008RAJ6 5.625% 09/01/2024 DD 08/22/16	104.00	151,426.57	156,000.00	0.25	4,573.43
152,000.000 BUILDERS FIRSTSOURCE INC 144A 12008RAM9 6.750% 06/01/2027 DD 05/30/19	109.63	162,584.08	166,630.00	0.27	4,045.92
240,000.000 STANDARD INDUSTRIES INC/N 144A 120111BN8 6.000% 10/15/2025 DD 10/05/15	105.13	248,165.58	252,300.00	0.41	4,134.42
260,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPBP7 5.875% 04/01/2024 DD 02/19/16	103.38	266,699.03	268,775.00	0.43	2,075.97
260,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPBR3 5.500% 05/01/2026 DD 04/21/16	105.38	268,395.07	273,975.00	0.44	5,579.93
200,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPBT9 5.125% 05/01/2027 DD 02/06/17	105.50	199,804.75	211,000.00	0.34	11,195.25
215,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPBX0 5.000% 02/01/2028 DD 08/08/17	104.93	208,604.59	225,603.80	0.36	16,999.21
54,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPCB7 5.375% 06/01/2029 DD 05/23/19	107.00	55,038.52	57,780.00	0.09	2,741.48

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EATON VANCE HY PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
170,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPCD3 4.750% 03/01/2030 DD 10/01/19	101.80	170,899.28	173,065.10	0.28	2,165.82
140,000.000 CDK GLOBAL INC 12508EAF8 4.875% 06/01/2027 DD 12/01/17	105.63	143,382.20	147,875.00	0.24	4,492.80
47,000.000 CDK GLOBAL INC 144A 12508EAJ0 5.250% 05/15/2029 DD 05/15/19	107.25	47,000.00	50,407.50	0.08	3,407.50
185,000.000 CIT GROUP INC 125581GX0 6.125% 03/09/2028 DD 03/09/18	118.00	189,198.47	218,300.00	0.35	29,101.53
200,000.000 CSC HOLDINGS LLC 144A 126307AU1 5.500% 05/15/2026 DD 05/15/18	105.87	207,449.06	211,748.00	0.34	4,298.94
345,000.000 CSC HOLDINGS LLC 144A 126307BA4 5.750% 01/15/2030 DD 07/10/19	106.75	350,678.91	368,287.50	0.59	17,608.59
195,000.000 CAESARS RESORT COLLECTION 144A 12652AAA1 5.250% 10/15/2025 DD 10/16/17	103.50	195,053.92	201,825.00	0.33	6,771.08
222,000.000 CVR REFINING LLC / COFFEYVILLE 126634AC8 6.500% 11/01/2022 DD 05/01/13	101.25	224,006.88	224,775.00	0.36	768.12
500,000.000 CABLEVISION SYSTEMS CORP 12686CBB4 5.875% 09/15/2022 DD 09/27/12	107.75	497,850.38	538,750.00	0.87	40,899.62
140,000.000 CALPINE CORP 144A 131347CC8 5.875% 01/15/2024 DD 10/31/13	102.00	139,733.84	142,800.00	0.23	3,066.16

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
149,000.000 CALPINE CORP 131347CF1 5.750% 01/15/2025 DD 07/22/14	102.63	148,166.07	152,911.25	0.25	4,745.18
70,000.000 CALPINE CORP 144A 131347CK0 5.250% 06/01/2026 DD 05/31/16	104.13	70,000.00	72,887.50	0.12	2,887.50
104,000.000 CALPINE CORP 144A 131347CM6 4.500% 02/15/2028 DD 12/20/19	100.89	104,000.00	104,922.48	0.17	922.48
187,000.000 CALPINE CORP 144A 131347CN4 5.125% 03/15/2028 DD 12/27/19	102.07	187,000.00	190,870.90	0.31	3,870.90
280,000.000 CATALENT PHARMA SOLUTIONS 144A 14879EAD0 4.875% 01/15/2026 DD 10/18/17	103.50	283,850.91	289,800.00	0.47	5,949.09
60,000.000 CATALENT PHARMA SOLUTIONS 144A 14879EAE8 5.000% 07/15/2027 DD 06/27/19	104.75	60,774.20	62,850.00	0.10	2,075.80
50,000.000 CENTENE CORP 15135BAD3 4.750% 05/15/2022 DD 04/29/14	102.00	50,371.68	51,000.00	0.08	628.32
360,000.000 CENTENE CORP 15135BAJ0 4.750% 01/15/2025 DD 11/09/16	103.87	367,432.55	373,942.80	0.60	6,510.25
98,000.000 CENTENE CORP 144A 15135BAQ4 4.250% 12/15/2027 DD 12/06/19	102.88	97,182.99	100,817.50	0.16	3,634.51
172,000.000 CENTENE CORP 144A 15135BAS0 4.625% 12/15/2029 DD 12/06/19	105.14	172,000.00	180,832.20	0.29	8,832.20

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
210,000.000 CENTENE CORP 144A 15137TAA8 5.375% 06/01/2026 DD 05/23/18	106.13	210,000.00	222,862.50	0.36	12,862.50
240,000.000 CENTENNIAL RESOURCE PRODU 144A 15138AAA8 5.375% 01/15/2026 DD 11/30/17	98.25	243,037.50	235,800.00	0.38	-7,237.50
150,000.000 CENTENNIAL RESOURCE PRODU 144A 15138AAC4 6.875% 04/01/2027 DD 03/15/19	104.00	150,268.49	156,000.00	0.25	5,731.51
175,000.000 CENTRAL GARDEN & PET CO 153527AM8 5.125% 02/01/2028 DD 12/14/17	103.50	173,846.10	181,125.00	0.29	7,278.90
56,000.000 CENTURYLINK INC 156700AX4 6.750% 12/01/2023 DD 11/27/13	111.63	57,864.72	62,510.00	0.10	4,645.28
175,000.000 CENTURYLINK INC 156700AZ9 5.625% 04/01/2025 DD 10/01/15	106.26	175,000.00	185,946.25	0.30	10,946.25
8,000.000 CENTURYLINK INC 156700BA3 7.500% 04/01/2024 DD 04/06/16	112.75	8,205.52	9,020.00	0.01	814.48
30,636.620 CENTURYLINK 5/17 COV-LITE TLB 15670BAB8	100.35	30,278.77	30,743.85	0.05	465.08
40,000.000 COLFAX CORP 144A 15723RAA2 6.000% 02/15/2024 DD 02/05/19	106.25	40,000.00	42,500.00	0.07	2,500.00
65,000.000 COLFAX CORP 144A 15723RAC8 6.375% 02/15/2026 DD 02/05/19	109.00	65,535.37	70,850.00	0.11	5,314.63

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
155,000.000 CHARLES RIVER LABORATORIE 144A 159864AC1 5.500% 04/01/2026 DD 04/03/18	107.50	156,713.59	166,625.00	0.27	9,911.41
48,000.000 CHARLES RIVER LABORATORIE 144A 159864AE7 4.250% 05/01/2028 DD 10/23/19	101.88	48,000.00	48,900.00	0.08	900.00
105,000.000 CHENIERE ENERGY PARTNERS LP 16411QAB7 5.250% 10/01/2025 DD 04/01/18	104.21	105,000.00	109,419.45	0.18	4,419.45
100,000.000 CHENIERE ENERGY PARTNERS LP 16411QAD3 5.625% 10/01/2026 DD 04/01/19	105.75	100,000.00	105,750.00	0.17	5,750.00
212,000.000 CHENIERE ENERGY PARTNERS 144A 16411QAE1 4.500% 10/01/2029 DD 09/12/19	102.76	213,786.19	217,851.20	0.35	4,065.01
153,000.000 CHENIERE CORPUS CHRISTI HOLDIN 16412XAC9 5.875% 03/31/2025 DD 12/09/16	112.45	160,814.96	172,042.38	0.28	11,227.42
180,000.000 CHESAPEAKE ENERGY 12/19 LAST O 16516FAH2 0.000% 12/31/2022 DD 12/04/19	102.83	178,973.20	185,099.40	0.30	6,126.20
70,000.000 CINEMARK USA INC 172441AZ0 4.875% 06/01/2023 DD 05/24/13	101.63	69,645.01	71,137.50	0.11	1,492.49
114,000.000 CITGO HOLDING INC 144A 17302WAB4 9.250% 08/01/2024 DD 08/01/19	107.25	114,000.00	122,265.00	0.20	8,265.00
150,000.000 CLEAN HARBORS INC 144A 184496AP2 5.125% 07/15/2029 DD 07/02/19	107.26	154,008.78	160,890.00	0.26	6,881.22

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20,000.000 CLEAR CHANNEL WORLDWIDE H 144A 18451QAN8 9.250% 02/15/2024 DD 02/12/19	110.75	20,000.00	22,150.00	0.04	2,150.00
121,000.000 CLEAR CHANNEL WORLDWIDE H 144A 18453HAA4 5.125% 08/15/2027 DD 08/23/19	104.13	121,000.00	125,997.30	0.20	4,997.30
103,000.000 CLOUD CRANE LLC 144A 18911YAA3 10.125% 08/01/2024 DD 07/29/16	105.00	109,510.87	108,150.00	0.17	-1,360.87
81,000.000 COMMSCOPE TECHNOLOGIES LL 144A 20337YAA5 6.000% 06/15/2025 DD 06/11/15	100.11	82,146.08	81,091.53	0.13	-1,054.55
92,000.000 COMMSCOPE TECHNOLOGIES LL 144A 20338HAB9 5.000% 03/15/2027 DD 03/13/17	94.00	92,274.58	86,480.00	0.14	-5,794.58
159,000.000 COMMSCOPE INC 144A 20338QAA1 8.250% 03/01/2027 DD 02/19/19	105.25	162,207.98	167,347.50	0.27	5,139.52
98,000.000 COMPASS MINERALS INTERNAT 144A 20451NAG6 6.750% 12/01/2027 DD 11/26/19	106.25	98,000.00	104,125.00	0.17	6,125.00
236,000.000 CONNECT FINCO SARL / CONN 144A 20752TAA2 6.750% 10/01/2026 DD 10/07/19	106.50	237,207.44	251,340.00	0.40	14,132.56
250,000.000 CONSTELLIUM SE 144A 210383AG0 5.875% 02/15/2026 DD 11/09/17	105.75	254,970.23	264,375.00	0.43	9,404.77
172,000.000 CORE & MAIN HOLDINGS LP 144A 21871MAA1 8.625% 09/15/2024 DD 09/16/19	104.00	171,530.63	178,880.00	0.29	7,349.37

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140,000.000 COVANTA HOLDING CORP 22282EAF9 5.875% 03/01/2024 DD 03/06/14	102.88	140,333.84	144,025.00	0.23	3,691.16
230,000.000 COVANTA HOLDING CORP 22282EAG7 5.875% 07/01/2025 DD 03/16/17	105.50	231,663.95	242,650.00	0.39	10,986.05
94,000.000 CRESTWOOD MIDSTREAM PARTN 144A 226373AQ1 5.625% 05/01/2027 DD 04/15/19	101.38	94,000.00	95,292.50	0.15	1,292.50
220,000.000 CROWN AMERICAS LLC / CROWN AME 228187AB6 4.750% 02/01/2026 DD 02/01/19	105.63	221,380.49	232,375.00	0.37	10,994.51
55,000.000 CROWN AMERICAS LLC / CROWN AME 22819KAB6 4.250% 09/30/2026 DD 03/31/17	104.88	50,603.91	57,681.25	0.09	7,077.34
239,000.000 CROWNROCK LP / CROWNROCK 144A 228701AF5 5.625% 10/15/2025 DD 10/11/17	102.00	238,940.28	243,780.00	0.39	4,839.72
55,000.000 DAE FUNDING LLC 144A 23371DAA2 4.500% 08/01/2022 DD 08/04/17	101.50	55,000.00	55,825.00	0.09	825.00
205,000.000 DAE FUNDING LLC 144A 23371DAB0 5.000% 08/01/2024 DD 08/04/17	104.99	207,752.65	215,237.70	0.35	7,485.05
230,000.000 DELL INTERNATIONAL LLC / 144A 25272KAK9 6.020% 06/15/2026 DD 06/01/16	115.12	249,973.42	264,776.00	0.43	14,802.58
183,000.000 DIAMOND SPORTS GROUP LLC 144A 25277LAA4 5.375% 08/15/2026 DD 08/02/19	101.16	183,000.00	185,113.65	0.30	2,113.65

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
183,000.000 DIAMOND SPORTS GROUP LLC 144A 25277LAC0 6.625% 08/15/2027 DD 08/02/19	97.25	183,937.48	177,967.50	0.29	-5,969.98
197,000.000 DIAMONDBACK ENERGY INC 25278XAH2 5.375% 05/31/2025 DD 05/31/17	104.99	203,443.86	206,834.24	0.33	3,390.38
40,000.000 DISH DBS CORP 25470XAJ4 5.875% 07/15/2022 DD 05/16/12	106.00	40,407.24	42,400.00	0.07	1,992.76
24,000.000 DISH DBS CORP 25470XAY1 7.750% 07/01/2026 DD 06/13/16	105.94	23,583.48	25,425.36	0.04	1,841.88
200,000.000 DRAX FINCO PLC 144A 26151AAA7 6.625% 11/01/2025 DD 04/26/18	106.25	206,670.59	212,500.00	0.34	5,829.41
100,000.000 VISTRA ENERGY CORP 26817RAB4 5.875% 06/01/2023 DD 12/01/13	102.30	99,310.38	102,304.00	0.16	2,993.62
325,000.000 VISTRA CORP 144A 26817RBA5 8.125% 01/30/2026 DD 08/21/17	107.00	338,536.26	347,750.00	0.56	9,213.74
195,000.000 EIG INVESTORS CORP 26854XAB5 10.875% 02/01/2024 DD 02/01/17	99.75	205,604.10	194,512.50	0.31	-11,091.60
75,000.000 EMC CORP 268648AQ5 2.650% 06/01/2020 DD 06/06/13	100.02	74,694.36	75,013.50	0.12	319.14
87,000.000 EP ENERGY LLC / EVEREST A 144A 268787AJ7 7.750% 05/15/2026 DD 05/23/18	71.50	76,850.18	62,205.00	0.10	-14,645.18

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
119,000.000 ESH HOSPITALITY INC 144A 26907YAB0 4.625% 10/01/2027 DD 09/18/19	101.25	119,000.00	120,487.50	0.19	1,487.50
18,000.000 EAGLE HOLDING CO II LLC 144A 26959XAA1 7.625% 05/15/2022 DD 05/11/17	101.57	17,683.76	18,283.32	0.03	599.56
202,000.000 EAGLE HOLDING CO II LLC 144A 26959XAC7 7.750% 05/15/2022 DD 05/14/19	101.54	200,375.12	205,106.76	0.33	4,731.64
205,000.000 ELDORADO RESORTS INC 28470RAF9 6.000% 04/01/2025 DD 03/29/17	105.00	213,972.99	215,250.00	0.35	1,277.01
48,000.000 ELDORADO GOLD CORP 144A 284902AE3 9.500% 06/01/2024 DD 06/05/19	107.75	47,130.42	51,720.00	0.08	4,589.58
210,000.000 ENDEAVOR ENERGY RESOURCES 144A 29260FAD2 5.500% 01/30/2026 DD 12/07/17	103.25	208,053.10	216,825.00	0.35	8,771.90
50,000.000 ENCOMPASS HEALTH CORP 29261AAA8 4.500% 02/01/2028 DD 09/18/19	103.63	50,000.00	51,812.50	0.08	1,812.50
60,000.000 ENCOMPASS HEALTH CORP 29261AAB6 4.750% 02/01/2030 DD 09/18/19	103.75	60,000.00	62,250.00	0.10	2,250.00
96,000.000 ENERGIZER HOLDINGS INC 144A 29272WAA7 6.375% 07/15/2026 DD 07/06/18	106.50	97,870.91	102,240.00	0.16	4,369.09
134,000.000 ENERGIZER HOLDINGS INC 144A 29272WAB5 7.750% 01/15/2027 DD 01/28/19	111.76	140,584.00	149,751.70	0.24	9,167.70

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
195,000.000 ENERGY TRANSFER OPERATING LP 29278NAM5 5.875% 01/15/2024 DD 01/15/19	110.71	212,322.88	215,892.30	0.35	3,569.42
81,000.000 ENLINK MIDSTREAM LLC 29336TAA8 5.375% 06/01/2029 DD 04/09/19	94.00	81,191.22	76,140.00	0.12	-5,051.22
129,796.540 ENVISION HEALTHCARE 9/18 29373UAC5 0.000% 10/10/2025 DD 06/11/18	85.05	108,498.24	110,391.96	0.18	1,893.72
149,000.000 ENVIVA PARTNERS LP / ENVI 144A 29413XAD9 6.500% 01/15/2026 DD 12/09/19	107.06	149,000.00	159,523.87	0.26	10,523.87
130,000.000 EQUINIX INC 29444UAR7 5.375% 05/15/2027 DD 03/22/17	108.60	136,923.88	141,183.90	0.23	4,260.02
45,000.000 EXTRACTION OIL & GAS INC 144A 30227MAA3 7.375% 05/15/2024 DD 08/01/17	62.50	38,996.13	28,125.00	0.05	-10,871.13
136,000.000 EXTRACTION OIL & GAS INC 144A 30227MAB1 5.625% 02/01/2026 DD 01/25/18	60.00	132,184.91	81,600.00	0.13	-50,584.91
200,000.000 FIRST QUANTUM MINERALS LT 144A 335934AK1 7.250% 04/01/2023 DD 03/22/17	103.53	198,030.59	207,056.00	0.33	9,025.41
94,000.000 FIVE POINT OPERATING CO L 144A 33834YAA6 7.875% 11/15/2025 DD 11/22/17	100.73	95,330.40	94,687.14	0.15	-643.26
107,000.000 FREEPORT-MCMORAN INC 35671DBC8 5.450% 03/15/2043 DD 09/15/13	103.50	98,128.81	110,745.00	0.18	12,616.19

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
150,000.000 FRESENIUS US FINANCE II I 144A 35804GAK4 4.500% 01/15/2023 DD 09/25/15	105.37	150,000.00	158,050.50	0.25	8,050.50
235,000.000 GEMS MENASA CAYMAN LTD / 144A 36166LAA5 7.125% 07/31/2026 DD 08/08/19	105.25	238,489.03	247,337.50	0.40	8,848.47
125,000.000 GFL ENVIRONMENTAL INC 144A 36168QAD6 5.375% 03/01/2023 DD 02/26/18	103.00	125,000.00	128,750.00	0.21	3,750.00
257,000.000 GFL ENVIRONMENTAL INC 144A 36168QAE4 8.500% 05/01/2027 DD 04/23/19	110.00	262,130.51	282,700.00	0.46	20,569.49
325,000.000 GLP CAPITAL LP / GLP FINANCING 361841AH2 5.375% 04/15/2026 DD 04/28/16	110.54	349,417.44	359,255.00	0.58	9,837.56
90,000.000 GLP CAPITAL LP / GLP FINANCING 361841AK5 5.750% 06/01/2028 DD 05/21/18	113.54	90,000.00	102,186.00	0.16	12,186.00
132,000.000 GW B-CR SECURITY CORP 144A 36257BAA7 9.500% 11/01/2027 DD 10/30/19	106.75	135,700.25	140,910.00	0.23	5,209.75
195,000.000 GATEWAY CASINOS & ENTERTA 144A 36760BAE9 8.250% 03/01/2024 DD 02/22/17	102.25	203,043.75	199,387.50	0.32	-3,656.25
111,000.000 GO DADDY OPERATING CO LLC 144A 38016LAA3 5.250% 12/01/2027 DD 06/04/19	105.25	112,024.89	116,827.50	0.19	4,802.61
49,000.000 GOLDEN ENTERTAINMENT INC 144A 381013AA9 7.625% 04/15/2026 DD 04/15/19	106.00	49,000.00	51,940.00	0.08	2,940.00

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72,000.000 GOLDEN NUGGET INC 144A 38113YAC3 8.750% 10/01/2025 DD 09/26/17	106.94	72,000.00	76,995.36	0.12	4,995.36
128,000.000 GOLDEN NUGGET INC 144A 38113YAE9 6.750% 10/15/2024 DD 10/04/16	103.50	127,069.53	132,480.00	0.21	5,410.47
130,000.000 WR GRACE & CO-CONN 144A 383909AF5 5.625% 10/01/2024 DD 09/16/14	110.50	139,702.75	143,650.00	0.23	3,947.25
290,531.430 GRAFTECH 2/18 COV-LITE TLB 38431EAB4 0.000% 02/12/2025 DD 01/23/18	99.63	289,099.43	289,441.94	0.47	342.51
49,000.000 GRANITE US HOLDINGS CORP 144A 38748YAA0 11.000% 10/01/2027 DD 09/30/19	101.25	47,164.60	49,612.50	0.08	2,447.90
254,000.000 GREAT WESTERN PETROLEUM L 144A 39143GAA8 9.000% 09/30/2021 DD 09/22/16	89.38	257,153.78	227,012.50	0.37	-30,141.28
186,000.000 GREYSTAR REAL ESTATE PART 144A 39807UAB2 5.750% 12/01/2025 DD 11/24/17	103.75	188,674.56	192,975.00	0.31	4,300.44
49,000.000 GTCR AP FINANCE INC 144A 40060QAA3 8.000% 05/15/2027 DD 05/13/19	104.00	49,000.00	50,960.00	0.08	1,960.00
55,000.000 HCA INC 404119BN8 5.000% 03/15/2024 DD 03/17/14	109.32	55,262.66	60,124.35	0.10	4,861.69
260,000.000 HCA INC 404119BS7 5.875% 02/15/2026 DD 11/13/15	113.71	274,277.49	295,653.80	0.48	21,376.31

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
100,000.000 HCA INC 404119BV0 5.500% 06/15/2047 DD 06/22/17	114.95	100,000.00	114,950.00	0.19	14,950.00
91,000.000 HCA INC 404119BW8 5.875% 02/01/2029 DD 01/30/19	115.63	91,000.00	105,218.75	0.17	14,218.75
150,000.000 HCA INC 404121AG0 5.875% 05/01/2023 DD 10/23/12	110.52	157,232.76	165,774.00	0.27	8,541.24
280,000.000 HCA INC 404121AJ4 5.625% 09/01/2028 DD 08/23/18	113.96	279,688.14	319,088.00	0.51	39,399.86
143,187.500 HERBALIFE 8/18 COV-LITE 40421YAF9 TLB	100.22	143,703.07	143,505.38	0.23	-197.69
67,000.000 HILLMAN GROUP INC/THE 144A 40423BAA8 6.375% 07/15/2022 DD 06/30/14	93.00	62,985.90	62,310.00	0.10	-675.90
93,000.000 HECLA MINING CO 422704AD8 6.875% 05/01/2021 DD 11/01/13	99.68	91,299.42	92,697.75	0.15	1,398.33
45,000.000 HEXION INC 144A 42829LAF1 7.875% 07/15/2027 DD 07/01/19	104.00	45,195.41	46,797.75	0.08	1,602.34
10,000.000 HILCORP ENERGY I LP / HIL 144A 431318AQ7 5.750% 10/01/2025 DD 06/04/15	97.50	9,552.66	9,750.40	0.02	197.74
190,000.000 HILCORP ENERGY I LP / HIL 144A 431318AS3 6.250% 11/01/2028 DD 10/16/18	95.00	181,400.66	180,500.00	0.29	-900.66

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Asset Detail - By Currency

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
57,561.700 HILLMAN 5/18 COV-LITE TLB 43162TAK6	98.20	56,189.78	56,525.59	0.09	335.81
50,000.000 HOLLY ENERGY PARTNERS LP 144A 435765AG7 6.000% 08/01/2024 DD 07/19/16	104.25	50,000.00	52,125.00	0.08	2,125.00
10,000.000 HOLOGIC INC 144A 436440AK7 4.375% 10/15/2025 DD 10/10/17	103.25	10,094.16	10,325.00	0.02	230.84
195,000.000 HUB INTERNATIONAL LTD 144A 44332PAD3 7.000% 05/01/2026 DD 04/25/18	105.75	194,529.64	206,212.50	0.33	11,682.86
130,000.000 HUGHES SATELLITE SYSTEMS CORP 444454AA0 7.625% 06/15/2021 DD 12/15/11	106.85	137,371.77	138,898.50	0.22	1,526.73
130,000.000 HUGHES SATELLITE SYSTEMS CORP 444454AD4 5.250% 08/01/2026 DD 02/01/17	109.75	135,165.82	142,675.00	0.23	7,509.18
130,000.000 HUGHES SATELLITE SYSTEMS CORP 444454AF9 6.625% 08/01/2026 DD 02/01/17	111.00	139,265.35	144,300.00	0.23	5,034.65
124,000.000 GFL ENVIRONMENTAL INC 144A 44485HAA2 7.000% 06/01/2026 DD 05/14/18	105.64	126,714.28	130,993.60	0.21	4,279.32
48,000.000 IAA INC 144A 449253AB9 5.500% 06/15/2027 DD 06/06/19	106.25	48,000.00	51,000.00	0.08	3,000.00
190,000.000 ICAHN ENTERPRISES LP / ICAHN E 451102BQ9 6.375% 12/15/2025 DD 12/06/17	104.88	192,535.48	199,262.50	0.32	6,727.02

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
144,000.000 ICAHN ENTERPRISES LP / ICAHN E 451102BT3 6.250% 05/15/2026 DD 05/10/19	106.50	144,000.00	153,360.00	0.25	9,360.00
157,000.000 ICAHN ENTERPRISES LP / IC 144A 451102BX4 5.250% 05/15/2027 DD 12/12/19	102.26	157,000.00	160,552.91	0.26	3,552.91
8,068.000 IHEARTCOMMUNICATIONS INC 45174HBC0 6.375% 05/01/2026 DD 05/01/19	108.50	8,385.43	8,753.78	0.01	368.35
68,925.000 IHEARTCOMMUNICATIONS INC 45174HBD8 8.375% 05/01/2027 DD 05/01/19	110.50	71,826.96	76,162.13	0.12	4,335.17
34,159.120 CLEAR CHANNEL 4/19 EXIT TL 45175AAB7	100.71	34,159.12	34,400.97	0.06	241.85
121,269.790 INFOR (LAWSON) 2/17 (USD) B6 45672LAE5 TLB	100.39	121,650.11	121,746.38	0.20	96.27
95,000.000 INFRABUILD AUSTRALIA PTY 144A 45682RAA8 12.000% 10/01/2024 DD 10/03/19	103.08	95,000.00	97,924.10	0.16	2,924.10
250,000.000 INMARSAT FINANCE PLC 144A 45763PAE6 4.875% 05/15/2022 DD 01/15/14	101.25	245,393.62	253,125.00	0.41	7,731.38
220,000.000 INTELSAT JACKSON HOLDINGS SA 45824TAP0 5.500% 08/01/2023 DD 06/05/13	85.90	197,917.91	188,988.80	0.30	-8,929.11
50,000.000 INTELSAT JACKSON HOLDINGS 144A 45824TBA2 8.500% 10/15/2024 DD 09/19/18	91.08	50,675.98	45,541.50	0.07	-5,134.48

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
289,000.000 JBS USA LUX SA / JBS USA 144A 46590XAB2 5.500% 01/15/2030 DD 08/06/19	107.41	296,330.69	310,414.90	0.50	14,084.21
210,000.000 J2 CLOUD SERVICES LLC / J 144A 466253AA9 6.000% 07/15/2025 DD 06/27/17	106.00	217,039.51	222,600.00	0.36	5,560.49
14,000.000 JACK OHIO FINANCE LLC / J 144A 46647DAB9 10.250% 11/15/2022 DD 11/08/16	105.55	14,654.43	14,777.00	0.02	122.57
43,000.000 JAGGED PEAK ENERGY LLC 47009LAC9 5.875% 05/01/2026 DD 11/01/18	103.25	42,207.32	44,396.64	0.07	2,189.32
185,000.000 JAGUAR HOLDING CO II / PP 144A 47010DAA8 6.375% 08/01/2023 DD 08/18/15	103.22	189,571.98	190,955.15	0.31	1,383.17
235,000.000 KAR AUCTION SERVICES INC 144A 48238TAA7 5.125% 06/01/2025 DD 05/31/17	104.00	240,309.94	244,400.00	0.39	4,090.06
125,000.000 KFC HOLDING CO/PIZZA HUT 144A 48250NAA3 5.000% 06/01/2024 DD 06/16/16	103.63	125,000.00	129,531.25	0.21	4,531.25
25,000.000 KFC HOLDING CO/PIZZA HUT 144A 48250NAC9 4.750% 06/01/2027 DD 06/15/17	105.25	25,000.00	26,312.50	0.04	1,312.50
176,000.000 KINETIC CONCEPTS INC / KC 144A 49461BAH7 12.500% 11/01/2021 DD 10/06/16	102.88	181,521.16	181,060.00	0.29	-461.16
35,000.000 KORN FERRY 144A 50067PAA7 4.625% 12/15/2027 DD 12/16/19	100.50	35,000.00	35,175.00	0.06	175.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
302,000.000 LAUREATE EDUCATION INC 144A 518613AJ3 8.250% 05/01/2025 DD 04/26/17	107.63	320,528.39	325,027.50	0.52	4,499.11
70,000.000 LEVEL 3 FINANCING INC 527298BK8 5.375% 01/15/2024 DD 01/15/16	101.63	69,075.44	71,137.50	0.11	2,062.06
195,000.000 LEVEL 3 FINANCING INC 527298BM4 5.250% 03/15/2026 DD 10/15/16	104.00	199,314.90	202,800.00	0.33	3,485.10
223,000.000 REGIONALCARE HOSPITAL PAR 144A 53219LAR0 9.750% 12/01/2026 DD 11/16/18	113.00	238,940.89	251,990.00	0.41	13,049.11
49,000.000 LITHIA MOTORS INC 144A 536797AE3 4.625% 12/15/2027 DD 12/09/19	102.79	49,000.00	50,365.14	0.08	1,365.14
98,000.000 LIVE NATION ENTERTAINMENT 144A 538034AR0 4.750% 10/15/2027 DD 10/17/19	103.50	98,000.00	101,430.00	0.16	3,430.00
105,000.000 MDC PARTNERS INC 144A 552697AQ7 6.500% 05/01/2024 DD 03/23/16	90.50	102,356.93	95,025.00	0.15	-7,331.93
130,000.000 MGM RESORTS INTERNATIONAL 552953CC3 6.000% 03/15/2023 DD 11/25/14	109.75	135,054.33	142,675.00	0.23	7,620.67
115,000.000 MGM RESORTS INTERNATIONAL 552953CE9 5.750% 06/15/2025 DD 06/18/18	112.00	115,000.00	128,800.00	0.21	13,800.00
224,000.000 MGM GROWTH PROPERTIES OPE 144A 55303XAG0 5.750% 02/01/2027 DD 01/25/19	111.50	227,726.42	249,760.00	0.40	22,033.58

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
504,000.000 MPH ACQUISITION HOLDINGS 144A 553283AB8 7.125% 06/01/2024 DD 06/07/16	96.75	514,709.95	487,620.00	0.79	-27,089.95
175,000.000 MSCI INC 144A 55354GAB6 5.750% 08/15/2025 DD 08/13/15	104.88	175,918.50	183,531.25	0.30	7,612.75
38,000.000 MTS SYSTEMS CORP 144A 553777AA1 5.750% 08/15/2027 DD 07/16/19	104.50	38,233.57	39,710.00	0.06	1,476.43
201,000.000 MASONITE INTERNATIONAL CO 144A 575385AD1 5.375% 02/01/2028 DD 07/25/19	105.63	205,150.60	212,306.25	0.34	7,155.65
175,000.000 MATADOR RESOURCES CO 576485AE6 5.875% 09/15/2026 DD 08/21/18	100.25	175,000.00	175,437.50	0.28	437.50
72,000.000 MATTEL INC 144A 577081BB7 6.750% 12/31/2025 DD 12/20/17	107.48	73,395.16	77,385.60	0.12	3,990.44
39,000.000 MATTEL INC 144A 577081BD3 5.875% 12/15/2027 DD 11/20/19	105.38	38,692.72	41,096.25	0.07	2,403.53
400,000.000 MERLIN ENTERTAINMENTS LTD 144A 59010QAB2 5.750% 06/15/2026 DD 05/09/18	109.50	407,904.69	438,000.00	0.71	30,095.31
49,000.000 MOOG INC 144A 615394AM5 4.250% 12/15/2027 DD 12/13/19	101.76	49,000.00	49,862.40	0.08	862.40
105,000.000 MOSS CREEK RESOURCES HOLD 144A 61965RAA3 7.500% 01/15/2026 DD 01/18/18	76.00	105,811.58	79,800.00	0.13	-26,011.58

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
110,000.000 MURPHY OIL CORP 626717AJ1 5.750% 08/15/2025 DD 08/18/17	104.60	110,000.00	115,054.50	0.19	5,054.50
190,000.000 MURPHY OIL USA INC 626738AD0 5.625% 05/01/2027 DD 04/25/17	107.25	200,337.01	203,775.00	0.33	3,437.99
69,000.000 MURPHY OIL USA INC 626738AE8 4.750% 09/15/2029 DD 09/13/19	105.61	69,146.37	72,868.83	0.12	3,722.46
10,000.000 NGPL PIPECO LLC 144A 62912XAE4 4.375% 08/15/2022 DD 08/01/17	103.87	10,000.00	10,387.30	0.02	387.30
165,000.000 NRG ENERGY INC 629377CA8 7.250% 05/15/2026 DD 11/15/16	109.25	174,043.80	180,262.50	0.29	6,218.70
95,000.000 NRG ENERGY INC 629377CE0 5.750% 01/15/2028 DD 07/15/18	108.50	95,000.00	103,075.00	0.17	8,075.00
60,000.000 NRG ENERGY INC 144A 629377CH3 5.250% 06/15/2029 DD 05/14/19	108.13	60,000.00	64,875.00	0.10	4,875.00
257,057.500 NATIONAL MENTOR/CIVITAS 3/19 63689EAJ4 TLB	100.70	257,372.71	258,856.90	0.42	1,484.19
16,000.000 NATIONAL MENTOR/CIVITAS 3/19 63689EAK1 TLC	100.70	16,017.48	16,112.00	0.03	94.52
198,000.000 NAVISTAR INTERNATIONAL CO 144A 63934EAT5 6.625% 11/01/2025 DD 11/06/17	101.88	198,000.00	201,712.50	0.32	3,712.50

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
50,000.000 NAVIENT CORP 63938CAA6 5.000% 10/26/2020 DD 11/06/14	101.47	50,000.00	50,735.00	0.08	735.00
75,000.000 NAVIENT CORP 63938CAE8 7.250% 09/25/2023 DD 09/16/16	113.00	74,940.65	84,752.25	0.14	9,811.60
200,000.000 CSC HOLDINGS LLC 144A 64072TAA3 10.875% 10/15/2025 DD 10/09/15	111.75	200,000.00	223,500.00	0.36	23,500.00
75,810.000 CABLEVISION SYSTEMS/ALTICE USA 64072UAK8 0.000% 12/31/2022 DD 09/18/19	100.33	75,156.76	76,062.45	0.12	905.69
600,000.000 NEPTUNE ENERGY BONDCO PLC 144A 64073KAA1 6.625% 05/15/2025 DD 05/11/18	99.94	590,440.10	599,628.00	0.97	9,187.90
195,000.000 NETFLIX INC 64110LAL0 5.875% 02/15/2025 DD 02/05/15	111.50	209,414.38	217,425.00	0.35	8,010.62
115,000.000 NETFLIX INC 64110LAS5 4.875% 04/15/2028 DD 10/26/17	103.87	115,000.00	119,450.50	0.19	4,450.50
145,000.000 NETFLIX INC 64110LAT3 5.875% 11/15/2028 DD 04/26/18	110.86	145,000.00	160,741.20	0.26	15,741.20
125,000.000 NETFLIX INC 144A 64110LAV8 4.875% 06/15/2030 DD 10/25/19	101.56	125,000.00	126,953.75	0.20	1,953.75
188,000.000 NEW GOLD INC 144A 644535AF3 6.250% 11/15/2022 DD 11/14/12	99.53	181,096.19	187,118.28	0.30	6,022.09

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
130,000.000 NEWFIELD EXPLORATION CO 651290AR9 5.375% 01/01/2026 DD 03/10/15	108.46	135,243.13	140,999.30	0.23	5,756.17
214,000.000 NEXTERA ENERGY OPERATING 144A 65342QAB8 4.500% 09/15/2027 DD 09/25/17	104.25	197,845.59	223,095.00	0.36	25,249.41
45,000.000 NEXTERA ENERGY OPERATING 144A 65342QAC6 4.250% 09/15/2024 DD 09/25/17	104.00	45,000.00	46,800.00	0.08	1,800.00
122,000.000 NEXSTAR BROADCASTING INC 144A 65343HAA9 5.625% 07/15/2027 DD 07/03/19	105.38	124,411.47	128,563.60	0.21	4,152.13
50,000.000 NIELSEN FINANCE LLC / NIE 144A 65409QBB7 5.000% 04/15/2022 DD 04/11/14	100.38	50,088.85	50,187.50	0.08	98.65
50,000.000 NINE ENERGY SERVICE INC 144A 65441VAA9 8.750% 11/01/2023 DD 10/25/18	81.00	50,000.00	40,500.00	0.07	-9,500.00
200,000.000 NOVELIS CORP 144A 670001AA4 6.250% 08/15/2024 DD 08/29/16	104.88	200,000.00	209,750.00	0.34	9,750.00
50,000.000 NOVELIS CORP 144A 670001AC0 5.875% 09/30/2026 DD 09/14/16	106.41	51,506.69	53,205.50	0.09	1,698.81
103,000.000 NUFARM AUSTRALIA LTD / NU 144A 67052NAA3 5.750% 04/30/2026 DD 04/26/18	98.50	102,403.99	101,455.00	0.16	-948.99
85,000.000 INTRADO CORP 144A 68163PAA2 8.500% 10/15/2025 DD 10/10/17	80.00	78,379.23	68,000.00	0.11	-10,379.23

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
130,000.000 1011778 BC ULC / NEW RED 144A 68245XAC3 4.250% 05/15/2024 DD 05/17/17	102.50	131,232.60	133,250.00	0.21	2,017.40
202,000.000 1011778 BC ULC / NEW RED 144A 68245XAE9 5.000% 10/15/2025 DD 08/28/17	103.25	204,514.54	208,565.00	0.34	4,050.46
63,000.000 1011778 BC ULC / NEW RED 144A 68245XAH2 3.875% 01/15/2028 DD 09/24/19	100.25	63,000.00	63,157.50	0.10	157.50
98,000.000 1011778 BC ULC / NEW RED 144A 68245XAJ8 4.375% 01/15/2028 DD 11/19/19	100.25	98,000.00	98,245.00	0.16	245.00
25,000.000 PBF HOLDING CO LLC / PBF FINAN 69318FAE8 7.000% 11/15/2023 DD 11/15/16	103.75	25,773.88	25,937.50	0.04	163.62
290,000.000 PBF HOLDING CO LLC / PBF FINAN 69318FAG3 7.250% 06/15/2025 DD 05/30/17	106.75	294,904.94	309,575.00	0.50	14,670.06
21,000.000 PBF LOGISTICS LP / PBF LOGISTI 69318UAB1 6.875% 05/15/2023 DD 11/15/15	103.00	21,267.68	21,630.00	0.03	362.32
363,000.000 PERFORMANCE FOOD GROUP IN 144A 69346VAA7 5.500% 10/15/2027 DD 09/27/19	106.88	380,550.90	387,956.25	0.62	7,405.35
215,000.000 PQ CORP 144A 693522AG9 6.750% 11/15/2022 DD 05/04/16	103.38	218,515.90	222,256.25	0.36	3,740.35
145,000.000 CLARIOS GLOBAL LP / CLARI 144A 69867DAA6 6.250% 05/15/2026 DD 04/01/19	107.75	146,520.70	156,237.50	0.25	9,716.80

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
265,000.000 CLARIOS GLOBAL LP / CLARI 144A 69867DAC2 8.500% 05/15/2027 DD 04/01/19	106.25	265,428.59	281,562.50	0.45	16,133.91
260,000.000 SEVEN GENERATIONS ENERGY 144A 699320AH0 6.875% 06/30/2023 DD 06/05/15	102.88	266,826.81	267,475.00	0.43	648.19
20,000.000 PARK AEROSPACE HOLDINGS L 144A 70014LAA8 5.250% 08/15/2022 DD 02/03/17	106.54	20,000.00	21,308.00	0.03	1,308.00
145,000.000 PARK AEROSPACE HOLDINGS L 144A 70014LAB6 5.500% 02/15/2024 DD 02/03/17	109.79	149,383.47	159,196.95	0.26	9,813.48
260,000.000 PARSLEY ENERGY LLC / PARS 144A 701885AD7 5.375% 01/15/2025 DD 12/13/16	103.00	262,574.12	267,800.00	0.43	5,225.88
197,000.000 PARSLEY ENERGY LLC / PARS 144A 701885AH8 5.625% 10/15/2027 DD 10/11/17	105.75	200,464.90	208,327.50	0.34	7,862.60
40,000.000 PATTERN ENERGY GROUP INC 144A 70338PAC4 5.875% 02/01/2024 DD 01/25/17	102.88	41,175.20	41,150.00	0.07	-25.20
220,000.000 POST HOLDINGS INC 144A 737446AL8 5.500% 03/01/2025 DD 02/14/17	104.75	226,004.58	230,450.00	0.37	4,445.42
300,000.000 POST HOLDINGS INC 144A 737446AM6 5.750% 03/01/2027 DD 02/14/17	107.25	296,802.91	321,750.00	0.52	24,947.09
81,000.000 POST HOLDINGS INC 144A 737446AN4 5.625% 01/15/2028 DD 12/01/17	107.75	81,000.00	87,277.50	0.14	6,277.50

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48,000.000 POST HOLDINGS INC 144A 737446AP9 5.500% 12/15/2029 DD 07/03/19	106.63	48,000.00	51,182.40	0.08	3,182.40
83,271.367 PRECISION DRILLING CORP 740212AE5 6.500% 12/15/2021 DD 12/15/11	99.75	83,099.29	83,063.19	0.13	-36.10
35,000.000 PRECISION DRILLING CORP 144A 740212AL9 7.125% 01/15/2026 DD 11/22/17	95.00	35,000.00	33,250.00	0.05	-1,750.00
130,000.000 PRECISION DRILLING CORP 74022DAJ9 5.250% 11/15/2024 DD 11/15/14	91.75	121,558.45	119,275.00	0.19	-2,283.45
34,000.000 PRESTIGE BRANDS INC 144A 74112BAL9 5.125% 01/15/2028 DD 12/02/19	104.75	34,000.00	35,615.00	0.06	1,615.00
76,000.000 PRIME SECURITY SERVICES B 144A 74166MAA4 9.250% 05/15/2023 DD 05/02/16	104.88	77,580.34	79,705.00	0.13	2,124.66
199,000.000 RIVERBED TECHNOLOGY INC 144A 74339KAA0 8.875% 03/01/2023 DD 03/09/15	57.50	191,817.34	114,425.00	0.18	-77,392.34
55,000.000 QUALITYTECH LP / QTS FINA 144A 74759BAD5 4.750% 11/15/2025 DD 11/08/17	103.63	55,000.00	56,993.75	0.09	1,993.75
31,000.000 RHP HOTEL PROPERTIES LP / RHP 749571AD7 5.000% 04/15/2023 DD 04/14/15	102.00	30,888.37	31,620.00	0.05	731.63
405,000.000 RELIANCE INTERMEDIATE HOL 144A 75947TAB0 6.500% 04/01/2023 DD 03/24/15	102.50	412,737.09	415,125.00	0.67	2,387.91

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250,000.000 RESIDEO FUNDING INC 144A 76119LAA9 6.125% 11/01/2026 DD 10/19/18	100.75	251,921.33	251,875.00	0.41	-46.33
48,455.390 REYNOLDS GROUP ISSUER INC / RE 761735AP4 5.750% 10/15/2020 DD 09/28/12	100.13	48,486.68	48,515.96	0.08	29.28
325,000.000 REYNOLDS GROUP ISSUER INC 144A 761735AV1 7.000% 07/15/2024 DD 06/27/16	103.38	332,402.61	335,968.75	0.54	3,566.14
70,000.000 SBA COMMUNICATIONS CORP 78410GAB0 4.000% 10/01/2022 DD 04/01/18	101.88	70,000.00	71,312.50	0.11	1,312.50
25,000.000 NAVIENT CORP 78442FEL8 7.250% 01/25/2022 DD 01/27/12	108.64	25,248.32	27,161.00	0.04	1,912.68
6,000.000 SM ENERGY CO 78454LAH3 5.000% 01/15/2024 DD 01/15/14	95.25	5,540.19	5,715.00	0.01	174.81
140,000.000 SM ENERGY CO 78454LAL4 5.625% 06/01/2025 DD 05/21/15	94.92	130,477.04	132,883.80	0.21	2,406.76
24,000.000 SM ENERGY CO 78454LAN0 6.750% 09/15/2026 DD 09/12/16	98.00	22,728.12	23,520.00	0.04	791.88
75,000.000 SM ENERGY CO 78454LAP5 6.625% 01/15/2027 DD 08/20/18	98.29	75,000.00	73,714.50	0.12	-1,285.50
47,000.000 SS&C TECHNOLOGIES INC 144A 78466CAC0 5.500% 09/30/2027 DD 03/28/19	106.75	48,964.44	50,172.50	0.08	1,208.06

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33,592.850 SS&C TECHNOLOGIES 4/18 COV-LT 78466DBD5 TLB3	100.64	33,529.29	33,809.19	0.05	279.90
23,044.020 SS&C TECHNOLOGIES 4/18 COV-LT 78466DBE3 TLB4	100.64	23,000.42	23,192.42	0.04	192.00
256,901.230 SS&C TECHNOLOGIES 10/18 ADD-ON 78466DBF0 B5 COV-LITE TLB	100.62	256,564.09	258,481.17	0.42	1,917.08
200,000.000 SPCM SA 144A 7846ELAC1 4.875% 09/15/2025 DD 04/20/17	104.00	195,569.18	208,000.00	0.33	12,430.82
53,000.000 SCIENTIFIC GAMES INTERNAT 144A 80874YBC3 7.000% 05/15/2028 DD 11/26/19	107.25	53,000.00	56,842.50	0.09	3,842.50
43,000.000 SCIENTIFIC GAMES INTERNAT 144A 80874YBE9 7.250% 11/15/2029 DD 11/26/19	108.50	43,000.00	46,655.00	0.08	3,655.00
94,000.000 SCRIPPS ESCROW INC 144A 81104PAA7 5.875% 07/15/2027 DD 07/26/19	104.75	94,731.01	98,465.00	0.16	3,733.99
140,580.000 SEDGWICK CMS 12/18 COV-LITE TL 81527CAL1 0.000% 11/06/2025 DD 10/29/18	99.97	140,648.38	140,536.42	0.23	-111.96
123,000.000 SELECT MEDICAL CORP 144A 816196AT6 6.250% 08/15/2026 DD 08/01/19	108.25	127,445.07	133,149.96	0.21	5,704.89
125,000.000 SENSATA TECHNOLOGIES BV 144A 81725WAJ2 5.000% 10/01/2025 DD 03/26/15	108.63	125,000.00	135,781.25	0.22	10,781.25

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200,000.000 SENSATA TECHNOLOGIES UK F 144A 81727TAA6 6.250% 02/15/2026 DD 11/27/15	107.75	210,911.43	215,500.00	0.35	4,588.57
145,000.000 SERVICEMASTER CO LLC/THE 817609AB6 7.450% 08/15/2027 DD 08/19/97	113.00	156,269.94	163,850.00	0.26	7,580.06
405,000.000 SERVICEMASTER CO LLC/THE 144A 817610AA6 5.125% 11/15/2024 DD 11/08/16	103.75	404,710.37	420,187.50	0.68	15,477.13
205,000.000 SHELF DRILLING HOLDINGS L 144A 822538AE4 8.250% 02/15/2025 DD 02/07/18	95.25	206,032.99	195,262.50	0.31	-10,770.49
100,000.000 SINCLAIR TELEVISION GROUP 144A 829259AY6 5.500% 03/01/2030 DD 11/27/19	102.25	100,000.00	102,250.00	0.16	2,250.00
380,000.000 SIRIUS XM RADIO INC 144A 82967NBA5 5.000% 08/01/2027 DD 07/05/17	105.50	383,563.44	400,900.00	0.65	17,336.56
144,000.000 SIRIUS XM RADIO INC 144A 82967NBE7 4.625% 07/15/2024 DD 07/02/19	105.00	144,000.00	151,200.00	0.24	7,200.00
295,000.000 SONIC AUTOMOTIVE INC 83545GBC5 6.125% 03/15/2027 DD 03/10/17	104.25	293,869.04	307,537.50	0.50	13,668.46
8,000.000 SURGERY CENTER HOLDINGS I 144A 84611WAB0 6.750% 07/01/2025 DD 06/30/17	100.00	8,029.89	8,000.00	0.01	-29.89
190,000.000 SPECTRUM BRANDS INC 84762LAS4 6.125% 12/15/2024 DD 12/15/15	103.25	189,772.00	196,175.00	0.32	6,403.00

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280,000.000 SPECTRUM BRANDS INC 84762LAU9 5.750% 07/15/2025 DD 01/15/16	104.38	283,976.52	292,255.60	0.47	8,279.08
38,000.000 SPECTRUM BRANDS INC 144A 84762LAV7 5.000% 10/01/2029 DD 09/24/19	103.25	38,000.00	39,235.00	0.06	1,235.00
83,000.000 SPEEDWAY MOTORSPORTS LLC 144A 84779MAA2 4.875% 11/01/2027 DD 10/23/19	101.38	83,262.16	84,141.25	0.14	879.09
161,000.000 SPRINT CAPITAL CORP 852060AD4 6.875% 11/15/2028 DD 11/16/98	107.75	177,574.67	173,477.50	0.28	-4,097.17
6,000.000 SPRINT COMMUNICATIONS INC 852061AR1 7.000% 08/15/2020 DD 08/14/12	102.13	6,101.06	6,127.50	0.01	26.44
170,000.000 SPRINT COMMUNICATIONS INC 852061AS9 6.000% 11/15/2022 DD 11/14/12	104.88	161,622.53	178,287.50	0.29	16,664.97
365,000.000 SPRINT CORP 85207UAE5 7.250% 09/15/2021 DD 09/15/14	105.75	370,438.98	385,987.50	0.62	15,548.52
121,000.000 SPRINT CORP 85207UAF2 7.875% 09/15/2023 DD 09/15/14	110.33	123,225.92	133,502.93	0.21	10,277.01
80,000.000 SPRINT CORP 85207UAH8 7.125% 06/15/2024 DD 06/15/14	107.88	78,974.05	86,300.00	0.14	7,325.95
195,000.000 SPRINT CORP 85207UAJ4 7.625% 02/15/2025 DD 02/24/15	109.74	213,575.17	213,983.25	0.34	408.08

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73,000.000 SPRINT CORP 85207UAK1 7.625% 03/01/2026 DD 02/22/18	110.28	73,000.00	80,504.40	0.13	7,504.40
13,000.000 STANDARD INDUSTRIES INC/N 144A 853496AB3 5.500% 02/15/2023 DD 02/23/16	101.63	13,182.57	13,211.25	0.02	28.68
180,000.000 STARS GROUP HOLDINGS BV / 144A 85572NAA6 7.000% 07/15/2026 DD 07/10/18	108.25	180,585.20	194,850.00	0.31	14,264.80
10,000.000 STEEL DYNAMICS INC 858119BC3 5.125% 10/01/2021 DD 04/01/15	100.06	10,000.00	10,006.00	0.02	6.00
70,000.000 SUNOCO LP / SUNOCO FINANCE COR 86765LAJ6 4.875% 01/15/2023 DD 07/15/18	102.25	70,000.00	71,576.40	0.12	1,576.40
32,000.000 SUNOCO LP / SUNOCO FINANCE COR 86765LAL1 5.500% 02/15/2026 DD 08/15/18	103.75	32,000.00	33,200.00	0.05	1,200.00
35,000.000 SURGERY CENTER HOLDINGS I 144A 86881WAD4 10.000% 04/15/2027 DD 04/11/19	109.75	36,646.30	38,412.50	0.06	1,766.20
120,000.000 TMS INTERNATIONAL HOLDING 144A 87261QAB9 7.250% 08/15/2025 DD 08/14/17	90.42	124,382.20	108,500.40	0.17	-15,881.80
360,000.000 T-MOBILE USA INC 87264AAP0 6.500% 01/15/2026 DD 11/05/15	107.22	374,655.77	385,995.60	0.62	11,339.83
25,000.000 T-MOBILE USA INC 87264AAT2 5.375% 04/15/2027 DD 03/16/17	106.50	25,000.00	26,625.00	0.04	1,625.00

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75,000.000 T-MOBILE USA INC 87264AAU9 4.500% 02/01/2026 DD 01/25/18	102.50	75,000.00	76,875.00	0.12	1,875.00
65,000.000 T-MOBILE USA INC 87264AAV7 4.750% 02/01/2028 DD 01/25/18	104.78	63,338.27	68,107.65	0.11	4,769.38
25,000.000 TRI POINTE GROUP INC 87265HAF6 5.250% 06/01/2027 DD 06/08/17	104.50	25,000.00	26,125.00	0.04	1,125.00
155,000.000 TALLGRASS ENERGY PARTNERS 144A 87470LAA9 5.500% 09/15/2024 DD 09/01/16	100.50	157,232.51	155,775.00	0.25	-1,457.51
182,000.000 TALLGRASS ENERGY PARTNERS 144A 87470LAD3 5.500% 01/15/2028 DD 09/15/17	98.00	183,001.53	178,360.00	0.29	-4,641.53
175,000.000 TARGA RESOURCES PARTNERS LP / 87612BBJ0 5.875% 04/15/2026 DD 04/12/18	106.25	180,347.54	185,937.50	0.30	5,589.96
49,000.000 TARGA RESOURCES PARTNERS 144A 87612BBK7 6.500% 07/15/2027 DD 01/17/19	109.50	49,000.00	53,655.00	0.09	4,655.00
97,000.000 TARGA RESOURCES PARTNERS 144A 87612BBM3 6.875% 01/15/2029 DD 01/17/19	111.00	97,571.14	107,670.00	0.17	10,098.86
222,000.000 TAYLOR MORRISON COMMUNITI 144A 87724RAA0 5.875% 06/15/2027 DD 06/05/19	110.00	227,552.89	244,200.00	0.39	16,647.11
95,000.000 TEGNA INC 144A 87901JAC9 5.000% 09/15/2029 DD 09/13/19	101.75	95,000.00	96,662.50	0.16	1,662.50

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200,000.000 TELECOM ITALIA SPA/MILANO 144A 87927YAA0 5.303% 05/30/2024 DD 05/30/14	107.50	210,632.89	215,000.00	0.35	4,367.11
265,000.000 TELEFLEX INC 879369AF3 4.625% 11/15/2027 DD 11/20/17	105.98	268,649.68	280,849.65	0.45	12,199.97
70,000.000 TENET HEALTHCARE CORP 88033GCE8 8.125% 04/01/2022 DD 09/27/13	110.63	71,525.69	77,437.50	0.12	5,911.81
90,000.000 TENET HEALTHCARE CORP 88033GCS7 4.625% 07/15/2024 DD 06/14/17	102.38	90,000.00	92,137.50	0.15	2,137.50
295,000.000 TENET HEALTHCARE CORP 88033GCU2 5.125% 05/01/2025 DD 06/14/17	103.00	296,043.05	303,850.00	0.49	7,806.95
151,000.000 TENET HEALTHCARE CORP 144A 88033GCY4 4.875% 01/01/2026 DD 08/26/19	104.74	151,000.00	158,157.40	0.25	7,157.40
151,000.000 TENET HEALTHCARE CORP 144A 88033GDA5 5.125% 11/01/2027 DD 08/26/19	105.63	151,000.00	159,493.75	0.26	8,493.75
25,000.000 TENET HEALTHCARE CORP 144A 88033GDC1 4.625% 09/01/2024 DD 08/26/19	104.26	25,000.00	26,065.00	0.04	1,065.00
63,000.000 TEAM HEALTH HOLDINGS INC 144A 88047PAA2 6.375% 02/01/2025 DD 02/01/17	66.75	60,897.09	42,052.50	0.07	-18,844.59
45,000.000 TERRAFORM POWER OPERATING 144A 88104LAC7 4.250% 01/31/2023 DD 12/12/17	102.95	45,000.00	46,326.15	0.07	1,326.15

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
65,000.000 TERRAFORM POWER OPERATING 144A 88104LAE3 5.000% 01/31/2028 DD 12/12/17	105.73	65,000.00	68,725.15	0.11	3,725.15
233,000.000 TERRIER MEDIA BUYER INC 144A 88146LAA1 8.875% 12/15/2027 DD 12/17/19	105.75	233,881.09	246,397.50	0.40	12,516.41
244,000.000 TERVITA CORP 144A 88158UAA6 7.625% 12/01/2021 DD 12/12/16	100.63	245,301.54	245,525.00	0.40	223.46
280,000.000 TRANSDIGM INC 893647AZ0 6.500% 05/15/2025 DD 11/15/15	104.00	288,440.85	291,200.00	0.47	2,759.15
201,000.000 TRANSDIGM INC 144A 893647BE6 6.250% 03/15/2026 DD 02/13/19	108.26	201,116.61	217,604.61	0.35	16,488.00
108,000.000 TRANSDIGM INC 893647BH9 7.500% 03/15/2027 DD 09/15/19	109.38	109,726.90	118,130.40	0.19	8,403.50
199,000.000 TRANSDIGM INC 144A 893647BJ5 5.500% 11/15/2027 DD 11/13/19	101.12	199,000.00	201,234.77	0.32	2,234.77
61,208.310 TRANSDIGM 5/18 COV-LITE TLE 89364MBN3 0.000% 05/30/2025 DD 05/01/18	100.22	61,394.87	61,340.52	0.10	-54.35
50,000.000 TRANSOCEAN INC 144A 893830BF5 7.500% 01/15/2026 DD 10/17/17	98.75	51,917.69	49,375.00	0.08	-2,542.69
108,000.000 TRANSOCEAN INC 144A 893830BK4 7.250% 11/01/2025 DD 10/25/18	98.00	108,000.00	105,840.00	0.17	-2,160.00

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25,000.000 TRANSOCEAN POSEIDON LTD 144A 89383JAA6 6.875% 02/01/2027 DD 02/01/19	106.00	24,829.34	26,500.00	0.04	1,670.66
315,000.000 US FOODS INC 144A 90290MAB7 5.875% 06/15/2024 DD 06/27/16	103.00	319,552.44	324,450.00	0.52	4,897.56
200,000.000 UPCB FINANCE IV LTD 144A 90320MAA3 5.375% 01/15/2025 DD 04/15/15	102.80	204,552.99	205,600.00	0.33	1,047.01
34,000.000 UNIVAR SOLUTIONS USA INC/ 144A 91337CAA4 5.125% 12/01/2027 DD 11/22/19	104.38	34,000.00	35,488.52	0.06	1,488.52
283,000.000 USI INC/NY 144A 91739VAA6 6.875% 05/01/2025 DD 04/18/17	102.22	278,690.39	289,282.60	0.47	10,592.21
61,000.000 BAUSCH HEALTH COS INC 144A 91831AAB7 5.875% 05/15/2023 DD 03/27/15	100.88	57,968.37	61,533.75	0.10	3,565.38
22,000.000 BAUSCH HEALTH COS INC 144A 91911KAE2 5.500% 03/01/2023 DD 01/30/15	100.50	21,361.32	22,110.00	0.04	748.68
25,000.000 BAUSCH HEALTH COS INC 144A 91911KAJ1 6.500% 03/15/2022 DD 03/21/17	102.25	25,000.00	25,562.50	0.04	562.50
45,000.000 BAUSCH HEALTH COS INC 144A 91911KAN2 5.500% 11/01/2025 DD 10/17/17	104.50	45,000.00	47,025.00	0.08	2,025.00
115,000.000 BAUSCH HEALTH COS INC 144A 91911KAP7 9.000% 12/15/2025 DD 12/18/17	113.72	113,714.83	130,778.00	0.21	17,063.17

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
190,000.000 BAUSCH HEALTH AMERICAS IN 144A 91911XAV6 9.250% 04/01/2026 DD 03/26/18	114.86	200,697.66	218,234.00	0.35	17,536.34
337,000.000 BAUSCH HEALTH AMERICAS IN 144A 91911XAW4 8.500% 01/31/2027 DD 06/01/18	113.88	349,994.13	383,775.60	0.62	33,781.47
200,000.000 VALVOLINE INC 92047WAB7 4.375% 08/15/2025 DD 08/08/17	103.19	203,145.27	206,376.00	0.33	3,230.73
99,000.000 VENATOR FINANCE SARL / VE 144A 9226APAA3 5.750% 07/15/2025 DD 07/14/17	92.25	101,945.97	91,327.50	0.15	-10,618.47
70,000.000 VIASAT INC 144A 92552VAL4 5.625% 04/15/2027 DD 03/27/19	107.00	70,000.00	74,900.00	0.12	4,900.00
162,000.000 VICI PROPERTIES LP / VICI 144A 92564RAA3 4.250% 12/01/2026 DD 11/26/19	103.00	162,000.00	166,860.00	0.27	4,860.00
162,000.000 VICI PROPERTIES LP / VICI 144A 92564RAB1 4.625% 12/01/2029 DD 11/26/19	104.25	162,000.00	168,885.00	0.27	6,885.00
317,800.000 VICI PROPERTIES 1 LLC / VICI F 925651AA9 8.000% 10/15/2023 DD 10/06/17	108.25	337,452.68	344,018.50	0.55	6,565.82
580,000.000 VIKING CRUISES LTD 144A 92676XAD9 5.875% 09/15/2027 DD 09/20/17	106.88	586,791.85	619,875.00	1.00	33,083.15
275,000.000 WASTE PRO USA INC 144A 94107JAA1 5.500% 02/15/2026 DD 02/01/18	104.25	270,045.25	286,687.50	0.46	16,642.25

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EATON VANCE HY PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
385,000.000 WATCO COS LLC / WATCO FIN 144A 941130AA4 6.375% 04/01/2023 DD 03/22/13	101.50	389,233.96	390,775.00	0.63	1,541.04
416,000.000 WELLCARE HEALTH PLANS INC 94946TAC0 5.250% 04/01/2025 DD 03/22/17	104.00	431,358.20	432,640.00	0.70	1,281.80
165,000.000 WELLCARE HEALTH PLANS INC 144A 94946TAD8 5.375% 08/15/2026 DD 08/13/18	106.50	168,439.96	175,725.00	0.28	7,285.04
17,000.000 TRI POINTE GROUP INC / TRI POI 962178AN9 5.875% 06/15/2024 DD 06/15/15	108.75	17,323.16	18,487.50	0.03	1,164.34
70,000.000 WILLIAM CARTER CO/THE 144A 96926JAC1 5.625% 03/15/2027 DD 03/14/19	107.50	70,256.67	75,250.00	0.12	4,993.33
35,000.000 WPX ENERGY INC 98212BAJ2 5.250% 10/15/2027 DD 09/24/19	105.50	35,000.00	36,925.00	0.06	1,925.00
268,000.000 WYNN LAS VEGAS LLC / WYNN 144A 983130AX3 5.250% 05/15/2027 DD 05/11/17	106.25	260,536.41	284,750.00	0.46	24,213.59
230,000.000 WYNN RESORTS FINANCE LLC 144A 983133AA7 5.125% 10/01/2029 DD 09/20/19	107.25	235,676.79	246,675.00	0.40	10,998.21
260,000.000 XPO LOGISTICS INC 144A 983793AF7 6.125% 09/01/2023 DD 08/25/16	103.23	266,445.37	268,398.00	0.43	1,952.63
72,000.000 YUM! BRANDS INC 144A 988498AL5 4.750% 01/15/2030 DD 09/11/19	104.75	72,477.19	75,420.00	0.12	2,942.81

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EATON VANCE HY PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
155,000.000 ZAYO GROUP LLC / ZAYO CAPITAL 989194AL9 6.375% 05/15/2025 DD 11/15/15	103.08	160,205.47	159,778.65	0.26	-426.82
220,000.000 ZIGGO BOND CO BV 144A 98954UAB9 6.000% 01/15/2027 DD 09/23/16	105.50	226,966.79	232,100.00	0.37	5,133.21
313,000.000 PLAYTIKA 12/19 COV-LITE TLB 99AA67776	100.95	306,815.07	315,973.50	0.51	9,158.43
86,716.220 HARD ROCK NORTHERN INDIANA 11/ 99AAF2710 0.000% 11/06/2025 DD 09/24/19	101.00	84,171.18	87,583.38	0.14	3,412.20
6,283.780 HARD ROCK NORTHERN INDIANA 11/ 99AAF2728 0.000% 11/06/2025 DD 09/24/19	101.00	6,099.36	6,346.62	0.01	247.26
100,000.000 INTELSAT JACKSON 12/17 B5 L5137LAH8 FIXED TLB	101.05	100,000.00	101,054.00	0.16	1,054.00
79,116.370 AMAYA 6/18 (USD) TL N8233BAC6 0.000% 07/10/2025 DD 04/23/18	100.79	79,059.39	79,739.81	0.13	680.42
TOTAL FIXED INCOME SECURITIES U.S. DOLLAR		**57,902,729.01**	**59,535,636.35**	**95.87**	**1,632,907.34**
TOTAL ASSETS U.S. DOLLAR		**59,317,452.34**	**60,928,190.29**	**98.12**	**1,610,737.95**
TOTAL ASSETS		**60,445,835.83**	**62,098,030.98**	**100.00**	**1,652,195.15**

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MARATHON EMD PI1 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
FIXED INCOME SECURITIES					
13,000,000.000 MARATHON EM BOND FUND 99VVBK5X7	1.12	13,000,000.00	14,603,291.31	100.00	1,603,291.31

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PRAIRIE 2 MINN - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
UNIT OF PARTICIPATION					
33,583,790.348 PRAIRIE #2 QUALIFIED MTU 99VVAQUY5	15.26	375,757,525.13	512,577,436.25	100.00	136,819,911.12

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CASH PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
1,671,452.340 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	1,671,452.34	1,671,452.34	99.99	0.00
INTEREST RECEIVABLE		138.26	138.26	0.01	0.00
TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**1,671,590.60**	**1,671,590.60**	**100.00**	**0.00**
TOTAL ASSETS U.S. DOLLAR		**1,671,590.60**	**1,671,590.60**	**100.00**	**0.00**
TOTAL ASSETS		**1,671,590.60**	**1,671,590.60**	**100.00**	**0.00**

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
CANADIAN DOLLAR					
CASH & CASH EQUIVALENTS					
DIVIDENDS RECEIVABLE		537.61	541.34	0.00	3.73
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
330,920.930 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	330,920.93	330,920.93	0.16	0.00
CASH		1,279.67	1,279.67	0.00	0.00
DIVIDENDS RECEIVABLE		153,916.21	153,916.21	0.08	0.00
INTEREST RECEIVABLE		42.17	42.17	0.00	0.00
TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**486,158.98**	**486,158.98**	**0.24**	**0.00**
EQUITY					
2,724.000 AFLAC INC 001055102	36.03	79,502.76	98,145.72	0.05	18,642.96
558.000 AGCO CORP 001084102	55.46	20,210.76	30,946.68	0.02	10,735.92
2,932.000 AGNC INVESTMENT CORP 00123Q104	12.90	35,122.44	37,822.80	0.02	2,700.36

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
40,359.000 AT&T INC 00206R102	30.23	1,128,128.36	1,220,052.57	0.60	91,924.21
12,131.000 ABBOTT LABORATORIES 002824100	91.43	528,204.70	1,109,137.33	0.55	580,932.63
12,380.000 ABBVIE INC 00287Y109	98.18	452,976.11	1,215,468.40	0.60	762,492.29
247.000 ABIOMED INC 003654100	241.56	24,512.28	59,665.32	0.03	35,153.04
846.000 ACACIA COMMUNICATIONS INC 00401C108	67.19	32,376.42	56,842.74	0.03	24,466.32
1,901.000 ACADIA PHARMACEUTICALS INC 004225108	48.47	29,042.77	92,141.47	0.05	63,098.70
3,276.000 ACADIA REALTY TRUST 004239109	12.98	37,433.30	42,522.48	0.02	5,089.18
408.000 ACCELERON PHARMA INC 00434H108	95.27	37,348.32	38,870.16	0.02	1,521.84
492.000 ACI WORLDWIDE INC 004498101	26.99	5,180.76	13,279.08	0.01	8,098.32
4,947.000 ACTIVISION BLIZZARD INC 00507V109	75.90	183,220.87	375,477.30	0.19	192,256.43

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PARAMETRIC US PI2 - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
273.000 ACUITY BRANDS INC 00508Y102	95.74	14,927.64	26,137.02	0.01	11,209.38
3,110.000 ADOBE INC 00724F101	435.31	109,409.67	1,353,814.10	0.67	1,244,404.43
314.000 ADVANCE AUTO PARTS INC 00751Y106	142.45	30,304.14	44,729.30	0.02	14,425.16
1,410.000 AECOM 00766T100	37.58	30,098.87	52,987.80	0.03	22,888.93
1,371.000 AERIE PHARMACEUTICALS INC 00771V108	14.76	17,995.90	20,235.96	0.01	2,240.06
193.000 ADVANSIX INC 00773T101	11.74	1,079.01	2,265.82	0.00	1,186.81
7,581.000 ADVANCED MICRO DEVICES INC 007903107	52.61	246,829.86	398,836.41	0.20	152,006.55
1,092.000 ADVANCED DRAINAGE SYSTEMS INC 00790R104	49.40	37,709.36	53,944.80	0.03	16,235.44
1,171.000 ADVANCED DISPOSAL SERVICES INC 00790X101	30.17	38,044.93	35,329.07	0.02	-2,715.86
517.000 AFFILIATED MANAGERS GROUP INC 008252108	74.56	31,800.67	38,547.52	0.02	6,746.85

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,530.000 AGILENT TECHNOLOGIES INC 00846U101	88.37	56,630.72	223,576.10	0.11	166,945.38
898.000 AGIOS PHARMACEUTICALS INC 00847X104	53.48	37,539.54	48,025.04	0.02	10,485.50
1,484.000 AIR PRODUCTS AND CHEMICALS INC 009158106	241.46	92,760.39	358,326.64	0.18	265,566.25
1,331.000 AKAMAI TECHNOLOGIES INC 00971T101	107.09	72,032.13	142,536.79	0.07	70,504.66
1,164.000 ALASKA AIR GROUP INC 011659109	36.26	19,497.00	42,206.64	0.02	22,709.64
197.000 ALBANY INTERNATIONAL CORP 012348108	58.71	4,873.78	11,565.87	0.01	6,692.09
566.000 ALEXANDRIA REAL ESTATE EQUITIE 015271109	162.25	82,251.12	91,833.50	0.05	9,582.38
1,052.000 ALEXION PHARMACEUTICALS INC 015351109	112.24	78,427.99	118,076.48	0.06	39,648.49
518.000 ALIGN TECHNOLOGY INC 016255101	274.44	37,946.48	142,159.92	0.07	104,213.44
41.000 ALLEGHANY CORP 017175100	489.14	11,979.12	20,054.74	0.01	8,075.62

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
233.000 ALLEGIANT TRAVEL CO 01748X102	109.21	10,876.44	25,445.93	0.01	14,569.49
510.000 ALLETE INC 018522300	54.61	24,367.80	27,851.10	0.01	3,483.30
1,276.000 ALLIANT ENERGY CORP 018802108	47.84	28,484.41	61,043.84	0.03	32,559.43
2,619.000 ALLSTATE CORP/THE 020002101	96.99	69,075.82	254,016.81	0.13	184,940.99
2,493.000 ALLY FINANCIAL INC 02005N100	19.83	39,805.74	49,436.19	0.02	9,630.45
1,145.000 ALNYLAM PHARMACEUTICALS INC 02043Q107	148.11	90,037.26	169,585.95	0.08	79,548.69
1,451.000 ALPHABET INC-CL C 02079K107	1,413.61	310,681.74	2,051,148.11	1.02	1,740,466.37
2,403.000 ALPHABET INC-CL A 02079K305	1,418.05	1,352,243.80	3,407,574.15	1.69	2,055,330.35
327.000 ALTERYX INC 02156B103	164.28	39,684.72	53,719.56	0.03	14,034.84
2,408.000 ALTRA INDUSTRIAL MOTION CORP 02208R106	31.86	41,795.84	76,718.88	0.04	34,923.04

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
12,560.000 ALTRIA GROUP INC 02209S103	39.25	234,971.11	492,980.00	0.24	258,008.89
2,855.000 AMAZON.COM INC 023135106	2,758.82	1,581,701.66	7,876,431.10	3.90	6,294,729.44
142.000 AMERCO 023586100	302.19	12,483.47	42,910.98	0.02	30,427.51
1,630.000 AMEREN CORP 023608102	70.36	75,561.81	114,686.80	0.06	39,124.99
2,889.000 AMERICAN ELECTRIC POWER CO INC 025537101	79.64	106,435.83	230,079.96	0.11	123,644.13
1,311.000 AMERICAN EQUITY INVESTMENT LIF 025676206	24.71	15,006.03	32,394.81	0.02	17,388.78
4,376.000 AMERICAN EXPRESS CO 025816109	95.20	241,865.65	416,595.20	0.21	174,729.55
657.000 AMERICAN FINANCIAL GROUP INC/O 025932104	63.46	28,277.42	41,693.22	0.02	13,415.80
1,644.000 AMERICAN HOMES 4 RENT 02665T306	26.90	27,451.24	44,223.60	0.02	16,772.36
7,657.000 AMERICAN INTERNATIONAL GROUP I 026874784	31.18	197,434.01	238,745.26	0.12	41,311.25

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
604.000 AMERICAN SOFTWARE INC/GA 029683109	15.76	5,031.32	9,519.04	0.00	4,487.72
286.000 AMERICAN STATES WATER CO 029899101	78.63	5,052.19	22,488.18	0.01	17,435.99
2,235.000 AMERICAN TOWER CORP 03027X100	258.54	99,249.42	577,836.90	0.29	478,587.48
1,201.000 AMERICAN WATER WORKS CO INC 030420103	128.66	30,661.53	154,520.66	0.08	123,859.13
1,285.000 AMERICOLD REALTY TRUST 03064D108	36.30	44,537.18	46,645.50	0.02	2,108.32
1,580.000 AMERISOURCEBERGEN CORP 03073E105	100.77	34,727.76	159,216.60	0.08	124,488.84
1,712.000 AMERIPRISE FINANCIAL INC 03076C106	150.04	79,988.74	256,868.48	0.13	176,879.74
572.000 AMERIS BANCORP 03076K108	23.59	5,119.40	13,493.48	0.01	8,374.08
1,519.000 AMETEK INC 031100100	89.37	43,068.71	135,753.03	0.07	92,684.32
4,286.000 AMGEN INC 031162100	235.86	258,525.82	1,010,895.96	0.50	752,370.14

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PARAMETRIC US PI2 - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,805.000 AMICUS THERAPEUTICS INC 03152W109	15.08	31,567.47	57,379.40	0.03	25,811.93
2,341.000 AMPHENOL CORP 032095101	95.81	68,410.67	224,291.21	0.11	155,880.54
2,055.000 ANALOG DEVICES INC 032654105	122.64	100,885.64	252,025.20	0.12	151,139.56
10,713.000 ANNALY CAPITAL MANAGEMENT INC 035710409	6.56	64,982.54	70,277.28	0.03	5,294.74
464.000 ANSYS INC 03662Q105	291.73	19,965.92	135,362.72	0.07	115,396.80
1,644.000 ANTHEM INC 036752103	262.98	290,783.86	432,339.12	0.21	141,555.26
1,022.000 ANTERIX INC 03676C100	45.34	24,568.88	46,337.48	0.02	21,768.60
1,045.000 APARTMENT INVESTMENT AND MANAG 03748R754	37.64	31,012.88	39,333.80	0.02	8,320.92
27,195.000 APPLE INC 037833100	364.80	737,531.65	9,920,736.00	4.92	9,183,204.35
981.000 APPFOLIO INC 03783C100	162.71	31,990.41	159,618.51	0.08	127,628.10

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
4,148.000 APPLE HOSPITALITY REIT INC 03784Y200	9.66	35,719.28	40,069.68	0.02	4,350.40
146.000 APPLIED INDUSTRIAL TECHNOLOGIE 03820C105	62.39	4,991.74	9,108.94	0.00	4,117.20
7,992.000 APPLIED MATERIALS INC 038222105	60.45	123,673.38	483,116.40	0.24	359,443.02
651.000 APTARGROUP INC 038336103	111.98	64,954.19	72,898.98	0.04	7,944.79
1,681.000 ARAMARK 03852U106	22.57	38,256.15	37,940.17	0.02	-315.98
4,291.000 ARCHER-DANIELS-MIDLAND CO 039483102	39.90	136,581.53	171,210.90	0.08	34,629.37
566.000 ARCOSA INC 039653100	42.20	4,958.15	23,885.20	0.01	18,927.05
747.000 ARCONIC CORP 03966V107	13.93	9,159.70	10,405.71	0.01	1,246.01
1,069.000 ARES MANAGEMENT CORP 03990B101	39.70	35,566.99	42,439.30	0.02	6,872.31
320.000 ARISTA NETWORKS INC 040413106	210.03	47,075.64	67,209.60	0.03	20,133.96

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Report ID : IACS0005
Base Currency : USD
Status : FINAL

PARAMETRIC US PI2 - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
439.000 ARMSTRONG WORLD INDUSTRIES INC 04247X102	77.96	14,570.03	34,224.44	0.02	19,654.41
835.000 ARROW ELECTRONICS INC 042735100	68.69	27,989.20	57,356.15	0.03	29,366.95
258.860 ARROW FINANCIAL CORP 042744102	29.73	4,994.26	7,695.91	0.00	2,701.65
1,025.000 ARROWHEAD PHARMACEUTICALS INC 04280A100	43.19	37,554.33	44,269.75	0.02	6,715.42
294.000 ASBURY AUTOMOTIVE GROUP INC 043436104	77.33	5,092.08	22,735.02	0.01	17,642.94
633.000 ASHLAND GLOBAL HOLDINGS INC 044186104	69.10	18,522.24	43,740.30	0.02	25,218.06
533.000 ASPEN TECHNOLOGY INC 045327103	103.61	8,240.18	55,224.13	0.03	46,983.95
2,515.000 ASSOCIATED BANC-CORP 045487105	13.68	30,143.21	34,405.20	0.02	4,261.99
364.000 ASSURANT INC 04621X108	103.29	10,782.18	37,597.56	0.02	26,815.38
1,210.000 ATLANTIC UNION BANKSHARES CORP 04911A107	23.16	14,442.71	28,023.60	0.01	13,580.89

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
489.000 ATMOS ENERGY CORP 049560105	99.58	25,088.54	48,694.62	0.02	23,606.08
1,401.000 AUTODESK INC 052769106	239.19	48,390.54	335,105.19	0.17	286,714.65
3,335.000 AUTOMATIC DATA PROCESSING INC 053015103	148.89	164,173.43	496,548.15	0.25	332,374.72
258.000 AUTONATION INC 05329W102	37.58	5,462.81	9,695.64	0.00	4,232.83
172.000 AUTOZONE INC 053332102	1,128.12	174,763.04	194,036.64	0.10	19,273.60
444.000 AVALARA INC 05338G106	133.09	32,483.04	59,091.96	0.03	26,608.92
927.000 AVALONBAY COMMUNITIES INC 053484101	154.64	143,369.82	143,351.28	0.07	-18.54
237.000 AVANOS MEDICAL INC 05350V106	29.39	5,153.55	6,965.43	0.00	1,811.88
1,250.000 AVANGRID INC 05351W103	41.98	49,623.34	52,475.00	0.03	2,851.66
2,571.000 AVANTOR INC 05352A100	17.00	36,900.13	43,707.00	0.02	6,806.87

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
364.000 AVERY DENNISON CORP 053611109	114.09	15,777.66	41,528.76	0.02	25,751.10
365.000 AVISTA CORP 05379B107	36.39	9,993.70	13,282.35	0.01	3,288.65
2,168.000 B&G FOODS INC 05508R106	24.38	32,579.20	52,855.84	0.03	20,276.64
13,609.000 BGC PARTNERS INC 05541T101	2.74	35,728.62	37,288.66	0.02	1,560.04
1,461.000 BJ'S WHOLESALE CLUB HOLDINGS I 05550J101	37.27	31,891.32	54,451.47	0.03	22,560.15
1,026.000 BWX TECHNOLOGIES INC 05605H100	56.64	18,815.93	58,112.64	0.03	39,296.71
2,384.000 BALL CORP 058498106	69.49	72,550.66	165,664.16	0.08	93,113.50
264.000 BANCFIRST CORP 05945F103	40.57	5,043.72	10,710.48	0.01	5,666.76
1,692.000 BANCORPSOUTH BANK 05971J102	22.74	17,715.24	38,476.08	0.02	20,760.84
50,700.000 BANK OF AMERICA CORP 060505104	23.75	630,618.44	1,204,125.00	0.60	573,506.56

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453.000 BANK OF HAWAII CORP 062540109	61.41	20,583.71	27,818.73	0.01	7,235.02
3,349.000 BANK OF NEW YORK MELLON CORP/T 064058100	38.65	90,692.61	129,438.85	0.06	38,746.24
343.000 BARNES GROUP INC 067806109	39.56	8,046.78	13,569.08	0.01	5,522.30
3,510.000 BAXTER INTERNATIONAL INC 071813109	86.10	85,752.25	302,211.00	0.15	216,458.75
1,982.000 BECTON DICKINSON AND CO 075887109	239.27	207,409.73	474,233.14	0.24	266,823.41
703.000 BENCHMARK ELECTRONICS INC 08160H101	21.60	10,258.48	15,184.80	0.01	4,926.32
1,080.000 W R BERKLEY CORP 084423102	57.29	20,381.00	61,873.20	0.03	41,492.20
11,758.000 BERKSHIRE HATHAWAY INC 084670702	178.51	1,298,395.29	2,098,920.58	1.04	800,525.29
978.000 BERRY GLOBAL GROUP INC 08579W103	44.32	35,455.73	43,344.96	0.02	7,889.23
1,441.000 BEST BUY CO INC 086516101	87.27	17,464.92	125,756.07	0.06	108,291.15

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
466.000 BEYOND MEAT INC 08862E109	133.98	36,928.40	62,434.68	0.03	25,506.28
185.000 BIO-RAD LABORATORIES INC 090572207	451.49	65,837.72	83,525.65	0.04	17,687.93
642.000 BIOMARIN PHARMACEUTICAL INC 09061G101	123.34	60,283.80	79,184.28	0.04	18,900.48
1,075.000 BIOGEN INC 09062X103	267.55	75,007.64	287,616.25	0.14	212,608.61
458.000 BIO-TECHNE CORP 09073M104	264.07	69,937.55	120,944.06	0.06	51,006.51
564.000 BLACK HILLS CORP 092113109	56.66	28,295.16	31,956.24	0.02	3,661.08
938.000 BLACK KNIGHT INC 09215C105	72.56	33,636.36	68,061.28	0.03	34,424.92
188.000 BLACKBAUD INC 09227Q100	57.08	4,998.92	10,731.04	0.01	5,732.12
741.000 BLACKROCK INC 09247X101	544.09	182,237.57	403,170.69	0.20	220,933.12
1,657.000 BLACKSTONE MORTGAGE TRUST INC 09257W100	24.09	37,229.50	39,917.13	0.02	2,687.63

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,867.000 H&R BLOCK INC 093671105	14.28	26,637.61	26,660.76	0.01	23.15
778.000 BLUEBIRD BIO INC 09609G100	61.04	36,791.62	47,489.12	0.02	10,697.50
3,667.000 BOEING CO/THE 097023105	183.30	308,130.90	672,161.10	0.33	364,030.20
2,947.000 BONANZA CREEK ENERGY INC 097793400	14.82	31,876.80	43,674.54	0.02	11,797.74
306.000 BOOKING HOLDINGS INC 09857L108	1,592.34	127,117.24	487,256.04	0.24	360,138.80
1,385.000 BORGWARNER INC 099724106	35.30	37,349.30	48,890.50	0.02	11,541.20
139.000 BOSTON BEER CO INC/THE 100557107	536.65	47,213.70	74,594.35	0.04	27,380.65
772.000 BOSTON PRIVATE FINANCIAL HOLDI 101119105	6.88	4,701.48	5,311.36	0.00	609.88
1,574.000 BOSTON PROPERTIES INC 101121101	90.38	122,501.55	142,258.12	0.07	19,756.57
10,921.000 BOSTON SCIENTIFIC CORP 101137107	35.11	58,427.35	383,436.31	0.19	325,008.96

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216.000 BOTTOMLINE TECHNOLOGIES DE INC 101388106	50.77	5,080.32	10,966.32	0.01	5,886.00
2,999.000 BRIDGEBIO PHARMA INC 10806X102	32.61	99,586.79	97,797.39	0.05	-1,789.40
4,048.000 BRIGHAM MINERALS INC 10918L103	12.35	40,424.28	49,992.80	0.02	9,568.52
1,278.000 BRIGHTHOUSE FINANCIAL INC 10922N103	27.82	30,721.73	35,553.96	0.02	4,832.23
209.000 BRINK'S CO/THE 109696104	45.51	5,277.25	9,511.59	0.00	4,234.34
16,295.000 BRISTOL-MYERS SQUIBB CO 110122108	58.80	602,224.27	958,146.00	0.47	355,921.73
3,496.000 BRIXMOR PROPERTY GROUP INC 11120U105	12.82	37,744.32	44,818.72	0.02	7,074.40
685.000 BROADRIDGE FINANCIAL SOLUTIONS 11133T103	126.19	14,727.50	86,440.15	0.04	71,712.65
2,574.000 BROADCOM INC 11135F101	315.61	326,797.79	812,380.14	0.40	485,582.35
3,637.000 BROOKFIELD PROPERTY REIT INC 11282X103	9.96	31,519.60	36,224.52	0.02	4,704.92

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
282.000 BROWN & BROWN INC 115236101	40.76	3,551.79	11,494.32	0.01	7,942.53
3,676.000 BROWN-FORMAN CORP 115637209	63.66	151,057.27	234,014.16	0.12	82,956.89
49.000 BRUNOS INC NEW 116881202	0.00	490.00	0.00	0.00	-490.00
1,091.000 BRUNSWICK CORP/DE 117043109	64.01	28,145.61	69,834.91	0.03	41,689.30
392.000 BURLINGTON STORES INC 122017106	196.93	24,762.64	77,196.56	0.04	52,433.92
653.000 CBOE GLOBAL MARKETS INC 12503M108	93.28	39,076.23	60,911.84	0.03	21,835.61
1,484.000 CBRE GROUP INC 12504L109	45.22	34,639.38	67,106.48	0.03	32,467.10
977.000 CDK GLOBAL INC 12508E101	41.42	15,482.97	40,467.34	0.02	24,984.37
623.000 CDW CORP/DE 12514G108	116.18	66,038.00	72,380.14	0.04	6,342.14
490.000 CH ROBINSON WORLDWIDE INC 12541W209	79.06	37,225.30	38,739.40	0.02	1,514.10

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,179.000 CIGNA CORP 125523100	187.65	100,888.88	408,889.35	0.20	308,000.47
2,342.000 CIT GROUP INC 125581801	20.73	36,551.91	48,549.66	0.02	11,997.75
2,148.000 CME GROUP INC 12572Q105	162.54	134,602.82	349,135.92	0.17	214,533.10
3,119.000 CMS ENERGY CORP 125896100	58.42	45,324.68	182,211.98	0.09	136,887.30
1,640.000 CNA FINANCIAL CORP 126117100	32.15	44,600.34	52,726.00	0.03	8,125.66
3,355.000 CNO FINANCIAL GROUP INC 12621E103	15.57	22,180.10	52,237.35	0.03	30,057.25
6,251.000 CSX CORP 126408103	69.74	67,428.29	435,944.74	0.22	368,516.45
563.000 CVB FINANCIAL CORP 126600105	18.74	4,954.40	10,550.62	0.01	5,596.22
9,134.000 CVS HEALTH CORP 126650100	64.97	353,681.98	593,435.98	0.29	239,754.00
19.000 CABLE ONE INC 12685J105	1,774.85	2,843.87	33,722.15	0.02	30,878.28

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
5,020.000 CABOT OIL & GAS CORP 127097103	17.18	81,404.30	86,243.60	0.04	4,839.30
148.000 CABOT MICROELECTRONICS CORP 12709P103	139.54	4,992.04	20,651.92	0.01	15,659.88
153.000 CACI INTERNATIONAL INC 127190304	216.88	33,208.65	33,182.64	0.02	-26.01
2,354.000 CACTUS INC 127203107	20.63	30,618.77	48,563.02	0.02	17,944.25
1,694.000 CADENCE DESIGN SYSTEMS INC 127387108	95.96	17,295.74	162,556.24	0.08	145,260.50
5,603.000 CADENCE BANCORP 12739A100	8.86	37,348.99	49,642.58	0.02	12,293.59
3,638.000 CAESARS ENTERTAINMENT CORP 127686103	12.13	38,258.57	44,128.94	0.02	5,870.37
472.000 CALIFORNIA WATER SERVICE GROUP 130788102	47.70	9,888.40	22,514.40	0.01	12,626.00
781.000 CALLAWAY GOLF CO 131193104	17.51	4,810.96	13,675.31	0.01	8,864.35
701.000 CAMDEN PROPERTY TRUST 133131102	91.22	48,485.96	63,945.22	0.03	15,459.26

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,189.000 CAMPBELL SOUP CO 134429109	49.63	105,835.97	108,640.07	0.05	2,804.10
505.000 CANADIAN IMPERIAL BANK OF COMM 136069101	66.97	11,984.07	33,819.85	0.02	21,835.78
526.000 CANNAE HOLDINGS INC 13765N107	41.10	2,503.71	21,618.60	0.01	19,114.89
3,032.000 CAPITAL ONE FINANCIAL CORP 14040H105	62.59	165,732.09	189,772.88	0.09	24,040.79
1,964.000 CARDINAL HEALTH INC 14149Y108	52.19	99,612.01	102,501.16	0.05	2,889.15
2,469.000 CARETRUST REIT INC 14174T107	17.16	33,521.67	42,368.04	0.02	8,846.37
386.000 CARLISLE COS INC 142339100	119.67	18,311.84	46,192.62	0.02	27,880.78
1,478.000 CARMAX INC 143130102	89.55	46,310.80	132,354.90	0.07	86,044.10
6,373.000 CARRIER GLOBAL CORP 14448C104	22.22	84,115.81	141,608.06	0.07	57,492.25
570.000 CARTER'S INC 146229109	80.70	23,356.90	45,999.00	0.02	22,642.10

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551.000 CARVANA CO 146869102	120.20	31,186.60	66,230.20	0.03	35,043.60
173.000 CASEY'S GENERAL STORES INC 147528103	149.52	9,824.67	25,866.96	0.01	16,042.29
1,125.000 CATALENT INC 148806102	73.30	28,811.25	82,462.50	0.04	53,651.25
3,571.000 CATERPILLAR INC 149123101	126.50	273,063.38	451,731.50	0.22	178,668.12
4,016.000 CATCHMARK TIMBER TRUST INC 14912Y202	8.85	29,703.32	35,541.60	0.02	5,838.28
498.000 CATHAY GENERAL BANCORP 149150104	26.30	6,957.06	13,097.40	0.01	6,140.34
1,095.000 CELANESE CORP 150870103	86.34	35,554.65	94,542.30	0.05	58,987.65
4,437.000 CENTENE CORP 15135B101	63.55	154,441.48	281,971.35	0.14	127,529.87
4,068.000 CENTERPOINT ENERGY INC 15189T107	18.67	57,228.91	75,949.56	0.04	18,720.65
371.000 CENTRAL PACIFIC FINANCIAL CORP 154760409	16.03	4,889.59	5,947.13	0.00	1,057.54

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674.000 CERIDIAN HCM HOLDING INC 15677J108	79.27	36,939.51	53,427.98	0.03	16,488.47
1,984.000 CERNER CORP 156782104	68.55	56,304.70	136,003.20	0.07	79,698.50
1,255.000 CHARTER COMMUNICATIONS INC 16119P108	510.04	74,180.04	640,100.20	0.32	565,920.16
938.000 CHEGG INC 163092109	67.26	37,302.67	63,089.88	0.03	25,787.21
101.000 CHEMED CORP 16359R103	451.07	5,071.21	45,558.07	0.02	40,486.86
873.000 CHENIERE ENERGY INC 16411R208	48.32	23,846.27	42,183.36	0.02	18,337.09
321.000 CHESAPEAKE UTILITIES CORP 165303108	84.00	15,310.46	26,964.00	0.01	11,653.54
12,183.000 CHEVRON CORP 166764100	89.23	849,453.19	1,087,089.09	0.54	237,635.90
4,805.000 CHIMERA INVESTMENT CORP 16934Q208	9.61	38,036.57	46,176.05	0.02	8,139.48
228.000 CHIPOTLE MEXICAN GRILL INC 169656105	1,052.36	56,209.41	239,938.08	0.12	183,728.67

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1,497.000 CHURCH & DWIGHT CO INC 171340102	77.30	54,769.80	115,718.10	0.06	60,948.30
345.000 CHURCHILL DOWNS INC 171484108	133.15	4,940.40	45,936.75	0.02	40,996.35
1,253.000 CIENA CORP 171779309	54.16	15,324.19	67,862.48	0.03	52,538.29
791.000 CINCINNATI FINANCIAL CORP 172062101	64.03	22,258.74	50,647.73	0.03	28,388.99
25,084.000 CISCO SYSTEMS INC 17275R102	46.64	652,345.80	1,169,917.76	0.58	517,571.96
796.000 CINTAS CORP 172908105	266.36	25,280.96	212,022.56	0.11	186,741.60
13,544.000 CITIGROUP INC 172967424	51.10	534,065.46	692,098.40	0.34	158,032.94
4,772.000 CITIZENS FINANCIAL GROUP INC 174610105	25.24	97,718.85	120,445.28	0.06	22,726.43
1,417.000 CITRIX SYSTEMS INC 177376100	147.91	41,740.96	209,588.47	0.10	167,847.51
156.000 CITY HOLDING CO 177835105	65.17	4,907.76	10,166.52	0.01	5,258.76

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4,377.000 CITY OFFICE REIT INC 178587101	10.06	37,405.58	44,032.62	0.02	6,627.04
678.000 CLEAN HARBORS INC 184496107	59.98	36,923.88	40,666.44	0.02	3,742.56
1,820.000 CLEARWAY ENERGY INC 18539C204	23.06	37,651.70	41,969.20	0.02	4,317.50
1,153.000 CLOROX CO/THE 189054109	219.37	102,282.23	252,933.61	0.13	150,651.38
4,609.000 CLOUDERA INC 18914U100	12.72	30,862.25	58,626.48	0.03	27,764.23
166.000 COCA-COLA CONSOLIDATED INC 191098102	229.19	10,121.02	38,045.54	0.02	27,924.52
21,406.000 COCA-COLA CO/THE 191216100	44.68	520,624.78	956,420.08	0.47	435,795.30
8,806.000 COEUR MINING INC 192108504	5.08	23,864.26	44,734.48	0.02	20,870.22
850.000 COGENT COMMUNICATIONS HOLDINGS 19239V302	77.36	28,584.60	65,756.00	0.03	37,171.40
1,186.000 COGNEX CORP 192422103	59.72	17,378.58	70,827.92	0.04	53,449.34

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,832.000 COGNIZANT TECHNOLOGY SOLUTIONS 192446102	56.82	78,146.45	217,734.24	0.11	139,587.79
2,357.000 COLFAX CORP 194014106	27.90	45,954.71	65,760.30	0.03	19,805.59
5,922.000 COLGATE-PALMOLIVE CO 194162103	73.26	185,496.58	433,845.72	0.22	248,349.14
45,343.000 COLONY CAPITAL INC 19626G108	2.40	104,974.04	108,823.20	0.05	3,849.16
529.000 COLUMBIA BANKING SYSTEM INC 197236102	28.35	9,517.21	14,994.51	0.01	5,477.30
3,115.000 COLUMBIA PROPERTY TRUST INC 198287203	13.14	36,559.52	40,931.10	0.02	4,371.58
483.000 COMFORT SYSTEMS USA INC 199908104	40.75	5,028.03	19,682.25	0.01	14,654.22
27,218.000 COMCAST CORP 20030N101	38.98	534,039.94	1,060,957.64	0.53	526,917.70
1,132.000 COMERICA INC 200340107	38.10	36,393.14	43,129.20	0.02	6,736.06
1,346.000 COMMERCE BANCSHARES INC/MO 200525103	59.47	34,092.34	80,046.62	0.04	45,954.28

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
232.000 COMMUNITY BANK SYSTEM INC 203607106	57.02	5,630.64	13,228.64	0.01	7,598.00
1,051.000 COMMUNITY HEALTHCARE TRUST INC 20369C106	40.90	36,390.62	42,985.90	0.02	6,595.28
205.000 COMMUNITY TRUST BANCORP INC 204149108	32.76	5,029.95	6,715.80	0.00	1,685.85
16,131.000 COMSCORE INC 20564W105	3.10	30,411.93	50,006.10	0.02	19,594.17
3,537.000 CONAGRA BRANDS INC 205887102	35.17	75,581.45	124,396.29	0.06	48,814.84
184.000 CONMED CORP 207410101	71.99	4,999.28	13,246.16	0.01	8,246.88
5,112.000 CONOCOPHILLIPS 20825C104	42.02	185,019.36	214,806.24	0.11	29,786.88
2,216.000 CONSOLIDATED EDISON INC 209115104	71.93	123,727.97	159,396.88	0.08	35,668.91
1,568.000 CONSTELLATION BRANDS INC 21036P108	174.95	95,568.00	274,321.60	0.14	178,753.60
344.000 COOPER COS INC/THE 216648402	283.64	20,708.80	97,572.16	0.05	76,863.36

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775.000 COOPER TIRE & RUBBER CO 216831107	27.61	13,477.25	21,397.75	0.01	7,920.50
1,354.000 COPART INC 217204106	83.27	21,700.32	112,747.58	0.06	91,047.26
3,185.000 CORCEPT THERAPEUTICS INC 218352102	16.82	5,096.00	53,571.70	0.03	48,475.70
313.000 CORESITE REALTY CORP 21870Q105	121.06	33,278.16	37,891.78	0.02	4,613.62
387.000 CORELOGIC INC/UNITED STATES 21871D103	67.22	9,845.28	26,014.14	0.01	16,168.86
9,759.000 COREPOINT LODGING INC 21872L104	4.21	36,569.04	41,085.39	0.02	4,516.35
774.000 CORNERSTONE ONDEMAND INC 21925Y103	38.56	21,880.98	29,845.44	0.01	7,964.46
5,606.000 CORNING INC 219350105	25.90	95,966.16	145,195.40	0.07	49,229.24
1,918.000 CORTEVA INC 22052L104	26.79	33,562.33	51,383.22	0.03	17,820.89
208.000 CORVEL CORP 221006109	70.89	5,049.20	14,745.12	0.01	9,695.92

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2,762.000 COSTCO WHOLESALE CORP 22160K105	303.21	204,239.65	837,466.02	0.42	633,226.37
206.000 COSTAR GROUP INC 22160N109	710.67	39,974.02	146,398.02	0.07	106,424.00
309.000 COUPA SOFTWARE INC 22266L106	277.04	48,210.74	85,605.36	0.04	37,394.62
4,158.000 COVANTA HOLDING CORP 22282E102	9.59	35,722.22	39,875.22	0.02	4,153.00
564.000 CRANE CO 224399105	59.46	20,332.20	33,535.44	0.02	13,203.24
771.000 CREE INC 225447101	59.19	38,287.86	45,635.49	0.02	7,347.63
953.000 CROWDSTRIKE HOLDINGS INC 22788C105	100.29	94,156.40	95,576.37	0.05	1,419.97
2,200.000 CROWN CASTLE INTERNATIONAL COR 22822V101	167.35	122,061.42	368,170.00	0.18	246,108.58
783.000 CROWN HOLDINGS INC 228368106	65.13	28,362.84	50,996.79	0.03	22,633.95
1,573.000 CUBESMART 229663109	26.99	35,523.91	42,455.27	0.02	6,931.36

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566.000 CULLEN/FROST BANKERS INC 229899109	74.71	31,956.36	42,285.86	0.02	10,329.50
1,147.000 CUMMINS INC 231021106	173.26	110,486.53	198,729.22	0.10	88,242.69
303.000 CURTISS-WRIGHT CORP 231561101	89.28	9,886.74	27,051.84	0.01	17,165.10
648.000 CYRUSONE INC 23283R100	72.75	32,944.32	47,142.00	0.02	14,197.68
2,016.000 DR HORTON INC 23331A109	55.45	32,323.83	111,787.20	0.06	79,463.37
1,843.000 DTE ENERGY CO 233331107	107.50	94,731.71	198,122.50	0.10	103,390.79
2,291.000 DXC TECHNOLOGY CO 23355L106	16.50	36,066.25	37,801.50	0.02	1,735.25
3,964.000 DANA INC 235825205	12.19	36,319.60	48,321.16	0.02	12,001.56
4,582.000 DANAHER CORP 235851102	176.83	235,659.76	810,235.06	0.40	574,575.30
977.000 DARDEN RESTAURANTS INC 237194105	75.77	57,370.71	74,027.29	0.04	16,656.58

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1,793.000 DARLING INGREDIENTS INC 237266101	24.62	24,331.01	44,143.66	0.02	19,812.65
562.000 DAVITA INC 23918K108	79.14	28,791.26	44,476.68	0.02	15,685.42
108.000 DECKERS OUTDOOR CORP 243537107	196.39	5,114.88	21,210.12	0.01	16,095.24
1,349.000 DEERE & CO 244199105	157.15	57,179.26	211,995.35	0.11	154,816.09
882.000 DELL TECHNOLOGIES INC 24703L202	54.94	36,978.29	48,457.08	0.02	11,478.79
5,492.000 DELTA AIR LINES INC 247361702	28.05	43,919.21	154,050.60	0.08	110,131.39
1,626.000 DENTSPLY SIRONA INC 24906P109	44.06	56,824.11	71,641.56	0.04	14,817.45
5,376.000 DESIGNER BRANDS INC 250565108	6.77	29,062.28	36,395.52	0.02	7,333.24
538.000 DEXCOM INC 252131107	405.40	34,926.96	218,105.20	0.11	183,178.24
5,232.000 DIAMONDBACK ENERGY INC 25278X109	41.82	133,833.78	218,802.24	0.11	84,968.46

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1,094.000 DIGITAL REALTY TRUST INC 253868103	142.11	80,573.86	155,468.34	0.08	74,894.48
12,274.000 WALT DISNEY CO/THE 254687106	111.51	505,163.83	1,368,673.74	0.68	863,509.91
3,333.000 DISCOVER FINANCIAL SERVICES 254709108	50.09	80,232.42	166,949.97	0.08	86,717.55
1,271.000 DISH NETWORK CORP 25470M109	34.51	26,995.63	43,862.21	0.02	16,866.58
1,088.000 DOCUSIGN INC 256163106	172.21	59,688.40	187,364.48	0.09	127,676.08
1,462.000 DOLLAR GENERAL CORP 256677105	190.51	96,298.34	278,525.62	0.14	182,227.28
1,666.000 DOLLAR TREE INC 256746108	92.68	53,713.75	154,404.88	0.08	100,691.13
6,598.000 DOMINION ENERGY INC 25746U109	81.18	339,338.20	535,625.64	0.27	196,287.44
706.000 DOMINO'S PIZZA INC 25754A201	369.44	25,725.92	260,824.64	0.13	235,098.72
997.000 DONALDSON CO INC 257651109	46.52	37,176.39	46,380.44	0.02	9,204.05

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1,302.000 DOUGLAS EMMETT INC 25960P109	30.66	20,154.96	39,919.32	0.02	19,764.36
1,560.000 DOVER CORP 260003108	96.56	49,544.98	150,633.60	0.07	101,088.62
5,846.000 DOW INC 260557103	40.76	203,467.54	238,282.96	0.12	34,815.42
2,245.000 DROPBOX INC 26210C104	21.77	38,405.72	48,873.65	0.02	10,467.93
3,570.000 DUKE REALTY CORP 264411505	35.39	41,840.40	126,342.30	0.06	84,501.90
7,097.000 DUKE ENERGY CORP 26441C204	79.89	460,931.17	566,979.33	0.28	106,048.16
849.000 DUNKIN' BRANDS GROUP INC 265504100	65.23	27,473.64	55,380.27	0.03	27,906.63
5,819.000 DUPONT DE NEMOURS INC 26614N102	53.13	242,365.91	309,163.47	0.15	66,797.56
321.000 DYCOM INDUSTRIES INC 267475101	40.89	4,798.95	13,125.69	0.01	8,326.74
1,092.000 DYNATRACE INC 268150109	40.60	39,857.54	44,335.20	0.02	4,477.66

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
12,903.000	DYNAVAX TECHNOLOGIES CORP 268158201	8.87	117,486.81	114,449.61	0.06	-3,037.20
2,472.000	EOG RESOURCES INC 26875P101	50.66	88,328.85	125,231.52	0.06	36,902.67
5,823.000	EQT CORP 26884L109	11.90	40,096.35	69,293.70	0.03	29,197.35
1,336.000	EPR PROPERTIES 26884U109	33.13	35,874.51	44,261.68	0.02	8,387.17
435.000	EAGLE BANCORP INC 268948106	32.75	5,065.77	14,246.25	0.01	9,180.48
3,452.000	E*TRADE FINANCIAL CORP 269246401	49.73	30,791.84	171,667.96	0.09	140,876.12
492.000	EAGLE MATERIALS INC 26969P108	70.22	29,234.64	34,548.24	0.02	5,313.60
1,560.000	EAST WEST BANCORP INC 27579R104	36.24	28,969.20	56,534.40	0.03	27,565.20
1,800.000	EASTMAN CHEMICAL CO 277432100	69.64	85,532.00	125,352.00	0.06	39,820.00
6,508.000	EBAY INC 278642103	52.45	77,582.16	341,344.60	0.17	263,762.44

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573.000 ECHOSTAR CORP 278768106	27.96	9,385.79	16,021.08	0.01	6,635.29
1,980.000 ECOLAB INC 278865100	198.95	89,493.64	393,921.00	0.20	304,427.36
3,262.000 EDISON INTERNATIONAL 281020107	54.31	142,167.79	177,159.22	0.09	34,991.43
1,594.000 EDITAS MEDICINE INC 28106W103	29.58	32,323.35	47,150.52	0.02	14,827.17
3,912.000 EDWARDS LIFESCIENCES CORP 28176E108	69.11	150,198.24	270,358.32	0.13	120,160.08
632.000 EL PASO ELECTRIC CO 283677854	67.00	25,084.08	42,344.00	0.02	17,259.92
2,358.000 ELECTRONIC ARTS INC 285512109	132.05	67,778.14	311,373.90	0.15	243,595.76
421.000 EMCOR GROUP INC 29084Q100	66.14	11,964.82	27,844.94	0.01	15,880.12
598.000 EMERGENT BIOSOLUTIONS INC 29089Q105	79.08	31,717.92	47,289.84	0.02	15,571.92
4,080.000 EMERSON ELECTRIC CO 291011104	62.03	211,213.50	253,082.40	0.13	41,868.90

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315.000 EMPLOYERS HOLDINGS INC 292218104	30.15	5,021.10	9,497.25	0.00	4,476.15
1,331.000 ENCORE CAPITAL GROUP INC 292554102	34.18	29,892.60	45,493.58	0.02	15,600.98
220.000 ENCORE WIRE CORP 292562105	48.82	5,108.40	10,740.40	0.01	5,632.00
593.000 ENCOMPASS HEALTH CORP 29261A100	61.93	35,515.49	36,724.49	0.02	1,209.00
1,042.000 ENERGIZER HOLDINGS INC 29272W109	47.49	33,812.14	49,484.58	0.02	15,672.44
569.000 ENERSYS 29275Y102	64.38	15,124.02	36,632.22	0.02	21,508.20
669.000 ENTEGRIS INC 29362U104	59.05	31,777.50	39,504.45	0.02	7,726.95
1,924.000 ENTERGY CORP 29364G103	93.81	167,739.63	180,490.44	0.09	12,750.81
390.000 ENTERPRISE FINANCIAL SERVICES 293712105	31.12	5,190.90	12,136.80	0.01	6,945.90
1,949.000 EPIZYME INC 29428V104	16.06	32,231.71	31,300.94	0.02	-930.77

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775.000 EQUIFAX INC 294429105	171.88	26,793.85	133,207.00	0.07	106,413.15
535.000 EQUINIX INC 29444U700	702.30	233,876.83	375,730.50	0.19	141,853.67
2,781.000 EQUITABLE HOLDINGS INC 29452E101	19.29	45,446.54	53,645.49	0.03	8,198.95
909.000 EQUITY COMMONWEALTH 294628102	32.20	22,420.15	29,269.80	0.01	6,849.65
800.000 EQUITY LIFESTYLE PROPERTIES IN 29472R108	62.48	36,140.81	49,984.00	0.02	13,843.19
1,945.000 EQUITY RESIDENTIAL 29476L107	58.82	98,237.86	114,404.90	0.06	16,167.04
464.000 ERIE INDEMNITY CO 29530P102	191.90	19,759.86	89,041.60	0.04	69,281.74
1,088.000 ESSENTIAL UTILITIES INC 29670G102	42.24	18,661.38	45,957.12	0.02	27,295.74
353.000 ESSEX PROPERTY TRUST INC 297178105	229.17	51,867.81	80,897.01	0.04	29,029.20
769.000 ETSY INC 29786A106	106.23	39,011.37	81,690.87	0.04	42,679.50

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323.000 298736109	EURONET WORLDWIDE INC	95.82	4,857.92	30,949.86	0.02	26,091.94
740.000 29977A105	EVERCORE INC	58.92	18,206.96	43,600.80	0.02	25,393.84
2,274.000 30034W106	EVERGY INC	59.29	96,307.33	134,825.46	0.07	38,518.13
2,156.000 30040W108	EVERSOURCE ENERGY	83.27	116,414.09	179,530.12	0.09	63,116.03
1,502.000 30063P105	EXACT SCIENCES CORP	86.94	15,891.16	130,583.88	0.06	114,692.72
6,778.000 30161N101	EXELON CORP	36.29	217,972.42	245,973.62	0.12	28,001.20
2,172.000 30161Q104	EXELIXIS INC	23.74	38,243.06	51,563.28	0.03	13,320.22
1,707.000 302130109	EXPEDITORS INTERNATIONAL OF WA	76.04	102,284.44	129,800.28	0.06	27,515.84
4,355.000 30224P200	EXTENDED STAY AMERICA INC	11.19	37,477.16	48,732.45	0.02	11,255.29
585.000 30225T102	EXTRA SPACE STORAGE INC	92.37	19,660.03	54,036.45	0.03	34,376.42

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23,499.000 EXXON MOBIL CORP 30231G102	44.72	1,319,804.69	1,050,875.28	0.52	-268,929.41
750.000 FLIR SYSTEMS INC 302445101	40.57	25,027.50	30,427.50	0.02	5,400.00
1,011.000 FMC CORP 302491303	99.62	59,071.96	100,715.82	0.05	41,643.86
16,336.000 FACEBOOK INC 30303M102	227.07	1,221,752.37	3,709,415.52	1.84	2,487,663.15
131.000 FACTSET RESEARCH SYSTEMS INC 303075105	328.47	37,653.33	43,029.57	0.02	5,376.24
251.000 FAIR ISAAC CORP 303250104	418.04	7,276.49	104,928.04	0.05	97,651.55
10.000 FAIRFAX FINANCIAL HOLDINGS LTD 303901102	308.84	4,202.63	3,088.40	0.00	-1,114.23
2,998.000 FASTENAL CO 311900104	42.84	75,244.99	128,434.32	0.06	53,189.33
991.000 FEDERAL REALTY INVESTMENT TRUS 313747206	85.21	77,079.98	84,443.11	0.04	7,363.13
1,241.000 FEDERAL SIGNAL CORP 313855108	29.73	5,174.97	36,894.93	0.02	31,719.96

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,816.000 FEDERATED HERMES INC 314211103	23.70	35,026.56	43,039.20	0.02	8,012.64
1,905.000 FEDEX CORP 31428X106	140.22	204,255.43	267,119.10	0.13	62,863.67
597.000 F5 NETWORKS INC 315616102	139.48	50,022.12	83,269.56	0.04	33,247.44
3,530.000 FIDELITY NATIONAL INFORMATION 31620M106	134.09	173,622.43	473,337.70	0.23	299,715.27
1,579.000 FIDELITY NATIONAL FINANCIAL IN 31620R303	30.66	13,158.51	48,412.14	0.02	35,253.63
7,553.000 FIFTH THIRD BANCORP 316773100	19.28	111,010.68	145,621.84	0.07	34,611.16
787.000 FIRST AMERICAN FINANCIAL CORP 31847R102	48.02	35,881.69	37,791.74	0.02	1,910.05
2,510.000 FIRST BANCORP/PUERTO RICO 318672706	5.59	9,638.40	14,030.90	0.01	4,392.50
24.000 FIRST CITIZENS BANCSHARES INC/ 31946M103	405.02	4,320.24	9,720.48	0.00	5,400.24
1,067.000 FIRST COMMONWEALTH FINANCIAL C 319829107	8.28	5,217.63	8,834.76	0.00	3,617.13

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
900.000 FIRST FINANCIAL BANCORP 320209109	13.89	5,747.02	12,501.00	0.01	6,753.98
792.000 FIRST FINANCIAL BANKSHARES INC 32020R109	28.89	6,617.16	22,880.88	0.01	16,263.72
887.000 FIRST INDUSTRIAL REALTY TRUST 32054K103	38.44	10,226.50	34,096.28	0.02	23,869.78
1,556.000 FIRST REPUBLIC BANK/CA 33616C100	105.99	105,837.74	164,920.44	0.08	59,082.70
714.000 FIRST SOLAR INC 336433107	49.50	11,345.46	35,343.00	0.02	23,997.54
269.000 1ST SOURCE CORP 336901103	35.58	4,912.90	9,571.02	0.00	4,658.12
129.000 FIRSTCASH INC 33767D105	67.48	5,020.68	8,704.92	0.00	3,684.24
4,611.000 FISERV INC 337738108	97.62	75,749.95	450,125.82	0.22	374,375.87
2,689.000 FIRSTENERGY CORP 337932107	38.78	88,187.36	104,279.42	0.05	16,092.06
447.000 FIVE BELOW INC 33829M101	106.91	37,249.63	47,788.77	0.02	10,539.14

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494.000 FIVE9 INC 338307101	110.67	33,231.38	54,670.98	0.03	21,439.60
612.000 FLEETCOR TECHNOLOGIES INC 339041105	251.53	73,759.07	153,936.36	0.08	80,177.29
1,543.000 FLOWERS FOODS INC 343498101	22.36	33,773.55	34,501.48	0.02	727.93
1,411.000 FOOT LOCKER INC 344849104	29.16	38,997.98	41,144.76	0.02	2,146.78
7,176.000 FORD MOTOR CO 345370860	6.08	37,352.13	43,630.08	0.02	6,277.95
1,411.000 FORTINET INC 34959E109	137.27	72,889.52	193,687.97	0.10	120,798.45
1,880.000 FORTIVE CORP 34959J108	67.66	33,010.59	127,200.80	0.06	94,190.21
1,423.000 FORTUNE BRANDS HOME & SECURITY 34964C106	63.93	28,053.03	90,972.39	0.05	62,919.36
135.000 FORWARD AIR CORP 349853101	49.82	5,111.10	6,725.70	0.00	1,614.60
153.000 FOUR CORNERS PROPERTY TRUST IN 35086T109	24.40	2,761.90	3,733.20	0.00	971.30

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,894.000 FOX CORP 35137L105	26.82	77,118.06	77,617.08	0.04	499.02
228.000 FRANKLIN ELECTRIC CO INC 353514102	52.52	5,180.16	11,974.56	0.01	6,794.40
3,856.000 FRANKLIN RESOURCES INC 354613101	20.97	65,363.83	80,860.32	0.04	15,496.49
9,585.000 FREEPORT-MCMORAN INC 35671D857	11.57	52,843.86	110,898.45	0.05	58,054.59
228.000 HB FULLER CO 359694106	44.60	5,344.32	10,168.80	0.01	4,824.48
2,352.000 FULTON FINANCIAL CORP 360271100	10.53	24,225.60	24,766.56	0.01	540.96
293.000 GATX CORP 361448103	60.98	10,624.18	17,867.14	0.01	7,242.96
604.000 GCI LIBERTY INC 36164V305	71.12	6,147.14	42,956.48	0.02	36,809.34
648.000 GCP APPLIED TECHNOLOGIES INC 36164Y101	18.58	6,370.38	12,039.84	0.01	5,669.46
1,070.000 ARTHUR J GALLAGHER & CO 363576109	97.49	50,636.90	104,314.30	0.05	53,677.40

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1,346.000 GAMING AND LEISURE PROPERTIES 36467J108	34.60	41,919.44	46,571.60	0.02	4,652.16
4,873.000 GAP INC/THE 364760108	12.62	37,112.89	61,497.26	0.03	24,384.37
484.000 GARRETT MOTION INC 366505105	5.54	2,102.80	2,681.36	0.00	578.56
916.000 GARTNER INC 366651107	121.33	40,923.64	111,138.28	0.06	70,214.64
361.000 GENERAC HOLDINGS INC 368736104	121.93	36,753.41	44,016.73	0.02	7,263.32
2,284.000 GENERAL DYNAMICS CORP 369550108	149.46	194,658.10	341,366.64	0.17	146,708.54
27,278.000 GENERAL ELECTRIC CO 369604103	6.83	217,760.34	186,308.74	0.09	-31,451.60
5,048.000 GENERAL MILLS INC 370334104	61.65	158,565.25	311,209.20	0.15	152,643.95
9,891.000 GENERAL MOTORS CO 37045V100	25.30	236,937.22	250,242.30	0.12	13,305.08
1,502.000 GENTEX CORP 371901109	25.77	30,037.49	38,706.54	0.02	8,669.05

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1,473.000 GENUINE PARTS CO 372460105	86.96	64,646.82	128,092.08	0.06	63,445.26
457.000 GIBRALTAR INDUSTRIES INC 374689107	48.01	4,958.45	21,940.57	0.01	16,982.12
8,554.000 GILEAD SCIENCES INC 375558103	76.94	203,546.74	658,144.76	0.33	454,598.02
882.000 GLACIER BANCORP INC 37637Q105	35.29	11,015.07	31,125.78	0.02	20,110.71
2,760.000 GLADSTONE LAND CORP 376549101	15.86	32,448.80	43,773.60	0.02	11,324.80
549.000 GLOBAL BLOOD THERAPEUTICS INC 37890U108	63.13	37,860.30	34,658.37	0.02	-3,201.93
2,118.000 GLOBAL PAYMENTS INC 37940X102	169.62	48,456.53	359,255.16	0.18	310,798.63
933.000 GLOBE LIFE INC 37959E102	74.23	26,189.27	69,256.59	0.03	43,067.32
507.000 GODADDY INC 380237107	73.33	37,766.43	37,178.31	0.02	-588.12
1,412.000 GOLDMAN SACHS GROUP INC/THE 38141G104	197.62	182,121.35	279,039.44	0.14	96,918.09

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648.000 W R GRACE & CO 38388F108	50.81	25,891.75	32,924.88	0.02	7,033.13
1,875.000 GRACO INC 384109104	47.99	20,168.75	89,981.25	0.04	69,812.50
19.000 GRAHAM HOLDINGS CO 384637104	342.67	4,433.51	6,510.73	0.00	2,077.22
130.000 WW GRAINGER INC 384802104	314.16	37,159.19	40,840.80	0.02	3,681.61
377.000 GRAND CANYON EDUCATION INC 38526M106	90.53	5,108.35	34,129.81	0.02	29,021.46
2,449.000 GRANITE CONSTRUCTION INC 387328107	19.14	33,225.68	46,873.86	0.02	13,648.18
549.000 GREAT SOUTHERN BANCORP INC 390905107	40.36	9,997.29	22,157.64	0.01	12,160.35
649.000 GREEN DOT CORP 39304D102	49.08	8,229.32	31,852.92	0.02	23,623.60
821.000 GRIFFIN INDUSTRIAL REALTY INC 398231100	54.17	25,017.10	44,473.57	0.02	19,456.47
1,066.000 GRIFFON CORP 398433102	18.52	10,247.88	19,742.32	0.01	9,494.44

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152.000 GROUP 1 AUTOMOTIVE INC 398905109	65.97	5,973.60	10,027.44	0.00	4,053.84
862.000 GRUBHUB INC 400110102	70.30	25,928.96	60,598.60	0.03	34,669.64
510.000 GUARDANT HEALTH INC 40131M109	81.13	32,109.60	41,376.30	0.02	9,266.70
4,688.000 GUESS? INC 401617105	9.67	31,953.72	45,332.96	0.02	13,379.24
434.000 GUIDEWIRE SOFTWARE INC 40171V100	110.85	24,620.82	48,108.90	0.02	23,488.08
379.000 H&E EQUIPMENT SERVICES INC 404030108	18.48	4,839.83	7,003.92	0.00	2,164.09
1,054.000 HCA HEALTHCARE INC 40412C101	97.06	60,631.01	102,301.24	0.05	41,670.23
2,366.000 HMS HOLDINGS CORP 40425J101	32.39	24,559.08	76,634.74	0.04	52,075.66
10,070.000 HP INC 40434L105	17.43	138,646.84	175,520.10	0.09	36,873.26
604.000 HAEMONETICS CORP 405024100	89.56	18,038.46	54,094.24	0.03	36,055.78

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,457.000 HAIN CELESTIAL GROUP INC/THE 405217100	31.51	31,250.36	45,910.07	0.02	14,659.71
3,976.000 HANESBRANDS INC 410345102	11.29	31,517.60	44,889.04	0.02	13,371.44
4,197.000 HANMI FINANCIAL CORP 410495204	9.71	34,986.99	40,752.87	0.02	5,765.88
142.000 HANOVER INSURANCE GROUP INC/TH 410867105	101.33	6,178.42	14,388.86	0.01	8,210.44
1,857.000 HARLEY-DAVIDSON INC 412822108	23.77	35,893.75	44,140.89	0.02	8,247.14
2,263.000 HARTFORD FINANCIAL SERVICES GR 416515104	38.55	55,768.39	87,238.65	0.04	31,470.26
1,083.000 HASBRO INC 418056107	74.95	44,375.94	81,170.85	0.04	36,794.91
845.000 HAWAIIAN ELECTRIC INDUSTRIES I 419870100	36.06	24,766.95	30,470.70	0.02	5,703.75
879.000 HAWAIIAN HOLDINGS INC 419879101	14.04	5,054.25	12,341.16	0.01	7,286.91
1,182.000 HEALTHCARE REALTY TRUST INC 421946104	29.29	31,616.12	34,620.78	0.02	3,004.66

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1,457.000 HEALTHCARE TRUST OF AMERICA IN 42225P501	26.52	38,302.24	38,639.64	0.02	337.40
759.000 HEALTHEQUITY INC 42226A107	58.67	36,648.32	44,530.53	0.02	7,882.21
1,850.000 HEARTLAND EXPRESS INC 422347104	20.82	34,387.25	38,517.00	0.02	4,129.75
5,182.000 HEALTHPEAK PROPERTIES INC 42250P103	27.56	122,777.25	142,815.92	0.07	20,038.67
20,549.000 HECLA MINING CO 422704106	3.27	32,986.14	67,195.23	0.03	34,209.09
800.000 HEICO CORP 422806109	99.65	13,959.17	79,720.00	0.04	65,760.83
745.000 JACK HENRY & ASSOCIATES INC 426281101	184.03	47,307.26	137,102.35	0.07	89,795.09
985.000 HERITAGE COMMERCE CORP 426927109	7.51	4,869.25	7,392.43	0.00	2,523.18
385.000 HERITAGE FINANCIAL CORP/WA 42722X106	20.00	4,966.50	7,700.00	0.00	2,733.50
5,244.000 HERON THERAPEUTICS INC 427746102	14.71	47,720.92	77,139.24	0.04	29,418.32

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932.000 HERSHEY CO/THE 427866108	129.62	49,928.96	120,805.84	0.06	70,876.88
7,384.000 HEWLETT PACKARD ENTERPRISE CO 42824C109	9.73	54,939.40	71,846.32	0.04	16,906.92
627.000 HILL-ROM HOLDINGS INC 431475102	109.78	17,336.55	68,832.06	0.03	51,495.51
1,845.000 HILLENBRAND INC 431571108	27.07	36,563.67	49,944.15	0.02	13,380.48
785.000 HILLTOP HOLDINGS INC 432748101	18.45	9,252.00	14,483.25	0.01	5,231.25
2,025.000 HILTON GRAND VACATIONS INC 43283X105	19.55	35,979.12	39,588.75	0.02	3,609.63
871.000 HILTON WORLDWIDE HOLDINGS INC 43300A203	73.45	65,586.30	63,974.95	0.03	-1,611.35
1,911.000 HOLOGIC INC 436440101	57.00	35,479.86	108,927.00	0.05	73,447.14
836.000 HOME BANCSHARES INC/AR 436893200	15.38	4,932.40	12,857.68	0.01	7,925.28
7,098.000 HOME DEPOT INC/THE 437076102	250.51	317,398.74	1,778,119.98	0.88	1,460,721.24

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338.000 HOMESTREET INC 43785V102	24.61	4,912.76	8,318.18	0.00	3,405.42
5,596.000 HONEYWELL INTERNATIONAL INC 438516106	144.59	291,088.24	809,125.64	0.40	518,037.40
4,796.000 HOPE BANCORP INC 43940T109	9.22	39,125.84	44,219.12	0.02	5,093.28
3,986.000 HORIZON BANCORP INC/IN 440407104	10.69	36,113.38	42,610.34	0.02	6,496.96
3,635.000 HORMEL FOODS CORP 440452100	48.27	64,494.04	175,461.45	0.09	110,967.41
4,771.000 HOST HOTELS & RESORTS INC 44107P104	10.79	55,165.87	51,479.09	0.03	-3,686.78
2,991.000 HOWMET AEROSPACE INC 443201108	15.85	49,571.35	47,407.35	0.02	-2,164.00
250.000 HUBSPOT INC 443573100	224.35	36,128.55	56,087.50	0.03	19,958.95
1,170.000 HUMANA INC 444859102	387.75	74,670.22	453,667.50	0.22	378,997.28
450.000 JB HUNT TRANSPORT SERVICES INC 445658107	120.34	20,574.00	54,153.00	0.03	33,579.00

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12,462.000 HUNTINGTON BANCSHARES INC/OH 446150104	9.04	78,931.78	112,594.17	0.06	33,662.39
344.000 HUNTINGTON INGALLS INDUSTRIES 446413106	174.49	12,961.36	60,024.56	0.03	47,063.20
2,133.000 HUNTSMAN CORP 447011107	17.97	26,136.75	38,330.01	0.02	12,193.26
165.000 HURON CONSULTING GROUP INC 447462102	44.25	4,851.00	7,301.25	0.00	2,450.25
514.000 HYATT HOTELS CORP 448579102	50.29	19,943.20	25,849.06	0.01	5,905.86
303.000 IAC/INTERACTIVECORP 44919P508	323.40	11,608.50	97,990.20	0.05	86,381.70
1,105.000 IAA INC 449253103	38.57	31,681.45	42,619.85	0.02	10,938.40
198.000 ICF INTERNATIONAL INC 44925C103	64.83	4,950.00	12,836.34	0.01	7,886.34
200.000 ICU MEDICAL INC 44930G107	184.31	32,484.00	36,862.00	0.02	4,378.00
287.000 IPG PHOTONICS CORP 44980X109	160.39	25,000.57	46,031.93	0.02	21,031.36

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2,031.000 ISTAR INC 45031U101	12.32	12,348.48	25,021.92	0.01	12,673.44
788.000 ITT INC 45073V108	58.74	15,320.78	46,287.12	0.02	30,966.34
1,467.000 IBERIABANK CORP 450828108	45.54	54,819.45	66,807.18	0.03	11,987.73
315.000 IDACORP INC 451107106	87.37	15,032.32	27,521.55	0.01	12,489.23
287.000 IDEX CORP 45167R104	158.04	14,860.69	45,357.48	0.02	30,496.79
724.000 IDEXX LABORATORIES INC 45168D104	330.16	27,066.74	239,035.84	0.12	211,969.10
2,798.000 ILLINOIS TOOL WORKS INC 452308109	174.85	126,121.80	489,230.30	0.24	363,108.50
859.000 ILLUMINA INC 452327109	370.35	157,595.08	318,130.65	0.16	160,535.57
3,629.000 IMAX CORP 45245E109	11.21	30,978.51	40,681.09	0.02	9,702.58
1,710.000 IMMUNOMEDICS INC 452907108	35.44	36,040.17	60,602.40	0.03	24,562.23

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,646.000 INCYTE CORP 45337C102	103.97	50,859.07	171,134.62	0.08	120,275.55
3,537.000 INDEPENDENCE REALTY TRUST INC 45378A106	11.49	32,633.82	40,640.13	0.02	8,006.31
190.000 INDEPENDENT BANK CORP 453836108	67.09	4,932.40	12,747.10	0.01	7,814.70
2,880.000 INDEPENDENT BANK CORP/MI 453838609	14.85	36,115.59	42,768.00	0.02	6,652.41
2,163.000 INGERSOLL RAND INC 45687V106	28.12	15,650.68	60,823.56	0.03	45,172.88
341.000 INGEVITY CORP 45688C107	52.57	6,107.18	17,926.37	0.01	11,819.19
337.000 INGLES MARKETS INC 457030104	43.07	5,048.26	14,514.59	0.01	9,466.33
412.000 INGREDION INC 457187102	83.00	20,064.33	34,196.00	0.02	14,131.67
305.000 INSIGHT ENTERPRISES INC 45765U103	49.20	5,072.15	15,006.00	0.01	9,933.85
156.000 INNOSPEC INC 45768S105	77.25	4,873.11	12,051.00	0.01	7,177.89

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
441.000 INPHI CORP 45772F107	117.50	32,338.53	51,817.50	0.03	19,478.97
411.000 INSULET CORP 45784P101	194.26	33,621.37	79,840.86	0.04	46,219.49
25,955.000 INTEL CORP 458140100	59.83	540,993.04	1,552,887.65	0.77	1,011,894.61
883.000 INTEGER HOLDINGS CORP 45826H109	73.05	26,896.18	64,503.15	0.03	37,606.97
1,135.000 INTERACTIVE BROKERS GROUP INC 45841N107	41.77	18,637.04	47,408.95	0.02	28,771.91
3,659.000 INTERCONTINENTAL EXCHANGE INC 45866F104	91.60	186,001.00	335,164.40	0.17	149,163.40
700.000 INTERDIGITAL INC 45867G101	56.63	31,906.00	39,641.00	0.02	7,735.00
1,182.000 INTERNATIONAL BANCSHARES CORP 459044103	32.02	19,053.84	37,847.64	0.02	18,793.80
4,344.000 INTERNATIONAL BUSINESS MACHINE 459200101	120.77	367,401.70	524,624.88	0.26	157,223.18
910.000 INTERNATIONAL FLAVORS & FRAGRA 459506101	122.46	36,099.79	111,438.60	0.06	75,338.81

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3,696.000 INTERPUBLIC GROUP OF COS INC/T 460690100	17.16	36,512.41	63,423.36	0.03	26,910.95
2,465.000 INTERSECT ENT INC 46071F103	13.54	27,509.40	33,376.10	0.02	5,866.70
3,666.000 INTRA-CELLULAR THERAPIES INC 46116X101	25.67	33,567.23	94,106.22	0.05	60,538.99
1,926.000 INTUIT INC 461202103	296.19	62,819.18	570,461.94	0.28	507,642.76
824.000 INTUITIVE SURGICAL INC 46120E602	569.83	100,457.09	469,539.92	0.23	369,082.83
925.000 INVESTORS BANCORP INC 46146L101	8.50	5,045.78	7,862.50	0.00	2,816.72
3,556.000 INVITATION HOMES INC 46187W107	27.53	79,315.49	97,896.68	0.05	18,581.19
715.000 IONIS PHARMACEUTICALS INC 462222100	58.96	32,275.10	42,156.40	0.02	9,881.30
879.000 IQVIA HOLDINGS INC 46266C105	141.88	95,182.33	124,712.52	0.06	29,530.19
6,304.000 IRIDIUM COMMUNICATIONS INC 46269C102	25.44	52,260.16	160,373.76	0.08	108,113.60

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407.000 JBG SMITH PROPERTIES 46590V100	29.57	11,694.44	12,034.99	0.01	340.55
19,013.000 JPMORGAN CHASE & CO 46625H100	94.06	769,075.85	1,788,362.78	0.89	1,019,286.93
225.000 JACK IN THE BOX INC 466367109	74.09	5,033.25	16,670.25	0.01	11,637.00
2,833.000 JEFFERIES FINANCIAL GROUP INC 47233W109	15.55	37,046.47	44,053.15	0.02	7,006.68
17,960.000 JOHNSON & JOHNSON 478160104	140.63	1,422,774.26	2,525,714.80	1.25	1,102,940.54
428.000 JONES LANG LASALLE INC 48020Q107	103.46	31,668.94	44,280.88	0.02	12,611.94
180.000 J2 GLOBAL INC 48123V102	63.21	4,905.00	11,377.80	0.01	6,472.80
3,428.000 JUNIPER NETWORKS INC 48203R104	22.86	59,237.94	78,364.08	0.04	19,126.14
717.000 KLA CORP 482480100	194.48	91,274.87	139,442.16	0.07	48,167.29
9,489.000 KALA PHARMACEUTICALS INC 483119103	10.51	35,945.53	99,729.39	0.05	63,783.86

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1,596.000 KB HOME 48666K109	30.68	12,943.56	48,965.28	0.02	36,021.72
795.000 KELLOGG CO 487836108	66.06	49,639.80	52,517.70	0.03	2,877.90
431.000 KEMPER CORP 488401100	72.52	18,006.43	31,256.12	0.02	13,249.69
1,535.000 KENNAMETAL INC 489170100	28.71	30,912.22	44,069.85	0.02	13,157.63
2,785.000 KENNEDY-WILSON HOLDINGS INC 489398107	15.22	36,780.92	42,387.70	0.02	5,606.78
6,436.000 KEYCORP 493267108	12.18	51,101.84	78,390.48	0.04	27,288.64
1,265.000 KEYSIGHT TECHNOLOGIES INC 49338L103	100.78	21,921.34	127,486.70	0.06	105,565.36
426.000 KFORCE INC 493732101	29.25	5,197.20	12,460.50	0.01	7,263.30
839.000 KILROY REALTY CORP 49427F108	58.70	44,957.94	49,249.30	0.02	4,291.36
2,623.000 KIMBERLY-CLARK CORP 494368103	141.35	216,843.93	370,761.05	0.18	153,917.12

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3,660.000 KIMCO REALTY CORP 49446R109	12.84	38,306.90	46,994.40	0.02	8,687.50
8,610.000 KINDER MORGAN INC 49456B101	15.17	124,885.29	130,613.70	0.06	5,728.41
525.000 KIRBY CORP 497266106	53.56	20,007.75	28,119.00	0.01	8,111.25
3,990.000 KITE REALTY GROUP TRUST 49803T300	11.54	37,371.35	46,044.60	0.02	8,673.25
3,418.000 KNOLL INC 498904200	12.19	35,671.83	41,665.42	0.02	5,993.59
1,228.000 KNIGHT-SWIFT TRANSPORTATION HO 499049104	41.71	33,419.42	51,219.88	0.03	17,800.46
176.000 KONTOOR BRANDS INC 50050N103	17.81	2,492.49	3,134.56	0.00	642.07
1,332.000 KORN FERRY 500643200	30.73	33,897.74	40,932.36	0.02	7,034.62
4,155.000 KRAFT HEINZ CO/THE 500754106	31.89	120,848.90	132,502.95	0.07	11,654.05
7,912.000 KROGER CO/THE 501044101	33.85	90,643.20	267,821.20	0.13	177,178.00

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713.000 LHC GROUP INC 50187A107	174.32	10,279.05	124,290.16	0.06	114,011.11
2,677.000 LKQ CORP 501889208	26.20	57,427.76	70,137.40	0.03	12,709.64
506.000 LCI INDUSTRIES 50189K103	114.98	37,223.49	58,179.88	0.03	20,956.39
622.000 LPL FINANCIAL HOLDINGS INC 50212V100	78.40	20,223.92	48,764.80	0.02	28,540.88
1,141.000 L3HARRIS TECHNOLOGIES INC 502431109	169.67	44,322.60	193,593.47	0.10	149,270.87
514.000 LA-Z-BOY INC 505336107	27.06	4,821.32	13,908.84	0.01	9,087.52
831.000 LABORATORY CORP OF AMERICA HOL 50540R409	166.11	55,604.11	138,037.41	0.07	82,433.30
346.000 LAKELAND FINANCIAL CORP 511656100	46.59	5,102.35	16,120.14	0.01	11,017.79
1,138.000 LAM RESEARCH CORP 512807108	323.46	27,918.93	368,097.48	0.18	340,178.55
766.000 LAMAR ADVERTISING CO 512816109	66.76	18,621.46	51,138.16	0.03	32,516.70

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820.000 LAMB WESTON HOLDINGS INC 513272104	63.93	13,565.92	52,422.60	0.03	38,856.68
292.000 LANCASTER COLONY CORP 513847103	154.99	35,809.08	45,257.08	0.02	9,448.00
356.000 LANDSTAR SYSTEM INC 515098101	112.31	34,532.00	39,982.36	0.02	5,450.36
2,093.000 LAS VEGAS SANDS CORP 517834107	45.54	84,417.66	95,315.22	0.05	10,897.56
1,948.000 LATTICE SEMICONDUCTOR CORP 518415104	28.39	34,786.54	55,303.72	0.03	20,517.18
1,451.000 ESTEE LAUDER COS INC/THE 518439104	188.68	144,521.87	273,774.68	0.14	129,252.81
803.000 LEAR CORP 521865204	109.02	38,882.32	87,543.06	0.04	48,660.74
1,251.000 LEGGETT & PLATT INC 524660107	35.15	35,727.30	43,972.65	0.02	8,245.35
765.000 LEGG MASON INC 524901105	49.75	38,066.40	38,058.75	0.02	-7.65
1,002.000 LEIDOS HOLDINGS INC 525327102	93.67	27,957.76	93,857.34	0.05	65,899.58

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3,403.000 LENNAR CORP 526057104	61.62	115,276.62	209,692.86	0.10	94,416.24
33.000 LENNAR CORP 526057302	46.09	723.83	1,520.97	0.00	797.14
38.000 LENNOX INTERNATIONAL INC 526107107	232.99	2,405.40	8,853.62	0.00	6,448.22
863.000 LIBERTY BROADBAND CORP 530307305	123.96	105,583.28	106,977.48	0.05	1,394.20
10,985.000 LIBERTY OILFIELD SERVICES INC 53115L104	5.48	35,761.17	60,197.80	0.03	24,436.63
862.000 LIBERTY MEDIA CORP-LIBERTY SIR 531229409	34.52	24,045.93	29,756.24	0.01	5,710.31
920.000 LIBERTY MEDIA CORP-LIBERTY SIR 531229607	34.45	30,599.20	31,694.00	0.02	1,094.80
1,158.000 LIBERTY MEDIA CORP-LIBERTY FOR 531229854	31.71	38,039.51	36,720.18	0.02	-1,319.33
511.000 LIFE STORAGE INC 53223X107	94.95	37,141.32	48,519.45	0.02	11,378.13
5,722.000 ELI LILLY AND CO 532457108	164.18	535,093.62	939,437.96	0.47	404,344.34

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278.000 LINCOLN ELECTRIC HOLDINGS INC 533900106	84.24	9,980.20	23,418.72	0.01	13,438.52
2,982.000 LINCOLN NATIONAL CORP 534187109	36.79	95,098.62	109,707.78	0.05	14,609.16
279.000 LITHIA MOTORS INC 536797103	151.33	5,354.01	42,221.07	0.02	36,867.06
275.000 LITTELFUSE INC 537008104	170.63	32,692.25	46,923.25	0.02	14,231.00
826.000 LIVE NATION ENTERTAINMENT INC 538034109	44.33	37,070.88	36,616.58	0.02	-454.30
924.000 LIVERAMP HOLDINGS INC 53815P108	42.47	11,400.69	39,242.28	0.02	27,841.59
1,280.000 LOCKHEED MARTIN CORP 539830109	364.92	207,059.70	467,097.60	0.23	260,037.90
1,204.000 LOEWS CORP 540424108	34.29	37,407.26	41,285.16	0.02	3,877.90
450.000 LOGMEIN INC 54142L109	84.77	27,042.78	38,146.50	0.02	11,103.72
5,768.000 LOWE'S COS INC 548661107	135.12	165,271.08	779,372.16	0.39	614,101.08

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860.000 LULULEMON ATHLETICA INC 550021109	312.01	92,845.56	268,328.60	0.13	175,483.04
3,014.000 LYFT INC 55087P104	33.01	97,281.85	99,492.14	0.05	2,210.29
1,085.000 M&T BANK CORP 55261F104	103.97	82,071.55	112,807.45	0.06	30,735.90
2,344.000 MDU RESOURCES GROUP INC 552690109	22.18	49,448.06	51,989.92	0.03	2,541.86
721.000 MGE ENERGY INC 55277P104	64.51	35,571.64	46,511.71	0.02	10,940.07
3,013.000 MGM RESORTS INTERNATIONAL 552953101	16.80	30,503.52	50,618.40	0.03	20,114.88
313.000 MKS INSTRUMENTS INC 55306N104	113.24	14,856.87	35,444.12	0.02	20,587.25
7,524.000 MRC GLOBAL INC 55345K103	5.91	31,793.90	44,466.84	0.02	12,672.94
138.000 MSA SAFETY INC 553498106	114.44	4,854.84	15,792.72	0.01	10,937.88
634.000 MSC INDUSTRIAL DIRECT CO INC 553530106	72.81	34,255.02	46,161.54	0.02	11,906.52

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741.000 MSCI INC 55354G100	333.82	26,552.41	247,360.62	0.12	220,808.21
1,071.000 STEVEN MADDEN LTD 556269108	24.69	18,714.14	26,442.99	0.01	7,728.85
142.000 MADISON SQUARE GARDEN SPORTS C 55825T103	146.89	22,648.57	20,858.38	0.01	-1,790.19
142.000 MADISON SQUARE GARDEN ENTERTAI 55826T102	75.00	8,594.27	10,650.00	0.01	2,055.73
23,987.000 MAGNOLIA OIL & GAS CORP 559663109	6.06	108,865.31	145,361.22	0.07	36,495.91
412.000 MANPOWERGROUP INC 56418H100	68.75	15,714.52	28,325.00	0.01	12,610.48
3,396.000 MARATHON PETROLEUM CORP 56585A102	37.38	71,068.20	126,942.48	0.06	55,874.28
513.000 MARCUS CORP/THE 566330106	13.27	4,945.32	6,807.51	0.00	1,862.19
90.000 MARKEL CORP 570535104	923.17	51,289.94	83,085.30	0.04	31,795.36
296.000 MARKETAXESS HOLDINGS INC 57060D108	500.92	35,919.44	148,272.32	0.07	112,352.88

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3,608.000 MARSH & MCLENNAN COS INC 571748102	107.37	107,513.60	387,390.96	0.19	279,877.36
2,687.000 MARRIOTT INTERNATIONAL INC/MD 571903202	85.73	122,502.44	230,356.51	0.11	107,854.07
2,028.000 MARTEN TRANSPORT LTD 573075108	25.16	19,670.81	51,024.48	0.03	31,353.67
217.000 MARTIN MARIETTA MATERIALS INC 573284106	206.57	26,181.24	44,825.69	0.02	18,644.45
2,938.000 MASCO CORP 574599106	50.21	42,183.77	147,516.98	0.07	105,333.21
190.000 MASIMO CORP 574795100	227.99	34,703.50	43,318.10	0.02	8,614.60
356.000 MASTEC INC 576323109	44.87	6,497.00	15,973.72	0.01	9,476.72
6,184.000 MASTERCARD INC 57636Q104	295.70	324,225.15	1,828,608.80	0.91	1,504,383.65
526.000 MATCH GROUP INC 57665R106	107.05	33,153.78	56,308.30	0.03	23,154.52
500.000 MATSON INC 57686G105	29.10	8,942.86	14,550.00	0.01	5,607.14

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4,676.000 MATTEL INC 577081102	9.67	37,529.90	45,216.92	0.02	7,687.02
2,923.000 MAXIM INTEGRATED PRODUCTS INC 57772K101	60.61	91,555.68	177,163.03	0.09	85,607.35
2,703.000 MAXLINEAR INC 57776J100	21.46	32,995.11	58,006.38	0.03	25,011.27
558.000 MAXIMUS INC 577933104	70.45	34,010.10	39,311.10	0.02	5,301.00
441.000 MCCORMICK & CO INC/MD 579780206	179.41	23,031.29	79,119.81	0.04	56,088.52
4,732.000 MCDONALD'S CORP 580135101	184.47	234,946.61	872,912.04	0.43	637,965.43
1,684.000 MCKESSON CORP 58155Q103	153.42	90,057.62	258,359.28	0.13	168,301.66
2,442.000 MEDICAL PROPERTIES TRUST INC 58463J304	18.80	40,399.10	45,909.60	0.02	5,510.50
16,528.000 MERCK & CO INC 58933Y105	77.33	704,138.05	1,278,110.24	0.63	573,972.19
944.000 MERCURY SYSTEMS INC 589378108	78.66	16,567.20	74,255.04	0.04	57,687.84

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128.000 MERCURY GENERAL CORP 589400100	40.75	4,974.08	5,216.00	0.00	241.92
984.000 MERIDIAN BANCORP INC 58958U103	11.60	5,120.14	11,414.40	0.01	6,294.26
221.000 MERITAGE HOMES CORP 59001A102	76.12	5,049.85	16,822.52	0.01	11,772.67
1,315.000 MERITOR INC 59001K100	19.80	6,588.15	26,037.00	0.01	19,448.85
94.000 MESA LABORATORIES INC 59064R109	216.80	5,018.66	20,379.20	0.01	15,360.54
2,341.000 METLIFE INC 59156R108	36.52	74,592.28	85,493.32	0.04	10,901.04
170.000 METTLER-TOLEDO INTERNATIONAL I 592688105	805.55	51,214.42	136,943.50	0.07	85,729.08
50,937.000 MICROSOFT CORP 594918104	203.51	2,555,927.91	10,366,188.87	5.14	7,810,260.96
1,146.000 MICROCHIP TECHNOLOGY INC 595017104	105.31	86,770.74	120,685.26	0.06	33,914.52
5,400.000 MICRON TECHNOLOGY INC 595112103	51.52	46,548.86	278,208.00	0.14	231,659.14

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
686.000 MID-AMERICA APARTMENT COMMUNIT 59522J103	114.67	48,141.18	78,663.62	0.04	30,522.44
351.000 MIDDLEBY CORP/THE 596278101	78.94	10,661.04	27,707.94	0.01	17,046.90
2,570.000 MIDLAND STATES BANCORP INC 597742105	14.95	34,989.38	38,421.50	0.02	3,432.12
400.000 MIRATI THERAPEUTICS INC 60468T105	114.17	30,952.00	45,668.00	0.02	14,716.00
1,425.000 MOBILE MINI INC 60740F105	29.50	36,492.12	42,037.50	0.02	5,545.38
2,387.000 MODEL N INC 607525102	34.76	31,074.90	82,972.12	0.04	51,897.22
1,944.000 MODERNA INC 60770K107	64.21	33,334.88	124,824.24	0.06	91,489.36
358.000 MOHAWK INDUSTRIES INC 608190104	101.76	20,413.16	36,430.08	0.02	16,016.92
304.000 MOLINA HEALTHCARE INC 60855R100	177.98	37,848.00	54,105.92	0.03	16,257.92
1,261.000 MOMENTA PHARMACEUTICALS INC 60877T100	33.27	36,593.41	41,953.47	0.02	5,360.06

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
10,605.000 MONDELEZ INTERNATIONAL INC 609207105	51.13	200,752.16	542,233.65	0.27	341,481.49
252.000 MONGODB INC 60937P106	226.34	37,874.52	57,037.68	0.03	19,163.16
345.000 MONOLITHIC POWER SYSTEMS INC 609839105	237.00	5,226.75	81,765.00	0.04	76,538.25
3,776.000 MONSTER BEVERAGE CORP 61174X109	69.32	172,867.13	261,752.32	0.13	88,885.19
1,388.000 MOODY'S CORP 615369105	274.73	53,181.58	381,325.24	0.19	328,143.66
221.000 MOOG INC 615394202	52.98	9,483.64	11,708.58	0.01	2,224.94
9,977.000 MORGAN STANLEY 617446448	48.30	211,601.19	481,889.10	0.24	270,287.91
83.000 MORNINGSTAR INC 617700109	140.97	4,849.69	11,700.51	0.01	6,850.82
1,139.000 MOTOROLA SOLUTIONS INC 620076307	140.13	115,253.05	159,608.07	0.08	44,355.02
476.000 MUELLER INDUSTRIES INC 624756102	26.58	8,653.68	12,652.08	0.01	3,998.40

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350.000 MURPHY USA INC 626755102	112.59	9,641.63	39,406.50	0.02	29,764.87
1,002.000 NCR CORP 62886E108	17.32	17,446.56	17,354.64	0.01	-91.92
3,632.000 NRG ENERGY INC 629377508	32.56	35,993.12	118,257.92	0.06	82,264.80
21.000 NVR INC 62944T105	3,258.75	35,047.61	68,433.75	0.03	33,386.14
738.000 NASDAQ INC 631103108	119.47	22,396.95	88,168.86	0.04	65,771.91
332.000 NATIONAL HEALTH INVESTORS INC 63633D104	60.72	16,244.76	20,159.04	0.01	3,914.28
948.000 NATIONAL INSTRUMENTS CORP 636518102	38.71	32,108.76	36,697.08	0.02	4,588.32
5,435.000 NATIONAL OILWELL VARCO INC 637071101	12.25	56,990.97	66,578.75	0.03	9,587.78
1,237.000 NATIONAL RETAIL PROPERTIES INC 637417106	35.48	37,136.29	43,888.76	0.02	6,752.47
1,765.000 NATIONAL STORAGE AFFILIATES TR 637870106	28.66	22,680.25	50,584.90	0.03	27,904.65

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607.000 NATUS MEDICAL INC 639050103	21.82	5,032.03	13,244.74	0.01	8,212.71
2,079.000 NEKTAR THERAPEUTICS 640268108	23.16	25,467.75	48,149.64	0.02	22,681.89
233.000 NELNET INC 64031N108	47.74	5,039.79	11,123.42	0.01	6,083.63
529.000 NEOGEN CORP 640491106	77.60	32,131.46	41,050.40	0.02	8,918.94
1,400.000 NETAPP INC 64110D104	44.37	41,905.48	62,118.00	0.03	20,212.52
2,834.000 NETFLIX INC 64110L106	455.04	227,151.72	1,289,583.36	0.64	1,062,431.64
577.000 NEUROCRINE BIOSCIENCES INC 64125C109	122.00	30,927.20	70,394.00	0.03	39,466.80
14,165.000 NEW SENIOR INVESTMENT GROUP IN 648691103	3.62	38,345.40	51,277.30	0.03	12,931.90
1,539.000 NEW YORK TIMES CO/THE 650111107	42.03	12,161.41	64,684.17	0.03	52,522.76
89.000 NEWMARKET CORP 651587107	400.48	35,277.82	35,642.72	0.02	364.90

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5,543.000 NEWMONT CORP 651639106	61.74	204,356.33	342,224.82	0.17	137,868.49
3,343.000 NEWS CORP 65249B109	11.86	30,581.98	39,647.98	0.02	9,066.00
496.000 NEWSSTAR FINANCIAL INCCVR 652CVR994 CONTRA	0.00	0.00	0.00	0.00	0.00
2,540.000 NEXTERA ENERGY INC 65339F101	240.17	115,249.25	610,031.80	0.30	494,782.55
1,250.000 NEXPOINT RESIDENTIAL TRUST INC 65341D102	35.35	31,910.40	44,187.50	0.02	12,277.10
8,408.000 NIKE INC 654106103	98.05	239,746.18	824,404.40	0.41	584,658.22
1,904.000 NISOURCE INC 65473P105	22.74	15,455.01	43,296.96	0.02	27,841.95
253.000 NORDSON CORP 655663102	189.71	37,110.62	47,996.63	0.02	10,886.01
2,280.000 NORFOLK SOUTHERN CORP 655844108	175.57	98,464.09	400,299.60	0.20	301,835.51
502.000 NORTHERN TRUST CORP 665859104	79.34	32,397.02	39,828.68	0.02	7,431.66

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,525.000 NORTHFIELD BANCORP INC 66611T108	11.52	36,227.54	40,608.00	0.02	4,380.46
1,106.000 NORTHROP GRUMMAN CORP 666807102	307.44	68,473.34	340,028.64	0.17	271,555.30
3,438.000 NORTONLIFELOCK INC 668771108	19.83	60,290.33	68,175.54	0.03	7,885.21
4,366.000 NOVAGOLD RESOURCES INC 66987E206	9.18	33,645.03	40,079.88	0.02	6,434.85
1,509.000 NU SKIN ENTERPRISES INC 67018T105	38.23	31,550.64	57,689.07	0.03	26,138.43
1,654.000 NUCOR CORP 670346105	41.41	65,092.97	68,492.14	0.03	3,399.17
3,737.000 NVIDIA CORP 67066G104	379.91	131,150.93	1,419,723.67	0.70	1,288,572.74
1,332.000 OGE ENERGY CORP 670837103	30.36	39,634.90	40,439.52	0.02	804.62
4,978.000 O-I GLASS INC 67098H104	8.98	33,233.15	44,702.44	0.02	11,469.29
539.000 O'REILLY AUTOMOTIVE INC 67103H107	421.67	94,449.07	227,280.13	0.11	132,831.06

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4,275.000 OCCIDENTAL PETROLEUM CORP 674599105	18.30	64,055.18	78,232.50	0.04	14,177.32
7,572.000 OCEANEERING INTERNATIONAL INC 675232102	6.39	27,074.90	48,385.08	0.02	21,310.18
784.000 OCEANFIRST FINANCIAL CORP 675234108	17.63	10,339.79	13,821.92	0.01	3,482.13
20,290.000 OFFICE DEPOT INC 676220106	2.35	30,541.45	47,681.50	0.02	17,140.05
13,465.000 OIL STATES INTERNATIONAL INC 678026105	4.75	35,889.22	63,958.75	0.03	28,069.53
773.000 OKTA INC 679295105	200.23	53,136.66	154,777.79	0.08	101,641.13
547.000 OLD DOMINION FREIGHT LINE INC 679580100	169.59	33,368.90	92,765.73	0.05	59,396.83
596.000 OLD NATIONAL BANCORP/IN 680033107	13.76	6,144.76	8,200.96	0.00	2,056.20
1,639.000 OLD REPUBLIC INTERNATIONAL COR 680223104	16.31	15,193.53	26,732.09	0.01	11,538.56
2,891.000 OLIN CORP 680665205	11.49	31,531.35	33,217.59	0.02	1,686.24

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697.000 OLLIE'S BARGAIN OUTLET HOLDING 681116109	97.65	32,298.98	68,062.05	0.03	35,763.07
1,714.000 OMNICOM GROUP INC 681919106	54.60	80,191.38	93,584.40	0.05	13,393.02
1,505.000 OMEGA HEALTHCARE INVESTORS INC 681936100	29.73	39,257.41	44,743.65	0.02	5,486.24
473.000 ONE GAS INC 68235P108	77.05	18,988.55	36,444.65	0.02	17,456.10
2,162.000 ONEOK INC 682680103	33.22	75,923.63	71,821.64	0.04	-4,101.99
15,511.000 ORACLE CORP 68389X105	55.27	277,149.01	857,292.97	0.42	580,143.96
809.000 ORMAT TECHNOLOGIES INC 686688102	63.49	14,788.52	51,363.41	0.03	36,574.89
833.000 OSHKOSH CORP 688239201	71.62	15,979.90	59,659.46	0.03	43,679.56
2,654.000 OTIS WORLDWIDE CORP 68902V107	56.86	98,590.35	150,906.44	0.07	52,316.09
937.000 OTTER TAIL CORP 689648103	38.79	25,055.38	36,346.23	0.02	11,290.85

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,790.000 OUTFRONT MEDIA INC 69007J106	14.17	34,378.08	39,534.30	0.02	5,156.22
1,078.000 OWENS CORNING 690742101	55.76	28,408.02	60,109.28	0.03	31,701.26
155.000 OXFORD INDUSTRIES INC 691497309	44.01	5,068.50	6,821.55	0.00	1,753.05
6,566.000 PG&E CORP 69331C108	8.87	40,353.07	58,240.42	0.03	17,887.35
3,329.000 PNC FINANCIAL SERVICES GROUP I 693475105	105.21	263,248.28	350,244.09	0.17	86,995.81
941.000 PNM RESOURCES INC 69349H107	38.44	23,032.11	36,172.04	0.02	13,139.93
1,446.000 PPG INDUSTRIES INC 693506107	106.06	76,750.37	153,362.76	0.08	76,612.39
996.000 PTC INC 69370C100	77.79	22,294.00	77,478.84	0.04	55,184.84
2,578.000 PACCAR INC 693718108	74.85	97,811.90	192,963.30	0.10	95,151.40
525.000 PACKAGING CORP OF AMERICA 695156109	99.80	19,952.55	52,395.00	0.03	32,442.45

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2,168.000 PACWEST BANCORP 695263103	19.71	34,812.24	42,731.28	0.02	7,919.04
623.000 PALO ALTO NETWORKS INC 697435105	229.67	49,189.70	143,084.41	0.07	93,894.71
718.000 PAPA JOHN'S INTERNATIONAL INC 698813102	79.41	12,974.26	57,016.38	0.03	44,042.12
5,552.000 PAR PACIFIC HOLDINGS INC 69888T207	8.99	41,006.52	49,912.48	0.02	8,905.96
81.000 PARK NATIONAL CORP 700658107	70.38	5,158.89	5,700.78	0.00	541.89
1,301.000 PARKER-HANNIFIN CORP 701094104	183.27	67,930.06	238,434.27	0.12	170,504.21
26,589.000 PATTERSON-UTI ENERGY INC 703481101	3.47	56,240.73	92,263.83	0.05	36,023.10
2,137.000 PAYCHEX INC 704326107	75.75	101,301.84	161,877.75	0.08	60,575.91
204.000 PAYCOM SOFTWARE INC 70432V102	309.73	46,426.69	63,184.92	0.03	16,758.23
7,902.000 PAYPAL HOLDINGS INC 70450Y103	174.23	224,095.18	1,376,765.46	0.68	1,152,670.28

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3,259.000 PEBBLEBROOK HOTEL TRUST 70509V100	13.66	36,359.14	44,517.94	0.02	8,158.80
427.000 PENN NATIONAL GAMING INC 707569109	30.54	3,633.04	13,040.58	0.01	9,407.54
710.000 PENSKE AUTOMOTIVE GROUP INC 70959W103	38.71	10,799.10	27,484.10	0.01	16,685.00
1,762.000 PEOPLES BANCORP INC/OH 709789101	21.28	36,369.16	37,495.36	0.02	1,126.20
4,963.000 PEOPLE'S UNITED FINANCIAL INC 712704105	11.57	36,140.13	57,421.91	0.03	21,281.78
7,764.000 PEPSICO INC 713448108	132.26	625,050.09	1,026,866.64	0.51	401,816.55
1,455.000 PERKINELMER INC 714046109	98.09	99,421.87	142,720.95	0.07	43,299.08
822.000 PERSPECTA INC 715347100	23.23	6,888.48	19,095.06	0.01	12,206.58
30,763.000 PFIZER INC 717081103	32.70	799,071.99	1,005,950.10	0.50	206,878.11
1,406.000 PHIBRO ANIMAL HEALTH CORP 71742Q106	26.27	33,179.57	36,935.62	0.02	3,756.05

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7,815.000 PHILIP MORRIS INTERNATIONAL IN 718172109	70.06	322,305.70	547,518.90	0.27	225,213.20
4,803.000 PHILLIPS 66 718546104	71.90	158,953.58	345,335.70	0.17	186,382.12
2,149.000 PHYSICIANS REALTY TRUST 71943U104	17.52	33,217.79	37,650.48	0.02	4,432.69
322.000 PINNACLE FINANCIAL PARTNERS IN 72346Q104	41.99	4,842.88	13,520.78	0.01	8,677.90
448.000 PINNACLE WEST CAPITAL CORP 723484101	73.29	21,900.66	32,833.92	0.02	10,933.26
659.000 PLANET FITNESS INC 72703H101	60.57	37,359.50	39,915.63	0.02	2,556.13
336.000 PLEXUS CORP 729132100	70.56	10,175.50	23,708.16	0.01	13,532.66
479.000 POLARIS INC 731068102	92.55	38,037.39	44,331.45	0.02	6,294.06
303.000 POOL CORP 73278L105	271.87	8,683.98	82,376.61	0.04	73,692.63
1,294.000 POPULAR INC 733174700	37.17	20,147.58	48,097.98	0.02	27,950.40

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366.000 POST HOLDINGS INC 737446104	87.62	20,377.14	32,068.92	0.02	11,691.78
321.000 POWER INTEGRATIONS INC 739276103	118.13	16,587.72	37,919.73	0.02	21,332.01
11,373.000 PRECISION BIOSCIENCES INC 74019P108	8.33	89,681.10	94,737.09	0.05	5,055.99
732.000 PREMIER FINANCIAL CORP 74052F108	17.67	5,223.11	12,934.44	0.01	7,711.33
1,841.000 T ROWE PRICE GROUP INC 74144T108	123.50	87,703.03	227,363.50	0.11	139,660.47
215.000 PRIMERICA INC 74164M108	116.60	5,022.40	25,069.00	0.01	20,046.60
4,104.000 PRINCIPAL FINANCIAL GROUP INC 74251V102	41.54	137,917.84	170,480.16	0.08	32,562.32
14,579.000 PROCTER & GAMBLE CO/THE 742718109	119.57	1,060,892.39	1,743,211.03	0.86	682,318.64
4,233.000 PROGRESSIVE CORP/THE 743315103	80.11	132,502.27	339,105.63	0.17	206,603.36
5,976.000 PROLOGIS INC 74340W103	93.33	263,911.64	557,740.08	0.28	293,828.44

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499.000 PROOFPOINT INC 743424103	111.12	23,148.61	55,448.88	0.03	32,300.27
846.000 PROSPERITY BANCSHARES INC 743606105	59.38	40,524.57	50,235.48	0.02	9,710.91
1,643.000 PRUDENTIAL FINANCIAL INC 744320102	60.90	88,749.08	100,058.70	0.05	11,309.62
3,830.000 PUBLIC SERVICE ENTERPRISE GROU 744573106	49.16	127,133.50	188,282.80	0.09	61,149.30
985.000 PUBLIC STORAGE 74460D109	191.89	102,523.50	189,011.65	0.09	86,488.15
3,169.000 PULTEGROUP INC 745867101	34.03	68,357.88	107,841.07	0.05	39,483.19
2,802.000 PURE STORAGE INC 74624M102	17.33	36,700.27	48,558.66	0.02	11,858.39
122.000 QUAKER CHEMICAL CORP 747316107	185.65	4,941.00	22,649.30	0.01	17,708.30
595.000 QTS REALTY TRUST INC 74736A103	64.09	32,439.40	38,133.55	0.02	5,694.15
1,047.000 QORVO INC 74736K101	110.53	11,927.85	115,724.91	0.06	103,797.06

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Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

PARAMETRIC US PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
7,488.000 QUALCOMM INC 747525103	91.21	328,741.13	682,980.48	0.34	354,239.35
892.000 QUEST DIAGNOSTICS INC 74834L100	113.96	77,307.22	101,652.32	0.05	24,345.10
209.000 QUIDEL CORP 74838J101	223.74	38,886.54	46,761.66	0.02	7,875.12
6,456.000 QURATE RETAIL INC 74915M100	9.50	32,188.16	61,332.00	0.03	29,143.84
166.000 RLI CORP 749607107	82.10	4,999.09	13,628.60	0.01	8,629.51
4,399.000 RLJ LODGING TRUST 74965L101	9.44	35,592.91	41,526.56	0.02	5,933.65
36.000 RMR GROUP INC/THE 74967R106	29.47	468.00	1,060.92	0.00	592.92
752.000 RPM INTERNATIONAL INC 749685103	75.06	19,908.98	56,445.12	0.03	36,536.14
16,709.000 RANGE RESOURCES CORP 75281A109	5.63	32,504.00	94,071.67	0.05	61,567.67
1,118.000 RAYMOND JAMES FINANCIAL INC 754730109	68.83	34,333.78	76,951.94	0.04	42,618.16

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,383.000 RAYONIER INC 754907103	24.79	31,323.03	34,284.57	0.02	2,961.54
11,155.000 RAYTHEON TECHNOLOGIES CORP 75513E101	61.62	365,427.67	687,371.10	0.34	321,943.43
130.000 RBC BEARINGS INC 75524B104	134.04	4,838.60	17,425.20	0.01	12,586.60
548.000 REATA PHARMACEUTICALS INC 75615P103	156.02	28,386.40	85,498.96	0.04	57,112.56
1,106.000 REGENCY CENTERS CORP 758849103	45.89	46,075.43	50,754.34	0.03	4,678.91
553.000 REGENERON PHARMACEUTICALS INC 75886F107	623.65	189,400.63	344,878.45	0.17	155,477.82
6,294.000 REGIONS FINANCIAL CORP 7591EP100	11.12	41,552.58	69,989.28	0.03	28,436.70
526.000 REINSURANCE GROUP OF AMERICA I 759351604	78.44	28,049.28	41,259.44	0.02	13,210.16
473.000 RELIANCE STEEL & ALUMINUM CO 759509102	94.93	23,309.44	44,901.89	0.02	21,592.45
345.000 RENASANT CORP 75970E107	24.90	4,988.70	8,590.50	0.00	3,601.80

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880.000 RENEWABLE ENERGY GROUP INC 75972A301	24.78	6,186.40	21,806.40	0.01	15,620.00
360.000 REPLIGEN CORP 759916109	123.61	37,396.80	44,499.60	0.02	7,102.80
2,615.000 REPUBLIC SERVICES INC 760759100	82.05	85,410.90	214,560.75	0.11	129,149.85
966.000 RESMED INC 761152107	192.00	24,246.60	185,472.00	0.09	161,225.40
5,874.000 RETAIL OPPORTUNITY INVESTMENTS 76131N101	11.33	53,859.59	66,552.42	0.03	12,692.83
7,761.000 RETAIL PROPERTIES OF AMERICA I 76131V202	7.32	37,296.60	56,810.52	0.03	19,513.92
2,570.000 REVANCE THERAPEUTICS INC 761330109	24.42	30,806.45	62,759.40	0.03	31,952.95
689.000 REX AMERICAN RESOURCES CORP 761624105	69.37	31,990.27	47,795.93	0.02	15,805.66
1,192.000 REXFORD INDUSTRIAL REALTY INC 76169C100	41.43	25,127.36	49,384.56	0.02	24,257.20
1,220.000 RINGCENTRAL INC 76680R206	285.01	18,373.20	347,712.20	0.17	329,339.00

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924.000 ROBERT HALF INTERNATIONAL INC 770323103	52.83	28,297.13	48,814.92	0.02	20,517.79
1,048.000 ROCKWELL AUTOMATION INC 773903109	213.00	60,101.96	223,224.00	0.11	163,122.04
333.000 ROGERS CORP 775133101	124.60	33,196.77	41,491.80	0.02	8,295.03
572.000 ROKU INC 77543R102	116.53	61,404.37	66,655.16	0.03	5,250.79
596.000 ROPER TECHNOLOGIES INC 776696106	388.26	127,707.99	231,402.96	0.11	103,694.97
1,626.000 ROSS STORES INC 778296103	85.24	98,218.23	138,600.24	0.07	40,382.01
958.000 ROYAL GOLD INC 780287108	124.32	81,078.12	119,098.56	0.06	38,020.44
275.000 RUSH ENTERPRISES INC 781846209	41.46	5,049.00	11,401.50	0.01	6,352.50
281.000 S&T BANCORP INC 783859101	23.45	4,979.32	6,589.45	0.00	1,610.13
1,578.000 S&P GLOBAL INC 78409V104	329.48	256,885.09	519,919.44	0.26	263,034.35

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623.000 SBA COMMUNICATIONS CORP 78410G104	297.92	25,290.00	185,604.16	0.09	160,314.16
1,749.000 SEI INVESTMENTS CO 784117103	54.98	35,319.39	96,160.02	0.05	60,840.63
214.000 SJW GROUP 784305104	62.11	4,962.66	13,291.54	0.01	8,328.88
929.000 SL GREEN REALTY CORP 78440X101	49.29	35,905.85	45,790.41	0.02	9,884.56
2,501.000 SLM CORP 78442P106	7.03	14,947.14	17,582.03	0.01	2,634.89
22,257.000 SM ENERGY CO 78454L100	3.75	37,730.61	83,463.75	0.04	45,733.14
1,392.000 SPS COMMERCE INC 78463M107	75.12	33,421.92	104,567.04	0.05	71,145.12
1,361.000 SS&C TECHNOLOGIES HOLDINGS INC 78467J100	56.48	39,821.97	76,869.28	0.04	37,047.31
348.000 SVB FINANCIAL GROUP 78486Q101	215.53	59,733.12	75,004.44	0.04	15,271.32
2,791.000 SABRA HEALTH CARE REIT INC 78573L106	14.43	37,708.61	40,274.13	0.02	2,565.52

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2,321.000 SAFEHOLD INC 78645L100	57.49	58,392.30	133,434.29	0.07	75,041.99
120.000 SAFETY INSURANCE GROUP INC 78648T100	76.26	4,950.00	9,151.20	0.00	4,201.20
2,375.000 SAGE THERAPEUTICS INC 78667J108	41.58	99,363.12	98,752.50	0.05	-610.62
5,716.000 SALESFORCE.COM INC 79466L302	187.33	391,515.81	1,070,778.28	0.53	679,262.47
109.000 SANDERSON FARMS INC 800013104	115.89	5,261.43	12,632.01	0.01	7,370.58
276.000 SANDY SPRING BANCORP INC 800363103	24.78	4,832.76	6,839.28	0.00	2,006.52
1,407.000 SANMINA CORP 801056102	25.04	12,883.59	35,231.28	0.02	22,347.69
2,439.000 SANTANDER CONSUMER USA HOLDING 80283M101	18.41	37,894.86	44,901.99	0.02	7,007.13
448.000 SAREPTA THERAPEUTICS INC 803607100	160.34	33,138.56	71,832.32	0.04	38,693.76
932.000 HENRY SCHEIN INC 806407102	58.39	27,493.26	54,419.48	0.03	26,926.22

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4,554.000 SCHLUMBERGER LTD 806857108	18.39	77,946.71	83,748.06	0.04	5,801.35
194.000 SCHOLASTIC CORP 807066105	29.94	4,834.48	5,808.36	0.00	973.88
8,633.000 CHARLES SCHWAB CORP/THE 808513105	33.74	123,396.14	291,277.42	0.14	167,881.28
612.000 SCIENCE APPLICATIONS INTERNATI 808625107	77.68	34,124.75	47,540.16	0.02	13,415.41
745.000 SCOTTS MIRACLE-GRO CO/THE 810186106	134.47	43,000.42	100,180.15	0.05	57,179.73
1,606.000 SEALED AIR CORP 81211K100	32.85	39,188.13	52,757.10	0.03	13,568.97
1,234.000 SEATTLE GENETICS INC 812578102	169.92	27,004.51	209,681.28	0.10	182,676.77
1,142.000 SELECT MEDICAL HOLDINGS CORP 81619Q105	14.73	15,084.22	16,821.66	0.01	1,737.44
340.000 SELECTIVE INSURANCE GROUP INC 816300107	52.74	5,392.40	17,931.60	0.01	12,539.20
943.000 SEMTECH CORP 816850101	52.22	31,863.97	49,243.46	0.02	17,379.49

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2,133.000 SEMPRA ENERGY 816851109	117.23	159,413.80	250,051.59	0.12	90,637.79
265.000 SENSIENT TECHNOLOGIES CORP 81725T100	52.16	9,877.89	13,822.40	0.01	3,944.51
1,811.000 SERVICE CORP INTERNATIONAL/US 817565104	38.89	14,958.86	70,429.79	0.03	55,470.93
735.000 SERVICEMASTER GLOBAL HOLDINGS 81761R109	35.69	16,865.16	26,232.15	0.01	9,366.99
1,212.000 SERVICENOW INC 81762P102	405.06	184,620.48	490,932.72	0.24	306,312.24
996.000 SHENANDOAH TELECOMMUNICATIONS 82312B106	49.29	5,522.82	49,092.84	0.02	43,570.02
424.000 SHERWIN-WILLIAMS CO/THE 824348106	577.85	151,573.49	245,008.40	0.12	93,434.91
612.000 SIGNATURE BANK/NEW YORK NY 82669G104	106.92	43,739.76	65,435.04	0.03	21,695.28
391.000 SILICON LABORATORIES INC 826919102	100.27	32,773.62	39,205.57	0.02	6,431.95
248.000 SILGAN HOLDINGS INC 827048109	32.39	4,968.68	8,032.72	0.00	3,064.04

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404.000 SIMMONS FIRST NATIONAL CORP 828730200	17.11	4,930.82	6,912.44	0.00	1,981.62
2,470.000 SIMON PROPERTY GROUP INC 828806109	68.38	140,486.25	168,898.60	0.08	28,412.35
725.000 SIMPSON MANUFACTURING CO INC 829073105	84.36	27,661.94	61,161.00	0.03	33,499.06
19,708.000 SIRIUS XM HOLDINGS INC 82968B103	5.87	38,546.63	115,685.96	0.06	77,139.33
2,434.000 SIX FLAGS ENTERTAINMENT CORP 83001A102	19.21	32,277.30	46,757.14	0.02	14,479.84
1,053.000 SKECHERS USA INC 830566105	31.38	4,794.66	33,043.14	0.02	28,248.48
1,809.000 SKYWORKS SOLUTIONS INC 83088M102	127.86	28,039.50	231,298.74	0.11	203,259.24
832.000 A O SMITH CORP 831865209	47.12	12,858.56	39,203.84	0.02	26,345.28
676.000 J M SMUCKER CO/THE 832696405	105.81	68,232.90	71,527.56	0.04	3,294.66
284.000 SNAP-ON INC 833034101	138.51	14,603.28	39,336.84	0.02	24,733.56

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
693.000 SONOCO PRODUCTS CO 835495102	52.29	21,755.05	36,236.97	0.02	14,481.92
268.000 SOUTH STATE CORP 840441109	47.66	6,934.43	12,772.88	0.01	5,838.45
3,803.000 SOUTHERN CO/THE 842587107	51.85	132,399.16	197,185.55	0.10	64,786.39
345.000 SOUTHSIDE BANCSHARES INC 84470P109	27.72	5,037.90	9,563.40	0.00	4,525.50
4,521.000 SOUTHWEST AIRLINES CO 844741108	34.18	37,786.12	154,527.78	0.08	116,741.66
481.000 SOUTHWEST GAS HOLDINGS INC 844895102	69.05	30,241.06	33,213.05	0.02	2,971.99
19,498.000 SOUTHWESTERN ENERGY CO 845467109	2.56	32,469.17	49,914.88	0.02	17,445.71
32,089.000 SPECTRUM PHARMACEUTICALS INC 84763A108	3.38	99,320.45	108,460.82	0.05	9,140.37
995.000 SPIRIT AEROSYSTEMS HOLDINGS IN 848574109	23.94	19,907.90	23,820.30	0.01	3,912.40
496.000 SPIRE INC 84857L101	65.71	32,948.91	32,592.16	0.02	-356.75

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1,328.000 SPIRIT REALTY CAPITAL INC 84860W300	34.86	38,218.20	46,294.08	0.02	8,075.88
732.000 SPLUNK INC 848637104	198.70	42,554.24	145,448.40	0.07	102,894.16
2,069.000 SPROUTS FARMERS MARKET INC 85208M102	25.59	33,264.17	52,945.71	0.03	19,681.54
1,871.000 SQUARE INC 852234103	104.94	65,820.34	196,342.74	0.10	130,522.40
1,048.000 STANLEY BLACK & DECKER INC 854502101	139.38	63,638.44	146,070.24	0.07	82,431.80
8,325.000 STARBUCKS CORP 855244109	73.59	165,412.62	612,636.75	0.30	447,224.13
1,509.000 STEEL DYNAMICS INC 858119100	26.09	35,322.23	39,369.81	0.02	4,047.58
738.000 STERICYCLE INC 858912108	55.98	37,822.50	41,313.24	0.02	3,490.74
726.000 STIFEL FINANCIAL CORP 860630102	47.43	24,700.72	34,434.18	0.02	9,733.46
2,085.000 STORE CAPITAL CORP 862121100	23.81	39,004.92	49,643.85	0.02	10,638.93

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138.000 STRATEGIC EDUCATION INC 86272C103	153.65	4,953.81	21,203.70	0.01	16,249.89
2,588.000 STRYKER CORP 863667101	180.19	171,654.79	466,331.72	0.23	294,676.93
115.000 STURM RUGER & CO INC 864159108	76.00	3,192.40	8,740.00	0.00	5,547.60
361.000 SUN COMMUNITIES INC 866674104	135.68	28,887.22	48,980.48	0.02	20,093.26
923.000 SYNOPSYS INC 871607107	195.00	23,407.28	179,985.00	0.09	156,577.72
2,070.000 SYNOVUS FINANCIAL CORP 87161C501	20.53	36,012.65	42,497.10	0.02	6,484.45
315.000 SYNNEX CORP 87162W100	119.77	17,818.61	37,727.55	0.02	19,908.94
5,516.000 SYNCHRONY FINANCIAL 87165B103	22.16	97,279.66	122,234.56	0.06	24,954.90
3,169.000 SYSCO CORP 871829107	54.66	137,923.02	173,217.54	0.09	35,294.52
1,433.000 TCF FINANCIAL CORP 872307103	29.42	28,278.98	42,158.86	0.02	13,879.88

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1,959.000 TD AMERITRADE HOLDING CORP 87236Y108	36.38	49,429.26	71,268.42	0.04	21,839.16
519.000 TFS FINANCIAL CORP 87240R107	14.31	4,899.36	7,426.89	0.00	2,527.53
6,794.000 TJX COS INC/THE 872540109	50.56	125,854.37	343,504.64	0.17	217,650.27
3,591.000 T-MOBILE US INC 872590104	104.15	121,670.78	374,002.65	0.19	252,331.87
3,591.000 T-MOBILE US INC 872590112 RTS	0.17	17,236.80	603.29	0.00	-16,633.51
6,065.000 TPG RE FINANCE TRUST INC 87266M107	8.60	30,360.32	52,159.00	0.03	21,798.68
462.000 TAKE-TWO INTERACTIVE SOFTWARE 874054109	139.57	6,842.22	64,481.34	0.03	57,639.12
8,710.000 TALOS ENERGY INC 87484T108	9.20	56,244.99	80,132.00	0.04	23,887.01
3,264.000 TARGET CORP 87612E106	119.93	288,239.67	391,451.52	0.19	103,211.85
2,166.000 TEGNA INC 87901J105	11.14	14,843.68	24,129.24	0.01	9,285.56

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618.000 TELADOC HEALTH INC 87918A105	190.84	28,353.84	117,939.12	0.06	89,585.28
229.000 TELEDYNE TECHNOLOGIES INC 879360105	310.95	14,788.97	71,207.55	0.04	56,418.58
269.000 TELEFLEX INC 879369106	363.98	14,883.77	97,910.62	0.05	83,026.85
2,070.000 TENET HEALTHCARE CORP 88033G407	18.11	33,011.15	37,487.70	0.02	4,476.55
8.000 TENNANT CO 880345103	65.01	306.32	520.08	0.00	213.76
1,681.000 TERADATA CORP 88076W103	20.80	33,364.44	34,964.80	0.02	1,600.36
1,238.000 TERADYNE INC 880770102	84.51	17,109.16	104,623.38	0.05	87,514.22
1,110.000 TERRENO REALTY CORP 88146M101	52.64	25,241.40	58,430.40	0.03	33,189.00
790.000 TESLA INC 88160R101	1,079.81	398,471.20	853,049.90	0.42	454,578.70
392.000 TETRA TECH INC 88162G103	79.12	8,874.88	31,015.04	0.02	22,140.16

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1,306.000 TEXAS CAPITAL BANCSHARES INC 88224Q107	30.87	33,836.93	40,316.22	0.02	6,479.29
7,220.000 TEXAS INSTRUMENTS INC 882508104	126.97	302,909.35	916,723.40	0.45	613,814.05
787.000 TEXAS ROADHOUSE INC 882681109	52.57	33,235.01	41,372.59	0.02	8,137.58
1,748.000 TEXTRON INC 883203101	32.91	31,848.56	57,526.68	0.03	25,678.12
357.000 TRADE DESK INC/THE 88339J105	406.50	61,003.62	145,120.50	0.07	84,116.88
2,738.000 THERMO FISHER SCIENTIFIC INC 883556102	362.34	134,442.51	992,086.92	0.49	857,644.41
237.000 THOR INDUSTRIES INC 885160101	106.53	7,245.09	25,247.61	0.01	18,002.52
4,356.000 3M CO 88579Y101	155.99	378,196.50	679,492.44	0.34	301,295.94
804.000 TIFFANY & CO 886547108	121.94	26,927.00	98,039.76	0.05	71,112.76
1,306.000 TOLL BROTHERS INC 889478103	32.59	28,007.74	42,562.54	0.02	14,554.80

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130.000 TOMPKINS FINANCIAL CORP 890110109	64.77	5,062.20	8,420.10	0.00	3,357.90
326.000 TOPBUILD CORP 89055F103	113.77	5,457.70	37,089.02	0.02	31,631.32
1,624.000 TORO CO/THE 891092108	66.34	20,056.40	107,736.16	0.05	87,679.76
395.000 TOWNE BANK/PORTSMOUTH VA 89214P109	18.84	5,100.49	7,441.80	0.00	2,341.31
804.000 TRACTOR SUPPLY CO 892356106	131.79	26,097.84	105,959.16	0.05	79,861.32
350.000 TRANSDIGM GROUP INC 893641100	442.05	115,835.66	154,717.50	0.08	38,881.84
761.000 TRANSUNION 89400J107	87.04	54,491.41	66,237.44	0.03	11,746.03
2,233.000 TRAVELERS COS INC/THE 89417E109	114.05	122,996.43	254,673.65	0.13	131,677.22
449.000 TREX CO INC 89531P105	130.07	36,752.49	58,401.43	0.03	21,648.94
422.000 TRICO BANCSHARES 896095106	30.45	6,055.70	12,849.90	0.01	6,794.20

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1,544.000 TRIMBLE INC 896239100	43.19	28,618.04	66,685.36	0.03	38,067.32
1,700.000 TRINITY INDUSTRIES INC 896522109	21.29	12,223.01	36,193.00	0.02	23,969.99
10,530.000 TRUIST FINANCIAL CORP 89832Q109	37.55	288,079.58	395,401.50	0.20	107,321.92
934.000 TWILIO INC 90138F102	219.42	74,639.88	204,938.28	0.10	130,298.40
5,209.000 TWITTER INC 90184L102	29.79	106,242.94	155,176.11	0.08	48,933.17
1,326.000 II-VI INC 902104108	47.22	29,846.63	62,613.72	0.03	32,767.09
191.000 TYLER TECHNOLOGIES INC 902252105	346.88	31,883.63	66,254.08	0.03	34,370.45
2,472.000 TYSON FOODS INC 902494103	59.71	40,278.10	147,603.12	0.07	107,325.02
2,063.000 UDR INC 902653104	37.38	57,699.20	77,114.94	0.04	19,415.74
2,214.000 UGI CORP 902681105	31.80	56,267.28	70,405.20	0.03	14,137.92

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753.000 UFP INDUSTRIES INC 90278Q108	49.51	9,814.10	37,281.03	0.02	27,466.93
3,501.000 US BANCORP 902973304	36.82	110,160.30	128,906.82	0.06	18,746.52
5,804.000 UBER TECHNOLOGIES INC 90353T100	31.08	162,478.69	180,388.32	0.09	17,909.63
277.000 ULTA BEAUTY INC 90384S303	203.42	17,403.91	56,347.34	0.03	38,943.43
671.000 ULTRAGENYX PHARMACEUTICAL INC 90400D108	78.22	38,340.40	52,485.62	0.03	14,145.22
4,630.000 UNDER ARMOUR INC 904311107	9.74	36,188.45	45,096.20	0.02	8,907.75
4,992.000 UNION PACIFIC CORP 907818108	169.07	225,136.29	843,997.44	0.42	618,861.15
773.000 UNITED COMMUNITY BANKS INC/GA 90984P303	20.12	5,094.07	15,552.76	0.01	10,458.69
1,089.000 UNITED BANKSHARES INC/WV 909907107	27.66	16,376.94	30,121.74	0.01	13,744.80
1,096.000 UNITED AIRLINES HOLDINGS INC 910047109	34.61	22,765.81	37,932.56	0.02	15,166.75

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277.000 UNITED FIRE GROUP INC 910340108	27.71	4,855.81	7,675.67	0.00	2,819.86
3,130.000 UNITED PARCEL SERVICE INC 911312106	111.18	237,541.45	347,993.40	0.17	110,451.95
877.000 UNITED RENTALS INC 911363109	149.04	29,665.30	130,708.08	0.06	101,042.78
1,986.000 US FOODS HOLDING CORP 912008109	19.72	36,001.25	39,163.92	0.02	3,162.67
5,379.000 UNITED STATES STEEL CORP 912909108	7.22	32,252.10	38,836.38	0.02	6,584.28
577.000 UNITED THERAPEUTICS CORP 91307C102	121.00	30,322.24	69,817.00	0.03	39,494.76
6,299.000 UNITEDHEALTH GROUP INC 91324P102	294.95	450,314.10	1,857,890.05	0.92	1,407,575.95
723.000 UNITIL CORP 913259107	44.82	19,860.65	32,404.86	0.02	12,544.21
2,954.000 UNIVAR SOLUTIONS INC 91336L107	16.86	35,535.42	49,804.44	0.02	14,269.02
1,213.000 UNIVERSAL CORP/VA 913456109	42.51	51,102.62	51,564.63	0.03	462.01

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413.000 UNIVERSAL DISPLAY CORP 91347P105	149.62	25,399.50	61,793.06	0.03	36,393.56
322.000 UNIVERSAL ELECTRONICS INC 913483103	46.82	5,255.04	15,076.04	0.01	9,821.00
546.000 UNIVERSAL HEALTH REALTY INCOME 91359E105	79.49	32,901.96	43,401.54	0.02	10,499.58
380.000 UNIVERSAL HEALTH SERVICES INC 913903100	92.89	18,338.12	35,298.20	0.02	16,960.08
4,075.000 URBAN EDGE PROPERTIES 91704F104	11.87	38,574.87	48,370.25	0.02	9,795.38
1,232.000 VF CORP 918204108	60.94	42,717.44	75,078.08	0.04	32,360.64
6.000 VSE CORP 918284100	31.39	66.60	188.34	0.00	121.74
226.000 VAIL RESORTS INC 91879Q109	182.15	9,991.46	41,165.90	0.02	31,174.44
4,566.000 VALERO ENERGY CORP 91913Y100	58.82	143,204.65	268,572.12	0.13	125,367.47
241.000 VALMONT INDUSTRIES INC 920253101	113.62	20,325.94	27,382.42	0.01	7,056.48

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1,737.000 VALVOLINE INC 92047W101	19.33	18,500.82	33,576.21	0.02	15,075.39
423.000 VAREX IMAGING CORP 92214X106	15.15	6,104.89	6,408.45	0.00	303.56
1,059.000 VARIAN MEDICAL SYSTEMS INC 92220P105	122.52	45,253.25	129,748.68	0.06	84,495.43
3,568.000 VECTOR GROUP LTD 92240M108	10.06	37,629.56	35,894.08	0.02	-1,735.48
729.000 VEEVA SYSTEMS INC 922475108	234.42	24,530.85	170,892.18	0.08	146,361.33
3,158.000 VENTAS INC 92276F100	36.62	102,434.73	115,645.96	0.06	13,211.23
1,238.000 VERISIGN INC 92343E102	206.83	29,146.48	256,055.54	0.13	226,909.06
24,164.000 VERIZON COMMUNICATIONS INC 92343V104	55.13	950,145.80	1,332,161.32	0.66	382,015.52
1,120.000 VERISK ANALYTICS INC 92345Y106	170.20	52,152.76	190,624.00	0.09	138,471.24
2,317.000 VERTEX PHARMACEUTICALS INC 92532F100	290.31	231,778.33	672,648.27	0.33	440,869.94

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5,297.000 VIACOMCBS INC 92556H206	23.32	90,306.72	123,526.04	0.06	33,219.32
2,307.000 VICI PROPERTIES INC 925652109	20.19	37,952.12	46,578.33	0.02	8,626.21
11,861.000 VISA INC 92826C839	193.17	597,007.14	2,291,189.37	1.14	1,694,182.23
2,019.000 VISHAY INTERTECHNOLOGY INC 928298108	15.27	19,059.36	30,830.13	0.02	11,770.77
371.000 VISHAY PRECISION GROUP INC 92835K103	24.58	4,960.27	9,119.18	0.00	4,158.91
2,084.000 VISTRA CORP 92840M102	18.62	35,851.68	38,804.08	0.02	2,952.40
332.000 VLASIC FOODS INTL INC COM 928559103	0.00	3,527.39	0.00	0.00	-3,527.39
861.000 VMWARE INC 928563402	154.86	71,899.05	133,334.46	0.07	61,435.41
7,229.000 VONAGE HOLDINGS CORP 92886T201	10.06	13,662.81	72,723.74	0.04	59,060.93
885.000 VOYA FINANCIAL INC 929089100	46.65	37,054.95	41,285.25	0.02	4,230.30

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903.000 VULCAN MATERIALS CO 929160109	115.85	46,994.80	104,612.55	0.05	57,617.75
18,213.000 W&T OFFSHORE INC 92922P106	2.28	28,144.08	41,525.64	0.02	13,381.56
90.000 WD-40 CO 929236107	198.30	4,888.80	17,847.00	0.01	12,958.20
587.000 WSFS FINANCIAL CORP 929328102	28.70	9,817.89	16,846.90	0.01	7,029.01
2,100.000 WEC ENERGY GROUP INC 92939U106	87.65	82,721.90	184,065.00	0.09	101,343.10
1,257.000 WESTINGHOUSE AIR BRAKE TECHNOL 929740108	57.57	67,770.72	72,365.49	0.04	4,594.77
9,348.000 WALMART INC 931142103	119.78	584,180.49	1,119,703.44	0.55	535,522.95
4,224.000 WALGREENS BOOTS ALLIANCE INC 931427108	42.39	169,121.09	179,055.36	0.09	9,934.27
571.000 WASHINGTON FEDERAL INC 938824109	26.84	9,889.72	15,325.64	0.01	5,435.92
218.000 WASHINGTON TRUST BANCORP INC 940610108	32.75	4,848.32	7,139.50	0.00	2,291.18

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1,776.000 WASTE MANAGEMENT INC 94106L109	105.91	79,989.36	188,096.16	0.09	108,106.80
189.000 WATTS WATER TECHNOLOGIES INC 942749102	81.00	6,261.57	15,309.00	0.01	9,047.43
439.000 WAYFAIR INC 94419L101	197.61	37,900.63	86,750.79	0.04	48,850.16
721.000 WEBSTER FINANCIAL CORP 947890109	28.61	14,170.57	20,627.81	0.01	6,457.24
2,158.000 WEINGARTEN REALTY INVESTORS 948741103	18.93	38,126.07	40,850.94	0.02	2,724.87
17,330.000 WELLS FARGO & CO 949746101	25.60	577,342.87	443,648.00	0.22	-133,694.87
3,257.000 WELLTOWER INC 95040Q104	51.75	132,006.52	168,549.75	0.08	36,543.23
3,177.000 WENDY'S CO/THE 95058W100	21.78	14,804.82	69,195.06	0.03	54,390.24
261.000 WESBANCO INC 950810101	20.31	4,909.41	5,300.91	0.00	391.50
697.000 WEST PHARMACEUTICAL SERVICES I 955306105	227.17	69,052.64	158,337.49	0.08	89,284.85

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729.000 WESTERN ALLIANCE BANCORP 957638109	37.87	4,891.59	27,607.23	0.01	22,715.64
2,116.000 WESTERN DIGITAL CORP 958102105	44.15	59,450.09	93,421.40	0.05	33,971.31
636.000 WESTLAKE CHEMICAL CORP 960413102	53.65	25,331.88	34,121.40	0.02	8,789.52
633.000 WEX INC 96208T104	165.01	50,356.24	104,451.33	0.05	54,095.09
5,538.000 WEYERHAEUSER CO 962166104	22.46	89,691.65	124,383.48	0.06	34,691.83
709.000 WHIRLPOOL CORP 963320106	129.53	66,493.86	91,836.77	0.05	25,342.91
6,738.000 WILLIAMS COS INC/THE 969457100	19.02	115,633.80	128,156.76	0.06	12,522.96
615.000 WILLIAMS-SONOMA INC 969904101	82.01	21,863.25	50,436.15	0.02	28,572.90
221.000 WINTRUST FINANCIAL CORP 97650W108	43.62	6,917.30	9,640.02	0.00	2,722.72
13,580.000 WISDOMTREE INVESTMENTS INC 97717P104	3.47	36,551.50	47,122.60	0.02	10,571.10

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387.000 WOODWARD INC 980745103	77.55	12,527.19	30,011.85	0.01	17,484.66
976.000 WORKDAY INC 98138H101	187.36	88,352.23	182,863.36	0.09	94,511.13
11,614.000 WORKHORSE GROUP INC 98138J206	17.39	115,041.67	201,967.46	0.10	86,925.79
361.000 WORTHINGTON INDUSTRIES INC 981811102	37.30	7,104.48	13,465.30	0.01	6,360.82
1,099.000 WYNDHAM DESTINATIONS INC 98310W108	28.18	17,687.02	30,969.82	0.02	13,282.80
1,099.000 WYNDHAM HOTELS & RESORTS INC 98311A105	42.62	21,514.36	46,839.38	0.02	25,325.02
1,214.000 XPO LOGISTICS INC 983793100	77.25	36,038.90	93,781.50	0.05	57,742.60
2,314.000 XILINX INC 983919101	98.39	76,724.59	227,674.46	0.11	150,949.87
1,134.000 XYLEM INC/NY 98419M100	64.96	31,196.40	73,664.64	0.04	42,468.24
293.000 YORK WATER CO/THE 987184108	47.96	5,051.32	14,052.28	0.01	9,000.96

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746.000 YUM! BRANDS INC 988498101	86.91	13,951.98	64,834.86	0.03	50,882.88
2,241.000 YUM CHINA HOLDINGS INC 98850P109	48.07	42,538.66	107,724.87	0.05	65,186.21
552.000 ZEBRA TECHNOLOGIES CORP 989207105	255.95	16,526.88	141,284.40	0.07	124,757.52
538.000 ZENDESK INC 98936J101	88.53	28,863.70	47,629.14	0.02	18,765.44
1,271.000 ZILLOW GROUP INC 98954M200	57.61	37,310.30	73,222.31	0.04	35,912.01
1,583.000 ZIMMER BIOMET HOLDINGS INC 98956P102	119.36	127,843.51	188,946.88	0.09	61,103.37
1,913.000 ZIONS BANCORP NA 989701107	34.00	29,670.63	65,042.00	0.03	35,371.37
3,484.000 ZOGENIX INC 98978L204	27.01	88,759.90	94,102.84	0.05	5,342.94
2,294.000 ZOETIS INC 98978V103	137.04	156,999.37	314,369.76	0.16	157,370.39
575.000 ZSCALER INC 98980G102	109.50	38,005.14	62,962.50	0.03	24,957.36

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1,224.000 ZOOM VIDEO COMMUNICATIONS INC 98980L101	253.54	314,334.32	310,332.96	0.15	-4,001.36
6,370.000 ZYNGA INC 98986T108	9.54	38,766.45	60,769.80	0.03	22,003.35
817.000 ALLEGION PLC G0176J109	102.22	17,401.98	83,513.74	0.04	66,111.76
5,038.000 AMCOR PLC G0250X107	10.21	32,695.14	51,437.98	0.03	18,742.84
1,134.000 AMDOCS LTD G02602103	60.88	34,523.32	69,037.92	0.03	34,514.60
688.000 AMBARELLA INC G037AX101	45.80	32,542.40	31,510.40	0.02	-1,032.00
1,742.000 AON PLC G0403H108	192.60	85,375.42	335,509.20	0.17	250,133.78
4,833.000 ARCH CAPITAL GROUP LTD G0450A105	28.65	40,345.59	138,465.45	0.07	98,119.86
261.000 ARGO GROUP INTERNATIONAL HOLDI G0464B107	34.83	4,844.35	9,090.63	0.00	4,246.28
1,804.000 ASSURED GUARANTY LTD G0585R106	24.41	24,191.64	44,035.64	0.02	19,844.00

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813.000 ATLASSIAN CORP PLC G06242104	180.27	80,340.01	146,559.51	0.07	66,219.50
1,380.000 ATHENE HOLDING LTD G0684D107	31.19	36,319.70	43,042.20	0.02	6,722.50
814.000 AXIS CAPITAL HOLDINGS LTD G0692U109	40.56	25,022.36	33,015.84	0.02	7,993.48
4,855.000 ACCENTURE PLC G1151C101	214.72	374,725.84	1,042,465.60	0.52	667,739.76
1,075.000 BUNGE LTD G16962105	41.13	37,785.87	44,214.75	0.02	6,428.88
253.000 CIMPRESS PLC G2143T103	76.34	8,574.17	19,314.02	0.01	10,739.85
2,960.000 EATON CORP PLC G29183103	87.48	161,906.01	258,940.80	0.13	97,034.79
50.000 ENSTAR GROUP LTD G3075P101	152.77	5,024.00	7,638.50	0.00	2,614.50
211.000 EVEREST RE GROUP LTD G3223R108	206.20	35,950.94	43,508.20	0.02	7,557.26
2,529.000 FRUIT OF THE LOOM INC CL A G3682L105	0.00	21,459.36	0.00	0.00	-21,459.36

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PARAMETRIC US PI2 - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
25.000 HELEN OF TROY LTD G4388N106	188.56	809.75	4,714.00	0.00	3,904.25
1,732.000 HERBALIFE NUTRITION LTD G4412G101	44.98	20,641.11	77,905.36	0.04	57,264.25
2,009.000 JANUS HENDERSON GROUP PLC G4474Y214	21.16	38,628.02	42,510.44	0.02	3,882.42
2,192.000 HORIZON THERAPEUTICS PLC G46188101	55.58	5,282.72	121,831.36	0.06	116,548.64
2,453.000 IHS MARKIT LTD G47567105	75.50	113,760.78	185,201.50	0.09	71,440.72
307.000 JAZZ PHARMACEUTICALS PLC G50871105	110.34	33,171.35	33,874.38	0.02	703.03
3,623.000 JOHNSON CONTROLS INTERNATIONAL G51502105	34.14	93,356.26	123,689.22	0.06	30,332.96
2,762.000 LINDE PLC G5494J103	212.11	262,436.47	585,847.82	0.29	323,411.35
3,678.000 MARVELL TECHNOLOGY GROUP LTD G5876H105	35.06	55,531.58	128,950.68	0.06	73,419.10
7,101.000 MEDTRONIC PLC G5960L103	91.70	555,198.92	651,161.70	0.32	95,962.78

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PARAMETRIC US PI2 - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,999.000 APTIV PLC G6095L109	77.92	75,607.84	155,762.08	0.08	80,154.24
3,144.000 NORWEGIAN CRUISE LINE HOLDINGS G66721104	16.43	38,020.05	51,655.92	0.03	13,635.87
930.000 NOVOCURE LTD G6674U108	59.30	28,941.60	55,149.00	0.03	26,207.40
1,475.000 NVENT ELECTRIC PLC G6700G107	18.73	18,185.50	27,626.75	0.01	9,441.25
353.000 RENAISSANCERE HOLDINGS LTD G7496G103	171.03	20,092.76	60,373.59	0.03	40,280.83
1,475.000 PENTAIR PLC G7S00T104	37.99	37,002.19	56,035.25	0.03	19,033.06
1,083.000 SENSATA TECHNOLOGIES HOLDING P G8060N102	37.23	36,355.89	40,320.09	0.02	3,964.20
312.000 STERIS PLC G8473T100	153.44	49,029.24	47,873.28	0.02	-1,155.96
2,452.000 TRANE TECHNOLOGIES PLC G8994E103	88.98	53,221.35	218,178.96	0.11	164,957.61
1,181.000 TRITON INTERNATIONAL LTD/BERMU G9078F107	30.24	35,687.49	35,713.44	0.02	25.95

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
43.000 WHITE MOUNTAINS INSURANCE GROU G9618E107	887.97	17,329.43	38,182.71	0.02	20,853.28
548.000 WILLIS TOWERS WATSON PLC G96629103	196.95	111,244.00	107,928.60	0.05	-3,315.40
3,596.000 CHUBB LTD H1467J104	126.62	265,962.64	455,325.52	0.23	189,362.88
465.000 GARMIN LTD H2906T109	97.50	38,157.90	45,337.50	0.02	7,179.60
727.000 SPOTIFY TECHNOLOGY SA L8681T102	258.19	127,254.08	187,704.13	0.09	60,450.05
2,471.000 LYONDELLBASELL INDUSTRIES NV N53745100	65.72	126,560.49	162,394.12	0.08	35,833.63
2,224.000 MYLAN NV N59465109	16.08	36,038.69	35,761.92	0.02	-276.77
1,682.000 QIAGEN NV N72482123	42.81	43,799.77	72,006.42	0.04	28,206.65
872.000 ROYAL CARIBBEAN CRUISES LTD V7780T103	50.30	36,763.52	43,861.60	0.02	7,098.08
TOTAL EQUITY U.S. DOLLAR		**86,658,612.76**	**201,290,023.99**	**99.76**	**114,631,411.23**
TOTAL ASSETS U.S. DOLLAR		**87,144,771.74**	**201,776,182.97**	**100.00**	**114,631,411.23**

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
TOTAL ASSETS		**87,145,309.35**	**201,776,724.31**	**100.00**	**114,631,414.96**

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
217.540 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	217.54	217.54	4,439.59	0.00
CASH		-212.64	-212.64	-4,339.59	0.00
TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**4.90**	**4.90**	**100.00**	**0.00**
TOTAL ASSETS U.S. DOLLAR		**4.90**	**4.90**	**100.00**	**0.00**
TOTAL ASSETS		**4.90**	**4.90**	**100.00**	**0.00**

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PARAMETRIC EAFE PI2 - [redacted]

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
AUSTRALIAN DOLLAR						
CASH & CASH EQUIVALENTS						
	DIVIDENDS RECEIVABLE		12,271.77	12,687.46	0.02	415.69
	NON-BASE CURRENCY		274.47	275.40	0.00	0.93
	FOREIGN TAXES PAYABLE - DIVIDENDS		-1,118.44	-1,136.81	-0.00	-18.37
	TOTAL CASH & CASH EQUIVALENTS AUSTRALIAN DOLLAR		**11,427.80**	**11,826.05**	**0.02**	**398.25**
EQUITY						
1,310.000 AA6041997	RAMSAY HEALTH CARE LTD	45.80	49,902.43	59,996.72	0.09	10,094.29
6,751.000 AA6065582	AUSTRALIA & NEW ZEALAND BANKIN	12.83	78,888.77	86,639.90	0.13	7,751.13
10,253.000 AA6076142	WESTPAC BANKING CORP	12.36	128,121.90	126,712.47	0.19	-1,409.43
14,892.000 AA6086257	FORTESCUE METALS GROUP LTD	9.54	40,415.64	142,006.02	0.21	101,590.38
40,326.000 AA6087289	TELSTRA CORP LTD	2.16	82,413.81	86,902.73	0.13	4,488.92

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
11,800.000 BENDIGO & ADELAIDE BANK LTD AA6091281	4.83	47,593.15	56,951.34	0.08	9,358.19
972.000 ASX LTD AA6129222	58.78	34,193.90	57,138.17	0.09	22,944.27
14,789.000 BHP GROUP LTD AA6144692	24.66	307,752.09	364,727.35	0.54	56,975.26
26,515.000 MIRVAC GROUP AA6161977	1.49	37,592.55	39,614.60	0.06	2,022.05
4,046.000 COMPUTERSHARE LTD AA6180415	9.12	30,262.17	36,910.14	0.05	6,647.97
2,360.000 CSL LTD AA6185497	197.60	87,087.76	466,334.82	0.69	379,247.06
818.000 REA GROUP LTD AA6198573	74.28	29,597.06	60,757.26	0.09	31,160.20
15,494.000 TRANSURBAN GROUP AA6200882	9.73	101,150.88	150,733.46	0.22	49,582.58
364.000 COCHLEAR LTD AA6211798	130.08	28,652.65	47,348.50	0.07	18,695.85
17,197.000 ORIGIN ENERGY LTD AA6214867	4.02	58,603.94	69,146.39	0.10	10,542.45

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6,846.000	COMMONWEALTH BANK OF AUSTRALIA AA6215039	47.80	324,545.98	327,209.16	0.49	2,663.18
22,370.000	BORAL LTD AA6218678	2.61	40,255.64	58,372.61	0.09	18,116.97
2,282.000	RIO TINTO LTD AA6220104	67.45	109,616.17	153,910.54	0.23	44,294.37
7,036.000	APA GROUP AA6247305	7.66	43,866.67	53,916.90	0.08	10,050.23
3,721.000	ARISTOCRAT LEISURE LTD AA6253980	17.56	41,402.46	65,328.67	0.10	23,926.21
8,357.000	INSURANCE AUSTRALIA GROUP LTD AA6271024	3.97	30,923.79	33,199.39	0.05	2,275.60
12,439.000	GPT GROUP/THE AA6365867	2.87	31,270.58	35,712.93	0.05	4,442.35
4,004.000	LENDLEASE CORP LTD AA6512005	8.52	29,397.81	34,101.05	0.05	4,703.24
13,200.000	SUNCORP GROUP LTD AA6585084	6.35	76,982.00	83,884.09	0.12	6,902.09
8,446.000	NATIONAL AUSTRALIA BANK LTD AA6624602	12.54	105,707.57	105,950.59	0.16	243.02

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
4,200.000 NEWCREST MINING LTD AA6637109	21.71	47,872.54	91,175.30	0.14	43,302.76
19,453.000 INCITEC PIVOT LTD AA6673047	1.29	25,420.96	25,112.61	0.04	-308.35
33,648.000 AMP LTD AA6709957	1.28	31,046.05	42,974.13	0.06	11,928.08
13,362.000 QANTAS AIRWAYS LTD AA6710344	2.60	29,728.87	34,775.01	0.05	5,046.14
13,112.000 SANTOS LTD AA6776709	3.65	37,626.60	47,846.34	0.07	10,219.74
2,712.000 SONIC HEALTHCARE LTD AA6821125	20.95	38,308.93	56,819.26	0.08	18,510.33
4,626.000 WESFARMERS LTD AA6948837	30.87	113,758.92	142,783.59	0.21	29,024.67
37,300.000 ALUMINA LTD AA6954983	1.12	34,918.42	41,731.71	0.06	6,813.29
3,499.000 WOODSIDE PETROLEUM LTD AA6979725	14.91	41,965.46	52,156.18	0.08	10,190.72
5,127.000 WOOLWORTHS GROUP LTD AA6981234	25.67	108,615.29	131,596.14	0.20	22,980.85

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
7,607.000	DEXUS AAB033YN9	6.33	38,281.30	48,184.26	0.07	9,902.96
11,102.000	GOODMAN GROUP AAB03FYZ5	10.22	41,718.81	113,509.35	0.17	71,790.54
7,347.000	BRAMBLES LTD AAB1FJ0C0	7.48	51,666.33	54,984.91	0.08	3,318.58
2,317.000	MACQUARIE GROUP LTD AAB28YTC2	81.66	112,309.52	189,197.18	0.28	76,887.66
5,029.000	CROWN RESORTS LTD AAB29LCJ2	6.66	30,736.65	33,482.05	0.05	2,745.40
2,741.000	JAMES HARDIE INDUSTRIES PLC AAB60QWJ9	18.95	18,081.23	51,935.15	0.08	33,853.92
3,760.000	TREASURY WINE ESTATES LTD AAB61JC64	7.22	20,195.12	27,130.20	0.04	6,935.08
8,473.000	SYDNEY AIRPORT AAB70DWB3	3.90	30,217.72	33,076.86	0.05	2,859.14
12,851.000	AURIZON HOLDINGS LTD AAB87CVM3	3.39	36,989.33	43,531.73	0.06	6,542.40
933.000	AFTERPAY LTD AABF5L8B9	41.99	36,108.62	39,178.18	0.06	3,069.56

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
288.000 ONEMARKET LTD AABFM70D5	0.67	331.98	192.34	0.00	-139.64
39,318.000 SCENTRE GROUP AABLZH0Z7	1.49	53,874.91	58,742.86	0.09	4,867.95
1,765.000 AMPOL LTD AABM91204	20.19	28,321.27	35,629.74	0.05	7,308.47
17,676.000 MEDIBANK PVT LTD AABRTNNQ3	2.06	29,935.30	36,388.08	0.05	6,452.78
4,046.000 AGL ENERGY LTD AABSS7GP7	11.74	42,276.56	47,495.69	0.07	5,219.13
25,144.000 SOUTH32 LTD AABWSW5D2	1.40	30,439.26	35,315.75	0.05	4,876.49
2,000.000 CIMIC GROUP LTD AABX17Q17	16.61	30,140.60	33,213.24	0.05	3,072.64
6,141.000 COLES GROUP LTD AABYWR0T4	11.82	63,268.25	72,596.11	0.11	9,327.86
TOTAL EQUITY AUSTRALIAN DOLLAR		**3,180,352.17**	**4,424,259.75**	**6.59**	**1,243,907.58**
TOTAL ASSETS AUSTRALIAN DOLLAR		**3,191,779.97**	**4,436,085.80**	**6.60**	**1,244,305.83**

DANISH KRONE
CASH & CASH EQUIVALENTS

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Shares/Par	Security ID	Description	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
		DIVIDENDS RECEIVABLE RECLAIM		13,249.55	13,124.53	0.02	-125.02
		NON-BASE CURRENCY		463.74	464.48	0.00	0.74
		TOTAL CASH & CASH EQUIVALENTS DANISH KRONE		**13,713.29**	**13,589.01**	**0.02**	**-124.28**
EQUITY							
332.000	SD4169217	CARLSBERG AS	132.10	39,768.83	43,856.75	0.07	4,087.92
33.000	SD4253045	AP MOLLER - MAERSK A/S	1,164.57	28,996.81	38,430.67	0.06	9,433.86
3,856.000	SD4588820	DANSKE BANK A/S	13.30	51,814.62	51,297.51	0.08	-517.11
298.000	SD4595734	GENMAB A/S	334.54	43,241.04	99,693.34	0.15	56,452.30
831.000	SD5964657	VESTAS WIND SYSTEMS A/S	101.78	32,325.13	84,578.30	0.13	52,253.17
1,000.000	SDB1WT5G0	DSV PANALPINA A/S	122.03	18,674.67	122,032.26	0.18	103,357.59
750.000	SDB44XTX3	PANDORA A/S	54.30	23,588.65	40,721.37	0.06	17,132.72

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
562.000 CHR HANSEN HOLDING A/S SDB573M10	103.07	41,542.12	57,928.10	0.09	16,385.98
1,000.000 NOVOZYMES A/S SDB798FW3	57.79	26,215.68	57,791.27	0.09	31,575.59
750.000 COLOPLAST A/S SDB8FMRX8	154.91	21,318.35	116,185.32	0.17	94,866.97
1,020.000 AMBU A/S SDBD9G339	31.40	34,373.04	32,032.79	0.05	-2,340.25
9,207.000 NOVO NORDISK A/S SDBHC8X98	64.71	161,651.12	595,767.87	0.89	434,116.75
2,093.000 ISS A/S SDBKJ9RT5	15.82	28,002.27	33,117.34	0.05	5,115.07
1,000.000 ORSTED A/S SDBYT16L1	115.34	34,832.99	115,341.44	0.17	80,508.45
TOTAL EQUITY DANISH KRONE		**586,345.32**	**1,488,774.33**	**2.22**	**902,429.01**
TOTAL ASSETS DANISH KRONE		**600,058.61**	**1,502,363.34**	**2.24**	**902,304.73**
EURO CURRENCY UNIT					
CASH & CASH EQUIVALENTS					
DIVIDENDS RECEIVABLE		31,946.05	31,826.08	0.05	-119.97

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
	DIVIDENDS RECEIVABLE RECLAIM		103,711.99	101,172.80	0.15	-2,539.19
	NON-BASE CURRENCY		32,936.07	32,528.92	0.05	-407.15
	FOREIGN TAXES PAYABLE - DIVIDENDS		-4,801.31	-4,791.13	-0.01	10.18
	TOTAL CASH & CASH EQUIVALENTS EURO CURRENCY UNIT		**163,792.80**	**160,736.67**	**0.24**	**-3,056.13**
EQUITY						
1,530.000 EA4651454	OMV AG	33.42	40,865.67	51,140.16	0.08	10,274.49
2,485.000 EA4943406	VOESTALPINE AG	21.50	35,926.89	53,434.23	0.08	17,507.34
1,625.000 EA5289833	ERSTE GROUP BANK AG	23.53	42,240.39	38,236.24	0.06	-4,004.15
1,816.000 EAB0704T7	RAIFFEISEN BANK INTERNATIONAL	17.81	31,271.10	32,348.70	0.05	1,077.60
29.000 EABFZ5BQ0	IMMOFINANZ AG	17.07	0.00	495.08	0.00	495.08
1,883.000 EB4497740	KBC GROUP NV	57.35	95,733.52	107,986.36	0.16	12,252.84

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599.000 SOLVAY SA EB4821105	80.04	39,036.60	47,941.37	0.07	8,904.77
740.000 UCB SA EB5596995	115.80	44,386.41	85,689.61	0.13	41,303.20
487.000 GROUPE BRUXELLES LAMBERT SA EB7097323	83.88	33,337.68	40,848.02	0.06	7,510.34
1,110.000 AGEAS SA/NV EBB86S2N3	35.42	38,757.20	39,320.81	0.06	563.61
1,042.000 UMICORE SA EBBF44467	47.07	18,950.42	49,048.21	0.07	30,097.79
4,426.000 ANHEUSER-BUSCH INBEV SA/NV EBBYYHL24	49.27	216,454.46	218,055.63	0.32	1,601.17
1,014.000 ADIDAS AG ED4031974	262.37	56,943.99	266,040.99	0.40	209,097.00
1,818.000 FRESENIUS SE & CO KGAA ED4352099	49.55	55,195.34	90,088.04	0.13	34,892.70
1,176.000 UNITED INTERNET AG ED4354137	42.35	18,245.59	49,808.29	0.07	31,562.70
362.000 HANNOVER RUECK SE ED4511801	172.29	18,317.70	62,369.42	0.09	44,051.72

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,209.000 GEA GROUP AG ED4557101	31.62	29,215.90	38,224.56	0.06	9,008.66
617.000 CONTINENTAL AG ED4598584	97.89	45,464.08	60,400.45	0.09	14,936.37
6,169.000 DEUTSCHE POST AG ED4617855	36.56	129,869.39	225,529.59	0.34	95,660.20
843.000 MERCK KGAA ED4741846	116.02	56,174.15	97,806.04	0.15	41,631.89
3,208.000 RWE AG ED4768963	34.94	73,659.55	112,091.36	0.17	38,431.81
5,245.000 SAP SE ED4846280	139.63	336,523.95	732,359.39	1.09	395,835.44
5,279.000 E.ON SE ED4942907	11.25	51,243.25	59,380.03	0.09	8,136.78
295.000 HENKEL AG & CO KGAA ED5002461	83.28	15,490.14	24,568.06	0.04	9,077.92
434.000 PUMA SE ED5064727	77.30	23,163.89	33,546.11	0.05	10,382.22
4,845.000 BAYER AG ED5069213	73.89	326,681.54	358,006.93	0.53	31,325.39

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,944.000 BASF SE ED5086571	56.02	181,970.50	164,930.89	0.25	-17,039.61
708.000 BEIERSDORF AG ED5107401	113.55	56,480.02	80,393.73	0.12	23,913.71
1,271.000 FRESENIUS MEDICAL CARE AG & CO ED5129074	85.70	76,802.94	108,920.05	0.16	32,117.11
2,311.000 ALLIANZ SE ED5231482	204.14	309,235.10	471,776.19	0.70	162,541.09
847.000 MUENCHENER RUECKVERSICHERUNGS- ED5294126	259.90	139,614.18	220,132.68	0.33	80,518.50
190.000 VOLKSWAGEN AG ED5497109	160.95	18,425.63	30,580.01	0.05	12,154.38
2,539.000 DAIMLER AG ED5529026	40.60	81,284.31	103,073.90	0.15	21,789.59
4,580.000 THYSSENKRUPP AG ED5636920	7.09	24,297.59	32,479.39	0.05	8,181.80
3,853.000 SIEMENS AG ED5727976	117.66	375,036.71	453,348.58	0.67	78,311.87
9,055.000 DEUTSCHE BANK AG ED5750358	9.51	60,033.18	86,079.92	0.13	26,046.74

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,776.000	BAYERISCHE MOTOREN WERKE AG ED5756025	63.82	134,290.88	177,157.06	0.26	42,866.18
20,308.000	DEUTSCHE TELEKOM AG ED5842353	16.79	298,807.23	340,879.46	0.51	42,072.23
6,901.000	INFINEON TECHNOLOGIES AG ED5889503	23.45	67,747.68	161,799.17	0.24	94,051.49
293.000	CARL ZEISS MEDITEC AG ED5922965	97.49	24,834.80	28,564.40	0.04	3,729.60
645.000	DEUTSCHE BOERSE AG ED7021964	180.88	84,253.05	116,669.73	0.17	32,416.68
518.000	WIRECARD AG ED7508929	6.44	57,919.04	3,333.67	0.00	-54,585.37
2,175.000	DEUTSCHE WOHNEN SE EDB0YZ0Z4	44.87	47,816.87	97,591.91	0.15	49,775.04
725.000	SYMRISE AG EDB1JB4K1	116.25	62,677.53	84,278.37	0.13	21,600.84
1,037.000	BRENNTAG AG EDB4YVF55	52.53	39,496.72	54,473.33	0.08	14,976.61
2,056.000	EVONIK INDUSTRIES AG EDB5ZQ9D2	25.39	42,341.64	52,210.93	0.08	9,869.29

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
8,671.000 COMMERZBANK AG EDB90LKT5	4.46	30,598.24	38,633.96	0.06	8,035.72
572.000 KION GROUP AG EDBB22L93	61.55	24,498.33	35,205.81	0.05	10,707.48
2,749.000 VONOVIA SE EDBBJPFY6	61.30	96,443.87	168,517.90	0.25	72,074.03
329.000 KNORR-BREMSE AG EDBD2P9X9	101.34	28,765.26	33,341.46	0.05	4,576.20
995.000 SIEMENS HEALTHINEERS AG EDBD594Y5	47.90	35,466.85	47,662.84	0.07	12,195.99
2,812.000 METRO AG EDBD6QT86	9.45	23,812.81	26,580.23	0.04	2,767.42
5,218.000 AROUNDTOWN SA EDBF0CK46	5.73	27,896.06	29,877.32	0.04	1,981.26
692.000 TEAMVIEWER AG EDBJ7WGS9	54.59	35,298.94	37,772.88	0.06	2,473.94
720.000 ZALANDO SE EDBQV0SV6	70.51	30,716.57	50,768.18	0.08	20,051.61
2,213.000 QIAGEN NV EDBYXS699	43.06	52,790.21	95,295.26	0.14	42,505.05

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1,463.000 UNIPER SE EDBZ6CZ40	32.23	39,998.97	47,158.93	0.07	7,159.96
1,242.000 DELIVERY HERO SE EDBZCNB45	102.16	45,044.44	126,884.86	0.19	81,840.42
1,619.000 ENDESA SA EE5271783	24.63	32,258.74	39,877.07	0.06	7,618.33
8,166.000 BANKINTER SA EE5474007	4.77	31,214.59	38,933.62	0.06	7,719.03
28,332.000 BANCO BILBAO VIZCAYA ARGENTARI EE5501908	3.44	84,158.09	97,499.81	0.15	13,341.72
3,506.000 NATURGY ENERGY GROUP SA EE5650424	18.60	63,716.67	65,229.06	0.10	1,512.39
7,981.000 REPSOL SA EE5669358	8.74	63,780.47	69,792.62	0.10	6,012.15
44,612.000 BANCO SANTANDER SA EE5705947	2.44	122,178.76	108,955.42	0.16	-13,223.34
25,546.000 TELEFONICA SA EE5732529	4.77	125,451.62	121,854.88	0.18	-3,596.74
1,243.000 ENAGAS SA EE7383073	24.43	25,592.12	30,364.64	0.05	4,772.52

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1,708.000 SIEMENS GAMESA RENEWABLE ENERG EEB01CP25	17.72	23,473.02	30,271.41	0.05	6,798.39
1,350.000 ACS ACTIVIDADES DE CONSTRUCCIO EEB01FLQ9	25.20	29,728.35	34,024.71	0.05	4,296.36
3,186.000 FERROVIAL SA EEB038516	26.62	42,704.29	84,807.03	0.13	42,102.74
15,016.000 MAPFRE SA EEB1G40S5	1.78	25,433.65	26,714.50	0.04	1,280.85
66,515.000 BANCO DE SABADELL SA EEB1X8QN0	0.35	33,583.68	23,091.73	0.03	-10,491.95
15,830.000 CAIXABANK SA EEB283W91	2.13	34,741.41	33,789.88	0.05	-951.53
29,049.000 IBERDROLA SA EEB288C92	11.59	194,611.20	336,704.29	0.50	142,093.09
2,403.000 AMADEUS IT GROUP SA EEB3MSM24	52.09	69,199.82	125,176.35	0.19	55,976.53
9,521.000 INTERNATIONAL CONSOLIDATED AIR EEB5282K7	2.75	47,583.28	26,156.33	0.04	-21,426.95
1,860.000 RED ELECTRICA CORP SA EEBD6FXN0	18.65	24,956.17	34,688.82	0.05	9,732.65

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1,350.000 ACS ACTIVIDADES DE CONSTRUCCIO EEBLB2XX3 RTS	1.56	2,131.32	2,105.32	0.00	-26.00
7,981.000 REPSOL SA EEBMVLS21 RTS	0.49	4,216.16	3,884.04	0.01	-332.12
25,546.000 TELEFONICA SA EEBMX0BW7 RTS	0.20	5,447.11	5,023.96	0.01	-423.15
5,747.000 INDUSTRIA DE DISENO TEXTIL SA EEBP9DL99	26.47	89,872.61	152,138.29	0.23	62,265.68
306.000 AENA SME SA EEBVRZ8L5	133.32	30,299.72	40,795.28	0.06	10,495.56
672.000 CELLNEX TELECOM SA EEBX90C09	60.92	34,312.94	40,938.01	0.06	6,625.07
2,390.000 GRIFOLS SA EEBYY3DX0	30.36	16,018.71	72,557.40	0.11	56,538.69
1,253.000 BOUYGUES SA EF4002129	34.15	37,073.49	42,796.20	0.06	5,722.71
2,744.000 AIRBUS SE EF4012250	71.34	107,150.15	195,763.79	0.29	88,613.64
3,972.000 VEOLIA ENVIRONNEMENT SA EF4031870	22.49	71,153.01	89,312.26	0.13	18,159.25

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,298.000 L'OREAL SA EF4057800	320.88	180,974.78	416,507.37	0.62	235,532.59
1,390.000 LVMH MOET HENNESSY LOUIS VUITT EF4061414	438.59	241,187.12	609,640.20	0.91	368,453.08
449.000 THALES SA EF4162790	80.73	18,082.98	36,248.68	0.05	18,165.70
988.000 CAPGEMINI SE EF4163434	114.51	61,688.64	113,131.08	0.17	51,442.44
1,084.000 CASINO GUICHARD PERRACHON SA EF4178416	36.95	36,993.68	40,055.57	0.06	3,061.89
241.000 INGENICO GROUP SA EF4196897	159.49	27,045.55	38,436.44	0.06	11,390.89
905.000 FAURECIA SE EF4400448	39.05	32,270.53	35,341.99	0.05	3,071.46
1,016.000 CIE GENERALE DES ETABLISSEMENT EF4588366	103.71	80,749.45	105,371.06	0.16	24,621.61
1,084.000 PERNOD RICARD SA EF4682326	157.30	105,861.28	170,510.12	0.25	64,648.84
2,827.000 RENAULT SA EF4712792	25.36	52,610.88	71,694.78	0.11	19,083.90

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
268.000 REMY COINTREAU SA EF4741718	136.13	24,914.77	36,481.71	0.05	11,566.94
230.000 SEB SA EF4792133	165.22	25,576.65	37,999.53	0.06	12,422.88
2,879.000 SCHNEIDER ELECTRIC SE EF4834109	111.06	180,880.05	319,733.31	0.48	138,853.26
3,765.000 VIVENDI SA EF4834778	25.65	70,097.93	96,582.59	0.14	26,484.66
4,033.000 ORANGE SA EF5176179	11.96	43,099.03	48,218.28	0.07	5,119.25
159.000 HERMES INTERNATIONAL EF5253978	835.40	53,363.59	132,828.44	0.20	79,464.85
616.000 DASSAULT SYSTEMES SE EF5330040	172.52	18,588.80	106,269.76	0.16	87,680.96
445.000 KERING SA EF5505070	543.89	70,536.55	242,029.00	0.36	171,492.45
2,924.000 CNP ASSURANCES EF5543980	11.51	29,751.88	33,661.93	0.05	3,910.05
580.000 ATOS SE EF5654787	85.25	38,529.83	49,443.31	0.07	10,913.48

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
5,698.000 SANOFI EF5671732	101.81	447,857.73	580,133.59	0.86	132,275.86
1,211.000 ACCOR SA EF5852845	27.19	30,349.52	32,928.86	0.05	2,579.34
1,631.000 NOKIA OYJ EF5946456	4.35	11,796.39	7,092.04	0.01	-4,704.35
5,032.000 STMICROELECTRONICS NV EF5962339	27.18	52,354.71	136,770.92	0.20	84,416.21
5,510.000 SOCIETE GENERALE SA EF5966512	16.62	80,387.60	91,590.64	0.14	11,203.04
58.000 EUROFINS SCIENTIFIC SE EF5972643	627.39	28,868.62	36,388.71	0.05	7,520.09
165.000 TELEPERFORMANCE EF5999331	253.72	32,498.34	41,863.73	0.06	9,365.39
409.000 EURAZEO SE EF7042395	51.24	18,013.03	20,956.38	0.03	2,943.35
555.000 SODEXO SA EF7062716	67.61	34,591.62	37,525.56	0.06	2,933.94
9,944.000 AXA SA EF7088422	20.90	173,364.65	207,870.05	0.31	34,505.40

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2,117.000 PEUGEOT SA EF7103528	16.26	30,940.61	34,429.22	0.05	3,488.61
1,290.000 JCDECAUX SA EF7136668	18.59	24,974.94	23,978.69	0.04	-996.25
1,494.000 ESSILORLUXOTTICA SA EF7212477	128.32	130,390.59	191,709.91	0.29	61,319.32
13,856.000 CREDIT AGRICOLE SA EF7262613	9.47	104,709.42	131,159.63	0.20	26,450.21
3,196.000 BNP PARIBAS SA EF7309687	39.73	117,353.97	126,963.71	0.19	9,609.74
1,354.000 CIE DE SAINT-GOBAIN EF7380480	36.00	45,234.61	48,739.88	0.07	3,505.27
376.000 WENDEL SE EF7390117	95.30	28,731.76	35,832.53	0.05	7,100.77
1,422.000 KLEPIERRE SA EF7582556	19.92	25,714.86	28,324.91	0.04	2,610.05
274.000 GECINA SA EF7742465	123.55	33,873.46	33,851.74	0.05	-21.72
526.000 COVIVIO EF7745633	72.44	30,875.56	38,105.11	0.06	7,229.55

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1,367.000 SAFRAN SA EFB058TZ0	100.21	61,904.21	136,983.57	0.20	75,079.36
7,953.000 ENGIE SA EFB0C2CQ3	12.35	97,769.72	98,256.53	0.15	486.81
2,714.000 EUTELSAT COMMUNICATIONS SA EFB0M7KJ8	9.22	26,456.19	25,025.96	0.04	-1,430.23
3,604.000 ELECTRICITE DE FRANCE SA EFB0NJJ12	9.22	33,513.14	33,232.71	0.05	-280.43
565.000 ARKEMA SA EFB0Z5YZ7	95.62	35,962.32	54,028.12	0.08	18,065.80
1,695.000 LEGRAND SA EFB11ZRK7	75.95	79,567.49	128,730.85	0.19	49,163.36
497.000 EIFFAGE SA EFB13X011	91.42	29,198.03	45,437.93	0.07	16,239.90
10,053.000 TOTAL SE EFB15C551	38.16	488,138.43	383,612.65	0.57	-104,525.78
338.000 AEROPORTS DE PARIS EFB164FY4	102.66	28,788.00	34,697.70	0.05	5,909.70
398.000 UBISOFT ENTERTAINMENT SA EFB1L3CS5	82.44	29,729.83	32,810.81	0.05	3,080.98

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2,972.000 VINCI SA EFB1XH021	92.10	183,385.61	273,716.15	0.41	90,330.54
2,530.000 DANONE SA EFB1Y9TB7	69.14	156,824.42	174,927.02	0.26	18,102.60
2,455.000 AIR LIQUIDE SA EFB1YXBJ6	144.21	206,998.78	354,041.59	0.53	147,042.81
1,924.000 BUREAU VERITAS SA EFB28DTJ8	21.09	29,036.40	40,582.46	0.06	11,546.06
2,035.000 GETLINK SE EFB292JQ6	14.42	24,327.02	29,347.24	0.04	5,020.22
2,934.000 SUEZ SA EFB3B8D01	11.72	32,658.78	34,386.69	0.05	1,727.91
2,150.000 EDENRED EFB62G1B5	43.72	43,663.65	94,007.09	0.14	50,343.44
1,617.000 VALEO SA EFBDC5ST5	26.24	27,197.37	42,424.88	0.06	15,227.51
436.000 BIOMERIEUX EFBF0LBX7	137.36	29,134.90	59,889.50	0.09	30,754.60
513.000 UNIBAIL-RODAMCO-WESTFIELD EFBF2PQ02	56.34	34,009.55	28,900.99	0.04	-5,108.56

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551.000 WORLDLINE SA/FRANCE EFBNFWR47	86.57	35,228.44	47,701.39	0.07	12,472.95
150.000 SARTORIUS STEDIM BIOTECH EFBYZ2QP1	252.71	29,651.45	37,906.31	0.06	8,254.86
760.000 AMUNDI SA EFBYZR017	78.28	39,917.84	59,495.50	0.09	19,577.66
2,283.000 ASSICURAZIONI GENERALI SPA EI4056715	15.13	32,254.74	34,539.12	0.05	2,284.38
64,077.000 INTESA SANPAOLO SPA EI4076838	1.91	96,898.65	122,604.83	0.18	25,706.18
4,949.000 MEDIOBANCA BANCA DI CREDITO FI EI4574816	7.18	26,819.51	35,518.62	0.05	8,699.11
43,914.000 ENEL SPA EI7144567	8.62	204,069.63	378,694.38	0.56	174,624.75
17,297.000 ENI SPA EI7145051	9.54	152,256.64	164,936.30	0.25	12,679.66
10,544.000 SNAM SPA EI7251479	4.87	43,993.16	51,325.37	0.08	7,332.21
7,576.000 TENARIS SA EI7538511	6.46	39,309.86	48,909.64	0.07	9,599.78

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
100,025.000 TELECOM ITALIA SPA/MILANO EI7634393	0.39	38,605.74	39,286.37	0.06	680.63
3,071.000 ATLANTIA SPA EI7667161	16.06	42,154.17	49,323.47	0.07	7,169.30
13,546.000 TERNA RETE ELETTRICA NAZIONALE EIB01BN53	6.87	60,064.93	93,080.42	0.14	33,015.49
866.000 RECORDATI SPA EIB07DRZ3	49.92	29,168.60	43,234.20	0.06	14,065.60
4,238.000 LEONARDO SPA EIB0DJNG9	6.63	27,919.36	28,083.47	0.04	164.11
586.000 FERRARI NV EIBD6G500	170.55	36,106.16	99,942.49	0.15	63,836.33
881.000 MONCLER SPA EIBGLP233	38.23	30,675.72	33,682.41	0.05	3,006.69
4,263.000 FINECOBANK BANCA FINECO SPA EIBNGN9Z1	13.49	32,729.96	57,527.69	0.09	24,797.73
7,174.000 FIAT CHRYSLER AUTOMOBILES NV EIBRJFWP2	10.05	57,785.58	72,066.09	0.11	14,280.51
12,167.000 UNICREDIT SPA EIBYMXPS6	9.20	108,382.19	111,892.02	0.17	3,509.83

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
727.000 EXOR NV EIBYSLCX9	57.10	29,454.72	41,512.39	0.06	12,057.67
3,732.000 DAVIDE CAMPARI-MILANO SPA EIBZ4CMZ6	8.42	23,069.93	31,436.97	0.05	8,367.04
1,670.000 WOLTERS KLUWER NV EN5671511	78.08	63,450.27	130,395.92	0.19	66,945.65
704.000 KONINKLIJKE VOPAK NV EN5809426	52.88	32,243.93	37,226.04	0.06	4,982.11
27,526.000 AEGON NV EN5927376	2.98	54,734.37	82,019.69	0.12	27,285.32
16,609.000 KONINKLIJKE KPN NV EN5956078	2.65	36,362.20	44,024.38	0.07	7,662.18
3,461.000 KONINKLIJKE PHILIPS NV EN5986620	46.63	117,580.90	161,397.46	0.24	43,816.56
1,002.000 HEINEKEN NV EN7792554	92.17	51,537.24	92,350.02	0.14	40,812.78
429.000 HEINEKEN HOLDING NV ENB0CCH48	81.82	29,205.23	35,101.41	0.05	5,896.18
1,096.000 KONINKLIJKE DSM NV ENB0HZL96	138.37	75,421.18	151,655.80	0.23	76,234.62

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6,983.000 UNILEVER NV ENB1527V7	53.07	218,478.94	370,579.69	0.55	152,100.75
2,191.000 ASML HOLDING NV ENB929F49	367.16	152,397.33	804,442.60	1.20	652,045.27
7,548.000 KONINKLIJKE AHOLD DELHAIZE NV ENBD0Q396	27.25	116,685.04	205,665.03	0.31	88,979.99
1,236.000 AKZO NOBEL NV ENBJ2KSG1	89.56	82,827.83	110,696.14	0.16	27,868.31
3,294.000 PROSUS NV ENBJDS7L4	92.93	233,080.01	306,109.55	0.46	73,029.54
2,743.000 NN GROUP NV ENBNG8PQ5	33.58	70,502.90	92,115.93	0.14	21,613.03
6,863.000 ALTICE EUROPE NV ENBYT3416	3.86	22,035.78	26,477.60	0.04	4,441.82
5,151.000 RELX PLC ENBYWLC62	23.14	44,121.37	119,178.12	0.18	75,056.75
73.000 ADYEN NV ENBZ1HM46	1,455.04	92,165.42	106,217.98	0.16	14,052.56
14,377.000 ING GROEP NV ENBZ57394	6.96	75,702.16	100,082.38	0.15	24,380.22

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
4,636.000	BANCO ESPIRITO SANTO SA EP4058061	0.00	12,190.60	0.00	0.00	-12,190.60
12,293.000	EDP - ENERGIAS DE PORTUGAL SA EP4103594	4.77	46,835.36	58,679.25	0.09	11,843.89
2,739.000	GALP ENERGIA SGPS SA EPB1FW752	11.56	30,569.33	31,670.59	0.05	1,101.26
2,224.000	JERONIMO MARTINS SGPS SA EPB1Y1SQ0	17.50	31,738.34	38,929.55	0.06	7,191.21
4,109.000	CRH PLC EZ4182240	34.26	105,143.06	140,758.21	0.21	35,615.15
480.000	KINGSPAN GROUP PLC EZ4491237	64.41	24,586.63	30,918.07	0.05	6,331.44
627.000	KERRY GROUP PLC EZ4519573	123.88	22,054.17	77,674.92	0.12	55,620.75
1,500.000	SMURFIT KAPPA GROUP PLC EZB1RR824	33.42	38,790.37	50,137.42	0.07	11,347.05
712.000	FLUTTER ENTERTAINMENT PLC EZBWT6H87	131.41	71,777.57	93,562.89	0.14	21,785.32
3,562.000	RYANAIR HOLDINGS PLC EZBYTBXV3	11.97	19,862.28	42,627.04	0.06	22,764.76

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,717.000 UPM-KYMMENE OYJ SF5051252	28.89	42,674.11	78,487.11	0.12	35,813.00
4,016.000 STORA ENSO OYJ SF5072670	11.94	32,755.28	47,947.36	0.07	15,192.08
2,133.000 SAMPO OYJ SF5226037	34.39	58,388.58	73,355.69	0.11	14,967.11
1,768.000 FORTUM OYJ SF5579559	18.99	28,558.37	33,568.75	0.05	5,010.38
878.000 ELISA OYJ SF5701518	60.81	28,715.42	53,388.85	0.08	24,673.43
912.000 NELES OYJ SF5713422	32.76	23,004.63	29,879.20	0.04	6,874.57
28,353.000 NOKIA OYJ SF5902942	4.37	120,986.12	123,828.01	0.18	2,841.89
3,105.000 NESTE OYJ SFB06YV43	39.10	18,307.92	121,395.72	0.18	103,087.80
1,611.000 KONE OYJ SFB09M9D1	68.76	59,272.57	110,771.14	0.16	51,498.57
1,119.000 ORION OYJ SFB17NY41	48.36	30,466.09	54,118.02	0.08	23,651.93

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
180.000 NORDEA BANK ABP SFBFM0SV0	6.91	1,140.99	1,242.92	0.00	101.93
TOTAL EQUITY EURO CURRENCY UNIT		**14,186,702.77**	**21,237,200.70**	**31.62**	**7,050,497.93**
PREFERRED SECURITIES					
881.000 FUCHS PETROLUB SE ED4354350	40.14	30,204.85	35,364.56	0.05	5,159.71
765.000 HENKEL AG & CO KGAA ED5076705	93.09	47,760.76	71,211.30	0.11	23,450.54
719.000 VOLKSWAGEN AG ED5497166	151.56	95,937.20	108,970.10	0.16	13,032.90
250.000 BAYERISCHE MOTOREN WERKE AG ED5756033	48.50	9,010.33	12,124.40	0.02	3,114.07
133.000 SARTORIUS AG ED5843328	328.63	42,080.25	43,708.28	0.07	1,628.03
840.000 PORSCHE AUTOMOBIL HOLDING SE ED7101063	57.46	37,690.18	48,266.70	0.07	10,576.52
TOTAL PREFERRED SECURITIES EURO CURRENCY UNIT		**262,683.57**	**319,645.34**	**0.48**	**56,961.77**
TOTAL ASSETS EURO CURRENCY UNIT		**14,613,179.14**	**21,717,582.71**	**32.33**	**7,104,403.57**
HONG KONG DOLLAR					
CASH & CASH EQUIVALENTS					
DIVIDENDS RECEIVABLE		5,189.64	5,189.60	0.01	-0.04

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
	NON-BASE CURRENCY		12,713.92	12,713.45	0.02	-0.47
	TOTAL CASH & CASH EQUIVALENTS HONG KONG DOLLAR		**17,903.56**	**17,903.05**	**0.03**	**-0.51**
EQUITY						
19,000.000 FH6030503	HANG LUNG PROPERTIES LTD HK/00101	2.37	35,259.44	45,009.00	0.07	9,749.56
12,000.000 FH6097015	CLP HOLDINGS LTD HK/00002	9.81	90,440.65	117,670.59	0.18	27,229.94
5,900.000 FH6267352	HONG KONG EXCHANGES & CLEARING HK/00388	42.58	119,901.67	251,211.22	0.37	131,309.55
6,500.000 FH6290057	MTR CORP LTD HK/00066	5.18	24,721.83	33,672.24	0.05	8,950.41
3,300.000 FH6408378	HANG SENG BANK LTD HK/00011	16.79	46,362.45	55,394.20	0.08	9,031.75
9,883.000 FH6420530	HENDERSON LAND DEVELOPMENT CO HK/00012	3.79	35,839.84	37,489.46	0.06	1,649.62
52,592.000 FH6436551	HONG KONG & CHINA GAS CO LTD HK/00003	1.55	52,774.63	81,428.05	0.12	28,653.42
13,000.000 FH6465873	GALAXY ENTERTAINMENT GROUP LTD HK/00027	6.81	40,096.82	88,478.73	0.13	48,381.91

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
34,000.000 BOC HONG KONG HOLDINGS LTD FH6536111 HK/02388	3.18	94,345.51	108,135.66	0.16	13,790.15
2,500.000 SUN HUNG KAI PROPERTIES LTD FH6859927 HK/00016	12.77	32,259.87	31,917.50	0.05	-342.37
12,000.000 WHEELOCK & CO LTD FH6981481 HK/00020	7.91	45,850.00	94,910.62	0.14	49,060.62
10,000.000 TECHTRONIC INDUSTRIES CO LTD FHB0190C9 HK/00669	9.78	31,371.90	97,800.77	0.15	66,428.87
14,140.000 LINK REIT FHB0PB4M2 HK/00823	8.17	61,253.71	115,576.39	0.17	54,322.68
64,600.000 AIA GROUP LTD FHB4TX8S5 HK/01299	9.33	251,252.20	602,620.49	0.90	351,368.29
21,000.000 HKT TRUST & HKT LTD FHB4TXDZ3 HK/06823	1.46	28,319.13	30,725.96	0.05	2,406.83
19,200.000 SANDS CHINA LTD FHB5B23W5 HK/01928	3.92	50,040.93	75,309.18	0.11	25,268.25
4,100.000 SWIRE PROPERTIES LTD FHB67C2G2 HK/01972	2.54	9,595.32	10,410.75	0.02	815.43
7,000.000 WHARF REAL ESTATE INVESTMENT C FHBF0GWS1 HK/01997	4.77	30,389.09	33,417.41	0.05	3,028.32

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
9,400.000 BUDWEISER BREWING CO APAC LTD FHBKDXJH8 HK/01876	2.91	26,964.66	27,349.38	0.04	384.72
38,500.000 WH GROUP LTD FHBLLHKZ0 HK/00288	0.86	29,092.31	32,983.89	0.05	3,891.58
6,500.000 NEW WORLD DEVELOPMENT CO LTD FHBMX0K58 HK/02909	4.75	30,603.50	30,862.72	0.05	259.22
14,840.000 CK ASSET HOLDINGS LTD FHBYZQ071 HK/01113	5.96	66,914.93	88,460.41	0.13	21,545.48
TOTAL EQUITY HONG KONG DOLLAR		**1,233,650.39**	**2,090,834.62**	**3.11**	**857,184.23**
TOTAL ASSETS HONG KONG DOLLAR		**1,251,553.95**	**2,108,737.67**	**3.14**	**857,183.72**
ISRAELI SHEKEL					
CASH & CASH EQUIVALENTS					
NON-BASE CURRENCY		707.01	767.51	0.00	60.50
EQUITY					
5,939.000 BANK HAPOALIM BM FZ6075805	5.95	27,261.28	35,315.34	0.05	8,054.06
8,105.000 ISRAEL DISCOUNT BANK LTD FZ6451279	3.03	24,819.70	24,589.35	0.04	-230.35
635.000 NICE LTD FZ6647132	186.34	18,153.41	118,323.44	0.18	100,170.03

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,898.000 FZ6916701	MIZRAHI TEFAHOT BANK LTD	18.67	33,422.06	35,437.89	0.05	2,015.83
293.000 FZBJ0CJC2	ISRACARD LTD	2.27	958.22	665.59	0.00	-292.63
	TOTAL EQUITY ISRAELI SHEKEL		**104,614.67**	**214,331.61**	**0.32**	**109,716.94**
	TOTAL ASSETS ISRAELI SHEKEL		**105,321.68**	**215,099.12**	**0.32**	**109,777.44**
JAPANESE YEN						
CASH & CASH EQUIVALENTS						
	DIVIDENDS RECEIVABLE		22,630.27	22,620.48	0.03	-9.79
	DIVIDENDS RECEIVABLE RECLAIM		14,883.17	15,159.76	0.02	276.59
	NON-BASE CURRENCY		106,367.99	105,739.71	0.16	-628.28
	FOREIGN TAXES PAYABLE - DIVIDENDS		-2,390.07	-2,389.01	-0.00	1.06
	TOTAL CASH & CASH EQUIVALENTS JAPANESE YEN		**141,491.36**	**141,130.94**	**0.21**	**-360.42**
EQUITY						
3,000.000 FJ6010907	AJINOMOTO CO INC	16.61	29,769.06	49,830.84	0.07	20,061.78
3,100.000 FJ6021508	ALPS ALPINE CO LTD	12.79	32,696.98	39,653.33	0.06	6,956.35

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
7,700.000 ACOM CO LTD FJ6049780	3.81	21,733.06	29,334.01	0.04	7,600.95
2,000.000 ASAHI GROUP HOLDINGS LTD FJ6054400	35.00	41,787.09	70,000.46	0.10	28,213.37
6,000.000 ASAHI KASEI CORP FJ6054608	8.12	32,835.39	48,696.30	0.07	15,860.91
1,600.000 BANK OF KYOTO LTD/THE FJ6075751	35.41	46,275.97	56,652.92	0.08	10,376.95
12,200.000 Z HOLDINGS CORP FJ6084845	4.88	52,637.48	59,481.85	0.09	6,844.37
3,000.000 NTT DATA CORP FJ6125630	11.11	19,803.45	33,341.06	0.05	13,537.61
9,300.000 NTT DOCOMO INC FJ6129277	26.71	160,666.85	248,436.76	0.37	87,769.91
3,500.000 BRIDGESTONE CORP FJ6132107	32.15	69,915.20	112,541.13	0.17	42,625.93
300.000 OBIC CO LTD FJ6136744	174.91	40,458.78	52,472.54	0.08	12,013.76
1,500.000 BROTHER INDUSTRIES LTD FJ6146503	18.00	18,190.42	27,000.97	0.04	8,810.55

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,600.000 CANON INC FJ6172327	19.78	36,152.59	31,655.93	0.05	-4,496.66
800.000 CENTRAL JAPAN RAILWAY CO FJ6183555	154.70	69,685.41	123,761.41	0.18	54,076.00
200.000 KOSE CORP FJ6194461	120.13	23,440.93	24,025.58	0.04	584.65
3,100.000 CHUGOKU ELECTRIC POWER CO INC/ FJ6195906	13.36	33,563.10	41,406.13	0.06	7,843.03
3,600.000 CHUGAI PHARMACEUTICAL CO LTD FJ6196409	53.44	50,462.09	192,371.50	0.29	141,909.41
700.000 CYBERAGENT INC FJ6220506	49.03	25,182.91	34,323.58	0.05	9,140.67
4,600.000 RAKUTEN INC FJ6229598	8.79	32,383.57	40,420.82	0.06	8,037.25
8,100.000 KDDI CORP FJ6248994	29.98	76,280.94	242,808.54	0.36	166,527.60
700.000 DAIFUKU CO LTD FJ6250024	87.32	32,767.42	61,120.64	0.09	28,353.22
400.000 DAITO TRUST CONSTRUCTION CO LT FJ6250503	91.85	19,398.86	36,739.12	0.05	17,340.26

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4,200.000 DAICEL CORP FJ6250545	7.72	31,782.09	32,428.97	0.05	646.88
1,200.000 DAIKIN INDUSTRIES LTD FJ6250727	160.68	58,359.65	192,816.42	0.29	134,456.77
1,000.000 DAI NIPPON PRINTING CO LTD FJ6250909	22.89	20,170.57	22,885.48	0.03	2,714.91
3,000.000 DAIWA HOUSE INDUSTRY CO LTD FJ6251360	23.56	33,953.32	70,686.38	0.11	36,733.06
200.000 LAWSON INC FJ6266913	50.15	8,549.55	10,029.20	0.01	1,479.65
700.000 OTSUKA CORP FJ6267051	52.65	27,933.15	36,854.06	0.05	8,920.91
5,000.000 MITSUBISHI UFJ LEASE & FINANCE FJ6268976	4.73	18,046.68	23,636.28	0.04	5,589.60
4,000.000 PAN PACIFIC INTERNATIONAL HOLD FJ6269867	21.96	33,841.50	87,834.27	0.13	53,992.77
100.000 DISCO CORP FJ6270949	241.83	19,171.20	24,183.16	0.04	5,011.96
1,600.000 EAST JAPAN RAILWAY CO FJ6298544	69.28	111,696.88	110,843.95	0.17	-852.93

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1,200.000 EISAI CO LTD FJ6307204	79.21	47,573.87	95,056.77	0.14	47,482.90
1,600.000 SBI HOLDINGS INC/JAPAN FJ6309465	21.58	24,766.35	34,525.65	0.05	9,759.30
300.000 FAST RETAILING CO LTD FJ6332434	571.91	69,534.82	171,571.58	0.26	102,036.76
38,000.000 MITSUBISHI UFJ FINANCIAL GROUP FJ6335171	3.91	170,855.58	148,498.86	0.22	-22,356.72
1,300.000 FUJI ELECTRIC CO LTD FJ6356367	27.29	30,259.50	35,474.81	0.05	5,215.31
4,000.000 SUBARU CORP FJ6356409	20.78	20,527.45	83,107.01	0.12	62,579.56
1,500.000 FUJIFILM HOLDINGS CORP FJ6356524	42.73	61,617.09	64,096.03	0.10	2,478.94
1,100.000 FANUC CORP FJ6356938	178.52	133,932.41	196,375.77	0.29	62,443.36
900.000 FUJITSU LTD FJ6356946	116.98	63,580.62	105,278.77	0.16	41,698.15
2,904.000 NOMURA RESEARCH INSTITUTE LTD FJ6390929	27.13	18,227.69	78,787.67	0.12	60,559.98

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6.000 NIPPON BUILDING FUND INC FJ6396801	5,691.25	25,552.84	34,147.47	0.05	8,594.63
6.000 JAPAN REAL ESTATE INVESTMENT C FJ6397585	5,125.83	25,137.60	30,754.97	0.05	5,617.37
1,600.000 HAMAMATSU PHOTONICS KK FJ6405875	43.29	29,817.38	69,258.93	0.10	39,441.55
1,000.000 HANKYU HANSHIN HOLDINGS INC FJ6408663	33.79	23,104.03	33,785.98	0.05	10,681.95
2,200.000 DENTSU GROUP INC FJ6416286	23.68	41,978.66	52,101.77	0.08	10,123.11
200.000 HIKARI TSUSHIN INC FJ6416328	227.56	38,784.92	45,511.42	0.07	6,726.50
21,600.000 RESONA HOLDINGS INC FJ6421559	3.41	69,227.10	73,638.41	0.11	4,411.31
5,100.000 HINO MOTORS LTD FJ6428307	6.75	31,258.69	34,414.42	0.05	3,155.73
300.000 HIROSE ELECTRIC CO LTD FJ6428729	109.56	28,714.20	32,868.33	0.05	4,154.13
5,100.000 HITACHI LTD FJ6429107	31.54	109,920.59	160,868.51	0.24	50,947.92

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,500.000 SUMITOMO MITSUI TRUST HOLDINGS FJ6431897	28.04	99,699.58	98,136.90	0.15	-1,562.68
4,600.000 HONDA MOTOR CO LTD FJ6435146	25.54	115,262.08	117,488.99	0.17	2,226.91
2,000.000 HOYA CORP FJ6441508	95.10	67,707.31	190,202.53	0.28	122,495.22
2,700.000 IHI CORP FJ6466984	14.44	29,700.64	38,991.52	0.06	9,290.88
4,800.000 ISUZU MOTORS LTD FJ6467107	9.02	29,018.55	43,303.89	0.06	14,285.34
8,800.000 ITOCHU CORP FJ6467800	21.52	83,310.62	189,360.89	0.28	106,050.27
2,100.000 JSR CORP FJ6470986	19.28	32,373.72	40,487.56	0.06	8,113.84
2,800.000 JGC HOLDINGS CORP FJ6473469	10.51	26,799.91	29,431.34	0.04	2,631.43
7,200.000 JAPAN TOBACCO INC FJ6474533	18.55	133,179.15	133,575.56	0.20	396.41
5,600.000 AEON CO LTD FJ6480043	23.22	59,849.40	130,027.34	0.19	70,177.94

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
4,000.000 KAJIMA CORP FJ6481322	11.90	19,760.86	47,606.25	0.07	27,845.39
3,300.000 KANSAI ELECTRIC POWER CO INC/T FJ6483484	9.69	31,643.91	31,964.59	0.05	320.68
2,900.000 KAO CORP FJ6483807	79.16	80,514.41	229,559.25	0.34	149,044.84
2,200.000 KAWASAKI HEAVY INDUSTRIES LTD FJ6484623	14.37	29,753.73	31,607.73	0.05	1,854.00
600.000 KEIO CORP FJ6487360	57.10	19,995.09	34,258.70	0.05	14,263.61
1,800.000 KIKKOMAN CORP FJ6490802	48.11	21,176.91	86,592.20	0.13	65,415.29
980.000 KEYENCE CORP FJ6490992	417.39	81,127.12	409,041.10	0.61	327,913.98
900.000 KINTETSU GROUP HOLDINGS CO LTD FJ6492964	44.91	31,444.42	40,418.04	0.06	8,973.62
3,200.000 KIRIN HOLDINGS CO LTD FJ6493749	21.08	68,493.27	67,464.43	0.10	-1,028.84
900.000 KOITO MANUFACTURING CO LTD FJ6496320	40.23	30,907.79	36,205.22	0.05	5,297.43

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,100.000 KOMATSU LTD FJ6496585	20.42	62,472.63	63,316.03	0.09	843.40
1,000.000 KONAMI HOLDINGS CORP FJ6496684	33.28	19,409.50	33,276.17	0.05	13,866.67
8,500.000 KONICA MINOLTA INC FJ6496700	3.45	30,322.85	29,308.99	0.04	-1,013.86
5,900.000 KUBOTA CORP FJ6497500	14.90	56,501.82	87,938.08	0.13	31,436.26
1,600.000 KYOCERA CORP FJ6499266	54.36	79,851.89	86,981.51	0.13	7,129.62
2,000.000 KYOWA KIRIN CO LTD FJ6499555	26.22	21,017.20	52,444.73	0.08	31,427.53
5,600.000 KYUSHU ELECTRIC POWER CO INC FJ6499803	8.39	41,003.90	46,975.95	0.07	5,972.05
3,500.000 TOKIO MARINE HOLDINGS INC FJ6513124	43.55	102,928.96	152,412.29	0.23	49,483.33
27.000 JAPAN RETAIL FUND INVESTMENT C FJ6513348	1,246.70	34,899.52	33,660.84	0.05	-1,238.68
1,500.000 LION CORP FJ6518800	23.98	32,449.02	35,968.86	0.05	3,519.84

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
21.000 ORIX JREIT INC FJ6527777	1,310.65	26,903.39	27,523.75	0.04	620.36
1,200.000 MAKITA CORP FJ6555802	36.29	20,378.38	43,546.37	0.06	23,167.99
4,800.000 SUMITOMO MITSUI FINANCIAL GROU FJ6563020	28.10	124,145.04	134,899.20	0.20	10,754.16
10,400.000 PANASONIC CORP FJ6572708	8.71	78,932.59	90,576.45	0.13	11,643.86
201,100.000 MIZUHO FINANCIAL GROUP INC FJ6591013	1.23	252,732.04	246,423.69	0.37	-6,308.35
1,400.000 MISUMI GROUP INC FJ6595170	24.97	26,402.29	34,959.45	0.05	8,557.16
2,100.000 MITSUBISHI ESTATE CO LTD FJ6596723	14.85	32,418.77	31,192.94	0.05	-1,225.83
8,000.000 MITSUBISHI CORP FJ6596780	21.04	157,887.69	168,327.38	0.25	10,439.69
9,000.000 MITSUBISHI ELECTRIC CORP FJ6597044	12.97	82,407.89	116,749.31	0.17	34,341.42
10,700.000 MITSUI & CO LTD FJ6597309	14.78	159,264.11	158,142.00	0.24	-1,122.11

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,200.000 MITSUI CHEMICALS INC FJ6597366	20.83	18,461.93	24,993.28	0.04	6,531.35
1,600.000 MITSUI OSK LINES LTD FJ6597580	17.69	26,417.44	28,296.80	0.04	1,879.36
5,300.000 MITSUI FUDOSAN CO LTD FJ6597606	17.70	94,563.03	93,806.83	0.14	-756.20
3,000.000 MURATA MANUFACTURING CO LTD FJ6610409	58.54	61,719.77	175,631.46	0.26	113,911.69
2,200.000 SEIKO EPSON CORP FJ6616505	11.43	17,415.31	25,143.44	0.04	7,728.13
2,500.000 NGK INSULATORS LTD FJ6619509	13.79	29,526.47	34,481.16	0.05	4,954.69
1,000.000 NGK SPARK PLUG CO LTD FJ6619608	14.31	13,596.23	14,311.54	0.02	715.31
600.000 NINTENDO CO LTD FJ6639556	445.01	82,017.53	267,006.53	0.40	184,989.00
2,600.000 DENSO CORP FJ6640380	38.98	80,071.56	101,339.39	0.15	21,267.83
1,100.000 NEC CORP FJ6640406	47.92	30,094.89	52,713.54	0.08	22,618.65

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
600.000 NIPPON PAINT HOLDINGS CO LTD FJ6640505	72.67	32,212.98	43,601.98	0.06	11,389.00
2,400.000 NIDEC CORP FJ6640687	66.70	70,048.72	160,081.57	0.24	90,032.85
700.000 NH FOODS LTD FJ6640760	40.09	21,199.16	28,062.29	0.04	6,863.13
1,210.000 NISSHIN SEIFUN GROUP INC FJ6640968	14.91	13,074.53	18,045.97	0.03	4,971.44
10,800.000 NIPPON TELEGRAPH & TELEPHONE C FJ6641370	23.32	149,957.44	251,818.14	0.37	101,860.70
4,900.000 NSK LTD FJ6641545	7.41	30,944.10	36,289.57	0.05	5,345.47
1,000.000 NISSAN CHEMICAL CORP FJ6641586	51.17	14,192.47	51,165.59	0.08	36,973.12
500.000 NISSIN FOODS HOLDINGS CO LTD FJ6641768	88.52	16,662.57	44,260.09	0.07	27,597.52
700.000 NITTO DENKO CORP FJ6641800	56.54	27,277.65	39,579.18	0.06	12,301.53
400.000 NIPPON EXPRESS CO LTD FJ6642121	51.72	17,503.69	20,688.70	0.03	3,185.01

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,400.000 YAMAHA CORP FJ6642386	46.99	18,378.87	65,792.28	0.10	47,413.41
2,000.000 MINEBEA MITSUMI INC FJ6642402	18.10	12,329.24	36,205.22	0.05	23,875.98
5,100.000 NIPPON STEEL CORP FJ6642568	9.39	40,399.17	47,910.74	0.07	7,511.57
10,600.000 NISSAN MOTOR CO LTD FJ6642865	3.70	43,570.98	39,222.50	0.06	-4,348.48
17,000.000 NOMURA HOLDINGS INC FJ6643103	4.47	67,934.91	76,014.27	0.11	8,079.36
2,300.000 NIPPON YUSEN KK FJ6643962	14.05	27,523.21	32,319.60	0.05	4,796.39
400.000 NITORI HOLDINGS CO LTD FJ6644804	195.81	15,118.77	78,324.14	0.12	63,205.37
1,100.000 ORIENTAL LAND CO LTD/JAPAN FJ6648896	131.99	54,048.69	145,191.64	0.22	91,142.95
1,500.000 ODAKYU ELECTRIC RAILWAY CO LTD FJ6656105	24.57	27,464.51	36,858.69	0.05	9,394.18
4,500.000 OBAYASHI CORP FJ6656402	9.34	26,081.38	42,044.77	0.06	15,963.39

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
6,500.000 OJI HOLDINGS CORP FJ6657707	4.64	26,522.52	30,184.92	0.04	3,662.40
5,900.000 OLYMPUS CORP FJ6658804	19.24	48,313.32	113,504.66	0.17	65,191.34
1,000.000 OMRON CORP FJ6659422	66.92	26,085.09	66,923.11	0.10	40,838.02
2,000.000 ONO PHARMACEUTICAL CO LTD FJ6660107	29.08	17,503.69	58,154.52	0.09	40,650.83
6,600.000 ORIX CORP FJ6661147	12.31	68,476.23	81,272.65	0.12	12,796.42
2,000.000 OSAKA GAS CO LTD FJ6661766	19.72	32,632.95	39,449.41	0.06	6,816.46
1,600.000 ALFRESA HOLDINGS CORP FJ6687217	20.86	27,992.79	33,383.70	0.05	5,390.91
700.000 PIGEON CORP FJ6688082	38.65	22,515.85	27,056.59	0.04	4,540.74
29.000 UNITED URBAN INVESTMENT CORP FJ6723830	1,073.37	28,929.42	31,127.59	0.05	2,198.17
2,000.000 JAPAN EXCHANGE GROUP INC FJ6743887	23.10	24,629.90	46,197.34	0.07	21,567.44

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,500.000 T&D HOLDINGS INC FJ6744299	8.54	28,834.32	29,879.04	0.04	1,044.72
300.000 SMC CORP/JAPAN FJ6763968	511.47	55,398.10	153,441.16	0.23	98,043.06
8,400.000 SOFTBANK GROUP CORP FJ6770625	50.52	118,929.14	424,340.73	0.63	305,411.59
2,500.000 SANTEN PHARMACEUTICAL CO LTD FJ6776606	18.38	15,038.90	45,951.71	0.07	30,912.81
900.000 SECOM CO LTD FJ6791597	87.34	39,670.78	78,608.70	0.12	38,937.92
2,000.000 SEKISUI CHEMICAL CO LTD FJ6793825	14.29	13,670.77	28,585.99	0.04	14,915.22
2,700.000 SEKISUI HOUSE LTD FJ6793908	19.02	29,835.84	51,367.20	0.08	21,531.36
1,400.000 SHIMADZU CORP FJ6804366	26.58	28,867.21	37,217.41	0.06	8,350.20
4,000.000 SHIMIZU CORP FJ6804408	8.20	16,694.52	32,812.72	0.05	16,118.20
2,100.000 SHIN-ETSU CHEMICAL CO LTD FJ6804580	116.74	122,465.76	245,163.83	0.37	122,698.07

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,900.000 SHIONOGI & CO LTD FJ6804689	62.57	45,108.18	118,876.58	0.18	73,768.40
400.000 SHIMANO INC FJ6804820	192.33	17,801.81	76,933.77	0.11	59,131.96
2,000.000 SHISEIDO CO LTD FJ6805264	63.35	81,514.20	126,708.99	0.19	45,194.79
1,500.000 SHOWA DENKO KK FJ6805462	22.39	25,504.80	33,591.32	0.05	8,086.52
1,200.000 SUNDRUG CO LTD FJ6817897	33.09	31,862.26	39,708.95	0.06	7,846.69
6,400.000 SONY CORP FJ6821501	68.44	189,632.14	438,036.79	0.65	248,404.65
900.000 STANLEY ELECTRIC CO LTD FJ6841103	24.05	17,315.24	21,648.05	0.03	4,332.81
16,500.000 SUMITOMO CHEMICAL CO LTD FJ6858560	2.98	48,893.66	49,246.88	0.07	353.22
1,500.000 SUMITOMO HEAVY INDUSTRIES LTD FJ6858735	21.74	29,126.02	32,604.16	0.05	3,478.14
1,800.000 SUMITOMO METAL MINING CO LTD FJ6858842	27.89	38,063.89	50,203.46	0.07	12,139.57

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1,800.000 SUMITOMO REALTY & DEVELOPMENT FJ6858909	27.46	40,770.23	49,435.97	0.07	8,665.74
8,300.000 SUMITOMO CORP FJ6858941	11.44	91,162.58	94,974.74	0.14	3,812.16
2,200.000 SUZUKI MOTOR CORP FJ6865508	33.90	53,211.18	74,573.85	0.11	21,362.67
1,400.000 THK CO LTD FJ6869138	24.69	28,587.74	34,570.14	0.05	5,982.40
600.000 TDK CORP FJ6869302	98.99	40,494.16	59,396.58	0.09	18,902.42
1,600.000 TAISEI CORP FJ6870102	36.33	17,631.46	58,135.98	0.09	40,504.52
5,349.000 TAKEDA PHARMACEUTICAL CO LTD FJ6870441	35.67	191,838.01	190,786.04	0.28	-1,051.97
800.000 ADVANTEST CORP FJ6870490	56.73	24,702.46	45,381.66	0.07	20,679.20
1,400.000 SYSMEX CORP FJ6883808	76.28	27,661.54	106,798.90	0.16	79,137.36
3,100.000 TERUMO CORP FJ6885076	37.83	78,400.36	117,264.68	0.17	38,864.32

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1,100.000 TOHO CO LTD/TOKYO FJ6895208	36.10	17,579.28	39,713.58	0.06	22,134.30
3,100.000 TOHOKU ELECTRIC POWER CO INC FJ6895265	9.51	29,682.94	29,481.39	0.04	-201.55
1,800.000 TOKYO GAS CO LTD FJ6895448	23.91	39,553.95	43,045.84	0.06	3,491.89
800.000 TOKYO ELECTRON LTD FJ6895679	245.08	68,616.85	196,060.62	0.29	127,443.77
5,000.000 TOKYU CORP FJ6896545	14.06	52,355.06	70,306.34	0.10	17,951.28
7,000.000 TORAY INDUSTRIES INC FJ6897147	4.70	31,087.55	32,928.58	0.05	1,841.03
2,000.000 TOSHIBA CORP FJ6897212	31.84	44,376.16	63,678.92	0.09	19,302.76
2,500.000 LIXIL GROUP CORP FJ6900214	13.96	29,561.04	34,898.27	0.05	5,337.23
5,600.000 MAZDA MOTOR CORP FJ6900305	5.99	30,252.98	33,532.00	0.05	3,279.02
700.000 TOYOTA INDUSTRIES CORP FJ6900545	52.93	19,884.36	37,048.71	0.06	17,164.35

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1,700.000 TOYOTA TSUSHO CORP FJ6900586	25.30	30,701.58	43,002.27	0.06	12,300.69
11,760.000 TOYOTA MOTOR CORP FJ6900644	62.68	480,526.37	737,091.52	1.10	256,565.15
1,900.000 UNICHARM CORP FJ6911484	40.97	44,912.30	77,842.15	0.12	32,929.85
1,100.000 WEST JAPAN RAILWAY CO FJ6957990	56.04	43,723.37	61,645.27	0.09	17,921.90
6,200.000 YAMADA DENKI CO LTD FJ6985025	4.96	29,522.84	30,745.70	0.05	1,222.86
800.000 YAKULT HONSHA CO LTD FJ6985116	58.86	25,777.45	47,087.18	0.07	21,309.73
2,500.000 YAMAHA MOTOR CO LTD FJ6985264	15.65	29,177.17	39,115.72	0.06	9,938.55
9,500.000 ASTELLAS PHARMA INC FJ6985389	16.68	69,083.15	158,458.08	0.24	89,374.93
2,872.000 YAMATO HOLDINGS CO LTD FJ6985561	21.60	42,065.90	62,026.79	0.09	19,960.89
2,700.000 YASKAWA ELECTRIC CORP FJ6986049	34.53	31,734.36	93,224.26	0.14	61,489.90

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,200.000 ASAHI INTECC CO LTD FJB019MQ0	28.41	29,924.74	34,091.86	0.05	4,167.12
2,200.000 M3 INC FJB02K2M5	42.50	36,778.75	93,497.70	0.14	56,718.95
4,000.000 SEVEN & I HOLDINGS CO LTD FJB0FS5D1	32.63	104,593.84	130,509.34	0.19	25,915.50
3,000.000 DAIICHI SANKYO CO LTD FJB0J7D93	81.62	68,712.92	244,871.85	0.36	176,158.93
1,400.000 BANDAI NAMCO HOLDINGS INC FJB0JDQD7	52.53	21,386.68	73,539.42	0.11	52,152.74
5,000.000 MITSUBISHI CHEMICAL HOLDINGS C FJB0JQTJ2	5.82	25,872.25	29,077.26	0.04	3,205.01
2,600.000 SUMCO CORP FJB0M0C87	15.28	32,379.49	39,740.46	0.06	7,360.97
14.000 DAIWA HOUSE REIT INVESTMENT CO FJB0Z6WY1	2,354.36	31,002.21	32,961.02	0.05	1,958.81
6,700.000 INPEX CORP FJB10RB16	6.18	39,933.65	41,416.60	0.06	1,482.95
1,600.000 AOZORA BANK LTD FJB1G1851	17.39	29,239.59	27,822.22	0.04	-1,417.37

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
3,500.000 FUKUOKA FINANCIAL GROUP INC FJB1TK1Y9	15.77	45,130.42	55,183.76	0.08	10,053.34
11,700.000 SEVEN BANK LTD FJB2NT8S0	2.73	28,024.03	31,992.40	0.05	3,968.37
5,100.000 ISETAN MITSUKOSHI HOLDINGS LTD FJB2Q4CL2	5.73	28,583.54	29,214.44	0.04	630.90
1,300.000 MS&AD INSURANCE GROUP HOLDINGS FJB2Q4CS7	27.45	38,051.58	35,679.66	0.05	-2,371.92
2,200.000 OTSUKA HOLDINGS CO LTD FJB5LTM91	43.56	65,784.97	95,822.40	0.14	30,037.43
2,600.000 DAI-ICHI LIFE HOLDINGS INC FJB601QS7	11.89	32,628.48	30,919.96	0.05	-1,708.52
1,000.000 MEIJI HOLDINGS CO LTD FJB60DQV4	79.53	19,510.65	79,529.13	0.12	60,018.48
28,162.000 ENEOS HOLDINGS INC FJB627LW8	3.54	99,478.48	99,716.21	0.15	237.73
2,419.000 SOMPO HOLDINGS INC FJB62G7K0	34.36	53,626.59	83,118.44	0.12	29,491.85
2,400.000 NEXON CO LTD FJB63QM79	22.59	29,992.24	54,213.28	0.08	24,221.04

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
800.000	PEPTIDREAM INC FJB97SH97	45.79	26,955.23	36,631.60	0.05	9,676.37
12.000	NIPPON PROLOGIS REIT INC FJB98BC64	3,040.27	33,882.71	36,483.29	0.05	2,600.58
800.000	SUNTORY BEVERAGE & FOOD LTD FJBBD7Q83	38.98	31,531.26	31,181.35	0.05	-349.91
10,500.000	CONCORDIA FINANCIAL GROUP LTD FJBD97JW9	3.20	29,633.58	33,577.42	0.05	3,943.84
2,600.000	SOFTBANK CORP FJBF5M0K1	12.75	33,516.98	33,137.14	0.05	-379.84
5,850.000	MEBUKI FINANCIAL GROUP INC FJBH0VTS4	2.32	21,665.59	13,556.10	0.02	-8,109.49
7,100.000	RECRUIT HOLDINGS CO LTD FJBQRRZ08	34.13	136,345.73	242,315.42	0.36	105,969.69
25.000	NOMURA REAL ESTATE MASTER FUND FJBYSJJF3	1,199.43	33,058.01	29,985.63	0.04	-3,072.38
1,100.000	LINE CORP FJBZB1Y52	50.24	31,231.76	55,262.55	0.08	24,030.79
	TOTAL EQUITY JAPANESE YEN		**10,448,738.31**	**16,919,427.21**	**25.19**	**6,470,688.90**
	TOTAL ASSETS JAPANESE YEN		**10,590,229.67**	**17,060,558.15**	**25.40**	**6,470,328.48**

NEW ZEALAND DOLLAR

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
CASH & CASH EQUIVALENTS						
	NON-BASE CURRENCY		61.21	61.22	0.00	0.01
EQUITY						
4,533.000 AN6287253	A2 MILK CO LTD	13.00	29,303.80	58,916.82	0.09	29,613.02
2,791.000 AN6340250	FISHER & PAYKEL HEALTHCARE COR	22.92	46,648.26	63,962.74	0.10	17,314.48
11,740.000 AN6881436	SPARK NEW ZEALAND LTD	2.94	13,747.69	34,462.77	0.05	20,715.08
8,029.000 ANBKX3XG0	AUCKLAND INTERNATIONAL AIRPORT	4.23	22,878.09	33,958.15	0.05	11,080.06
	TOTAL EQUITY NEW ZEALAND DOLLAR		**112,577.84**	**191,300.48**	**0.28**	**78,722.64**
	TOTAL ASSETS NEW ZEALAND DOLLAR		**112,639.05**	**191,361.70**	**0.28**	**78,722.65**
NORWEGIAN KRONE						
CASH & CASH EQUIVALENTS						
	DIVIDENDS RECEIVABLE RECLAIM		386.55	350.63	0.00	-35.92
	NON-BASE CURRENCY		57.17	56.40	0.00	-0.77
	TOTAL CASH & CASH EQUIVALENTS NORWEGIAN KRONE		**443.72**	**407.03**	**0.00**	**-36.69**
EQUITY						

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5,304.000 DNB ASA SN4263307	13.18	64,624.72	69,880.63	0.10	5,255.91
3,352.000 TELENOR ASA SN4732491	14.52	51,826.70	48,679.92	0.07	-3,146.78
7,496.000 EQUINOR ASA SN7133606	14.16	90,632.79	106,142.18	0.16	15,509.39
3,186.000 MOWI ASA SNB02L489	18.93	54,021.86	60,321.64	0.09	6,299.78
14,159.000 NORSK HYDRO ASA SNB11HK30	2.75	28,375.53	38,997.06	0.06	10,621.53
2,158.000 AKER BP ASA SNB1L95G4	18.17	28,471.40	39,213.99	0.06	10,742.59
1,744.000 GJENSIDIGE FORSIKRING ASA SNB4PH0C0	18.36	30,484.02	32,016.42	0.05	1,532.40
TOTAL EQUITY NORWEGIAN KRONE		**348,437.02**	**395,251.84**	**0.59**	**46,814.82**
TOTAL ASSETS NORWEGIAN KRONE		**348,880.74**	**395,658.87**	**0.59**	**46,778.13**
POUND STERLING					
CASH & CASH EQUIVALENTS					
DIVIDENDS RECEIVABLE		13,649.35	13,695.00	0.02	45.65

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
	DIVIDENDS RECEIVABLE RECLAIM		126.87	127.26	0.00	0.39
	NON-BASE CURRENCY		17,538.11	17,644.00	0.03	105.89
	TOTAL CASH & CASH EQUIVALENTS POUND STERLING		**31,314.33**	**31,466.26**	**0.05**	**151.93**
EQUITY						
1,822.000 EX0028368	BARRICK GOLD CORP	25.45	20,469.98	46,376.02	0.07	25,906.04
2,519.000 EX0053671	ASHTEAD GROUP PLC	33.60	43,101.13	84,628.23	0.13	41,527.10
7,067.000 EX0081185	BARRATT DEVELOPMENTS PLC	6.13	39,383.76	43,301.91	0.06	3,918.15
11,107.000 EX0136708	BRITISH LAND CO PLC/THE	4.77	53,772.18	53,028.80	0.08	-743.38
21,585.000 EX0216237	AVIVA PLC	3.38	78,583.85	72,970.29	0.11	-5,613.56
14,097.000 EX0237407	DIAGEO PLC	33.13	298,466.83	467,070.47	0.70	168,603.64
985.000 EX0240542	SCHRODERS PLC	36.44	23,407.74	35,891.28	0.05	12,483.54

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430.000 DCC PLC EX0242498	83.16	31,810.12	35,757.03	0.05	3,946.91
15,189.000 BAE SYSTEMS PLC EX0263494	5.97	87,247.42	90,722.24	0.14	3,474.82
12,542.000 BRITISH AMERICAN TOBACCO PLC EX0287584	38.36	441,723.94	481,101.11	0.72	39,377.17
1,444.000 HALMA PLC EX0405202	28.46	41,075.88	41,090.27	0.06	14.39
11,357.000 STANDARD CHARTERED PLC EX0408289	5.44	57,980.79	61,757.96	0.09	3,777.17
5,633.000 IMPERIAL BRANDS PLC EX0454499	19.01	103,027.55	107,081.68	0.16	4,054.13
82,474.000 HSBC HOLDINGS PLC EX0540529	4.68	609,308.09	385,811.85	0.57	-223,496.24
29,075.000 LEGAL & GENERAL GROUP PLC EX0560394	2.73	45,858.72	79,358.49	0.12	33,499.77
21,422.000 WM MORRISON SUPERMARKETS PLC EX0604317	2.35	47,675.47	50,436.72	0.08	2,761.25
1,972.000 ASSOCIATED BRITISH FOODS PLC EX0673122	23.66	35,874.08	46,660.95	0.07	10,786.87

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4,605.000 PEARSON PLC EX0677602	7.11	33,798.96	32,762.66	0.05	-1,036.30
3,021.000 PERSIMMON PLC EX0682537	28.25	65,324.36	85,330.61	0.13	20,006.25
14,268.000 PRUDENTIAL PLC EX0709959	15.06	128,945.60	214,815.95	0.32	85,870.35
5,372.000 RIO TINTO PLC EX0718877	56.21	231,647.15	301,946.39	0.45	70,299.24
3,368.000 ST JAMES'S PLACE PLC EX0766934	11.77	32,169.68	39,650.77	0.06	7,481.09
4,252.000 SSE PLC EX0790876	16.86	58,982.78	71,687.71	0.11	12,704.93
78,476.000 BP PLC EX0798051	3.80	418,587.62	297,876.31	0.44	-120,711.31
243,423.000 LLOYDS BANKING GROUP PLC EX0870611	0.39	96,218.78	93,766.13	0.14	-2,452.65
24,135.000 TESCO PLC EX0884703	2.82	66,593.49	68,022.18	0.10	1,428.69
5,779.000 SMITH & NEPHEW PLC EX0922321	18.60	71,175.26	107,500.72	0.16	36,325.46

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20,960.000 GLAXOSMITHKLINE PLC EX0925282	20.22	402,474.17	423,849.55	0.63	21,375.38
3,471.000 WEIR GROUP PLC/THE EX0946585	13.14	39,333.95	45,611.05	0.07	6,277.10
7,207.000 ASTRAZENECA PLC EX0989528	104.05	385,222.74	749,887.46	1.12	364,664.72
22,883.000 BT GROUP PLC EX3091355	1.41	31,586.86	32,246.76	0.05	659.90
75,212.000 BARCLAYS PLC EX3134866	1.41	98,383.69	106,332.73	0.16	7,949.04
1,112.000 INTERTEK GROUP PLC EX3163832	67.22	44,071.92	74,744.90	0.11	30,672.98
2,688.000 BURBERRY GROUP PLC EX3174300	19.76	34,350.65	53,124.08	0.08	18,773.43
1,175.000 NEXT PLC EX3208983	60.47	44,321.56	71,052.56	0.11	26,731.00
32,718.000 ITV PLC EX3398644	0.92	31,089.97	30,190.40	0.04	-899.57
11,227.000 J SAINSBURY PLC EXB019KW9	2.58	24,770.36	28,951.03	0.04	4,180.67

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27,225.000 G4S PLC EXB01FLG9	1.41	32,458.83	38,331.88	0.06	5,873.05
1,073.000 ADMIRAL GROUP PLC EXB02J636	28.41	25,534.38	30,480.11	0.05	4,945.73
1,495.000 BERKELEY GROUP HOLDINGS PLC EXB02L3W0	51.46	53,731.74	76,936.80	0.11	23,205.06
62,137.000 CENTRICA PLC EXB033F22	0.48	29,931.82	29,589.65	0.04	-342.17
16,191.000 ROYAL DUTCH SHELL PLC EXB03MLX5 A SHS	15.90	366,611.87	257,472.07	0.38	-109,139.80
17,185.000 ROYAL DUTCH SHELL PLC EXB03MM48 B SHS	15.12	413,199.32	259,901.54	0.39	-153,297.78
2,720.000 BUNZL PLC EXB0744B8	26.76	41,406.16	72,795.62	0.11	31,389.46
1,898.000 LONDON STOCK EXCHANGE GROUP PL EXB0SWJX9	103.27	61,463.89	196,009.21	0.29	134,545.32
6,713.000 UNILEVER PLC EXB10RZP7	53.81	231,588.36	361,229.08	0.54	129,640.72
5,784.000 EXPERIAN PLC EXB19NLV9	34.83	64,346.11	201,465.77	0.30	137,119.66

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1,559.000 SEVERN TRENT PLC EXB1FH8J7	30.63	34,012.98	47,752.99	0.07	13,740.01
809.000 WHITBREAD PLC EXB1KJJ48	27.46	15,289.27	22,211.12	0.03	6,921.85
2,155.000 HARGREAVES LANSDOWN PLC EXB1VZ0M0	20.12	36,660.56	43,362.37	0.06	6,701.81
7,001.000 ANGLO AMERICAN PLC EXB1XZS89	23.10	106,761.59	161,711.24	0.24	54,949.65
6,407.000 3I GROUP PLC EXB1YW440	10.29	39,494.37	65,912.69	0.10	26,418.32
3,990.000 RECKITT BENCKISER GROUP PLC EXB24CGK6	91.83	256,610.51	366,400.87	0.55	109,790.36
6,118.000 RELX PLC EXB2B0DG6	23.11	62,839.49	141,360.79	0.21	78,521.30
5,115.000 UNITED UTILITIES GROUP PLC EXB39J2M5	11.25	45,600.73	57,525.50	0.09	11,924.77
2,508.000 OCADO GROUP PLC EXB3MBS72	25.06	53,101.98	62,845.38	0.09	9,743.40
37,099.000 GLENCORE PLC EXB4T3BW4	2.12	67,579.57	78,486.44	0.12	10,906.87

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3,204.000 GVC HOLDINGS PLC EXB5VQMV7	9.15	20,882.72	29,319.33	0.04	8,436.61
7,366.000 SEGRO PLC EXB5ZN1N1	11.06	38,931.08	81,457.79	0.12	42,526.71
8,056.000 ROLLS-ROYCE HOLDINGS PLC EXB63H842	3.53	34,226.63	28,408.69	0.04	-5,817.94
9,086.000 EVRAZ PLC EXB71N6K5	3.56	23,306.64	32,377.69	0.05	9,071.05
60,854.000 NATWEST GROUP PLC EXB7T7729	1.50	95,778.84	91,432.50	0.14	-4,346.34
8,168.000 SAGE GROUP PLC/THE EXB8C3BL7	8.30	40,955.28	67,800.61	0.10	26,845.33
6,536.000 WPP PLC EXB8KF9B6	7.79	49,511.12	50,942.66	0.08	1,431.54
1,638.000 COCA-COLA HBC AG EXB9895B6	25.06	34,027.96	41,044.95	0.06	7,016.99
667.000 AVEVA GROUP PLC EXBBG9VN7	50.56	28,804.61	33,724.02	0.05	4,919.41
7,201.000 COMPASS GROUP PLC EXBD6K458	13.74	64,989.99	98,940.82	0.15	33,950.83

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14,712.000 NATIONAL GRID PLC EXBDR05C3	12.22	156,196.02	179,818.23	0.27	23,622.21
11,041.000 BHP GROUP PLC EXBH0P3Z9	20.44	195,370.39	225,697.54	0.34	30,327.15
73,346.000 VODAFONE GROUP PLC EXBH4HKS0	1.59	109,878.65	116,781.08	0.17	6,902.43
978.000 INTERCONTINENTAL HOTELS GROUP EXBHJYC07	44.07	29,880.03	43,104.23	0.06	13,224.20
6,128.000 MICRO FOCUS INTERNATIONAL PLC EXBJ1F4N2	5.34	30,594.11	32,709.99	0.05	2,115.88
917.000 CRODA INTERNATIONAL PLC EXBJFFLV0	64.94	40,183.00	59,552.86	0.09	19,369.86
1,192.000 FERGUSON PLC EXBJVNSS5	81.70	38,338.83	97,383.86	0.14	59,045.03
15,752.000 M&G PLC EXBKFB1C0	2.07	24,880.54	32,610.55	0.05	7,730.01
8,429.000 INFORMA PLC EXBMJ6DW6	5.81	48,374.74	48,991.56	0.07	616.82
6,132.000 AUTO TRADER GROUP PLC EXBVYVFW2	6.50	33,607.83	39,883.75	0.06	6,275.92

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268.000	SPIRAX-SARCO ENGINEERING PLC EXBWFGQN2	123.26	31,506.19	33,034.61	0.05	1,528.42
4,258.000	LAND SECURITIES GROUP PLC EXBYW0PQ8 REIT	6.83	33,684.28	29,094.35	0.04	-4,589.93
3,493.000	JD SPORTS FASHION PLC EXBYX91H4	7.69	23,725.78	26,853.85	0.04	3,128.07
22,257.000	MELROSE INDUSTRIES PLC EXBZ1G438	1.41	34,370.41	31,350.85	0.05	-3,019.56
	TOTAL EQUITY POUND STERLING		**7,698,046.28**	**9,236,492.74**	**13.75**	**1,538,446.46**
	TOTAL ASSETS POUND STERLING		**7,729,360.61**	**9,267,959.00**	**13.80**	**1,538,598.39**
SINGAPORE DOLLAR						
CASH & CASH EQUIVALENTS						
	DIVIDENDS RECEIVABLE		1,306.39	1,304.61	0.00	-1.78
	NON-BASE CURRENCY		6,158.52	6,150.99	0.01	-7.53
	TOTAL CASH & CASH EQUIVALENTS SINGAPORE DOLLAR		**7,464.91**	**7,455.60**	**0.01**	**-9.31**
EQUITY						
12,900.000	DBS GROUP HOLDINGS LTD FM6175208	14.91	152,871.35	192,337.19	0.29	39,465.84
14,000.000	CAPITALAND MALL TRUST FM6420125	1.40	18,031.42	19,669.55	0.03	1,638.13

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
15,500.000 ASCENDAS REAL ESTATE INVESTMEN FM6563874	2.27	29,523.27	35,220.96	0.05	5,697.69
15,000.000 COMFORTDELGRO CORP LTD FM6603738	1.04	16,761.65	15,590.84	0.02	-1,170.81
9,500.000 UNITED OVERSEAS BANK LTD FM6916783	14.50	133,846.07	137,762.09	0.21	3,916.02
10,400.000 UOL GROUP LTD FM6916841	4.87	45,316.88	50,618.97	0.08	5,302.09
2,800.000 VENTURE CORP LTD FM6927376	11.60	29,049.70	32,474.82	0.05	3,425.12
27,100.000 SEMBCORP INDUSTRIES LTD FMB08X160	1.25	30,679.18	33,995.20	0.05	3,316.02
25,100.000 OVERSEA-CHINESE BANKING CORP L FMB0F9V21	6.45	159,864.36	161,929.68	0.24	2,065.32
10,400.000 WILMAR INTERNATIONAL LTD FMB17KC65	2.93	25,247.33	30,490.66	0.05	5,243.33
8,100.000 KEPPEL CORP LTD FMB1VQ5C0	4.27	31,837.98	34,605.21	0.05	2,767.23
43,000.000 YANGZIJIANG SHIPBUILDING HOLDI FMB1VT039	0.67	24,714.88	28,665.64	0.04	3,950.76

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PARAMETRIC EAFE PI2 - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
TOTAL EQUITY SINGAPORE DOLLAR		**697,744.07**	**773,360.81**	**1.15**	**75,616.74**
TOTAL ASSETS SINGAPORE DOLLAR		**705,208.98**	**780,816.41**	**1.16**	**75,607.43**
SWEDISH KRONA					
CASH & CASH EQUIVALENTS					
DIVIDENDS RECEIVABLE RECLAIM		8,204.68	7,739.03	0.01	-465.65
NON-BASE CURRENCY		2,100.43	2,107.31	0.00	6.88
TOTAL CASH & CASH EQUIVALENTS SWEDISH KRONA		**10,305.11**	**9,846.34**	**0.01**	**-458.77**
EQUITY					
11,189.000 SKANDINAVISKA ENSKILDA BANKEN SS4813340	8.66	78,510.38	96,918.13	0.14	18,407.75
5,396.000 SWEDBANK AB SS4846522	12.82	63,686.02	69,153.87	0.10	5,467.85
1,200.000 SWEDISH MATCH AB SS5048565	70.30	28,861.98	84,365.09	0.13	55,503.11
1,800.000 SECURITAS AB SS5554042	13.48	19,362.63	24,256.57	0.04	4,893.94
3,043.000 INVESTOR AB SS5679591	52.78	71,722.11	160,598.83	0.24	88,876.72
2,342.000 HENNES & MAURITZ AB SS5687438	14.49	36,991.93	33,936.02	0.05	-3,055.91

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
14,754.000	TELEFONAKTIEBOLAGET LM ERICSSO SS5959373	9.25	96,043.06	136,444.39	0.20	40,401.33
9,479.000	TELIA CO AB SS5978381	3.74	29,921.45	35,406.42	0.05	5,484.97
1,663.000	SKANSKA AB SS7142093	20.34	31,550.66	33,825.30	0.05	2,274.64
1,250.000	ALFA LAVAL AB SS7332686	21.94	18,788.18	27,424.02	0.04	8,635.84
728.000	ICA GRUPPEN AB SSB0S1658	47.42	22,081.29	34,522.11	0.05	12,440.82
127.000	MODERN TIMES GROUP MTG AB SSB151P43	10.85	1,854.21	1,378.15	0.00	-476.06
2,010.000	SKF AB SSB1Q3J35	18.59	29,843.12	37,355.86	0.06	7,512.74
7,788.000	VOLVO AB SSB1QH836	15.66	84,851.79	121,961.13	0.18	37,109.34
5,294.000	SANDVIK AB SSB1VQ251	18.69	73,136.21	98,928.84	0.15	25,792.63
3,891.000	SVENSKA CELLULOSA AB SCA SSB1VVGZ9	11.89	15,470.16	46,274.44	0.07	30,804.28

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
1,249.000	HEXAGON AB SSB1XFTL9	58.39	32,373.29	72,929.22	0.11	40,555.93
4,598.000	TELE2 AB SSB97C732	13.26	36,714.28	60,975.02	0.09	24,260.74
3,793.000	ATLAS COPCO AB SSBD97BN3	42.35	52,713.74	160,649.78	0.24	107,936.04
1,600.000	ATLAS COPCO AB SSBD97BS2	36.99	16,026.61	59,180.07	0.09	43,153.46
902.000	INTERNATIONAL PETROLEUM CORP/S SSBDCT292	1.81	2,322.57	1,635.22	0.00	-687.35
3,793.000	EPIROC AB SSBDZV110	12.46	15,555.32	47,266.70	0.07	31,711.38
1,600.000	EPIROC AB SSBDZV128	12.23	5,093.48	19,569.27	0.03	14,475.79
2,732.000	ESSITY AB SSBF1K7P7	32.32	37,039.92	88,294.10	0.13	51,254.18
127.000	NORDIC ENTERTAINMENT GROUP AB SSBHWV254	30.59	2,583.70	3,884.98	0.01	1,301.28
2,479.000	BOLIDEN AB SSBJV12J7	22.75	38,617.56	56,409.55	0.08	17,791.99

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
2,681.000	KINNEVIK AB SSBK9X804	26.31	59,606.67	70,531.05	0.11	10,924.38
10,185.000	SVENSKA HANDELSBANKEN AB SSBXDZ9Q8	9.49	89,968.41	96,682.97	0.14	6,714.56
4,762.000	ASSA ABLOY AB SSBYPC1T6	20.33	38,481.19	96,833.19	0.14	58,352.00
21,016.000	NORDEA BANK ABP SSBYZF9J2	6.90	131,320.67	145,067.05	0.22	13,746.38
	TOTAL EQUITY SWEDISH KRONA		**1,261,092.59**	**2,022,657.34**	**3.01**	**761,564.75**
	TOTAL ASSETS SWEDISH KRONA		**1,271,397.70**	**2,032,503.68**	**3.03**	**761,105.98**
SWISS FRANC						
CASH & CASH EQUIVALENTS						
	DIVIDENDS RECEIVABLE RECLAIM		63,869.79	66,586.83	0.10	2,717.04
	NON-BASE CURRENCY		348.70	349.90	0.00	1.20
	TOTAL CASH & CASH EQUIVALENTS SWISS FRANC		**64,218.49**	**66,936.73**	**0.10**	**2,718.24**
EQUITY						
36.000	SGS SA ES4824771	2,443.14	59,776.97	87,953.14	0.13	28,176.17
195.000	SWISSCOM AG ES5533975	523.35	79,340.12	102,053.19	0.15	22,713.07

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
4.000 CHOCOLADEFABRIKEN LINDT & SPRU ES5962281	8,231.76	25,194.29	32,927.02	0.05	7,732.73
44.000 GIVAUDAN SA ES5980614	3,723.29	59,757.99	163,824.60	0.24	104,066.61
662.000 ZURICH INSURANCE GROUP AG ES5983816	352.70	165,350.45	233,486.78	0.35	68,136.33
11,223.000 NOVARTIS AG ES7103066	86.98	587,993.29	976,201.43	1.45	388,208.14
8,990.000 ABB LTD ES7108891	22.51	164,492.71	202,371.06	0.30	37,878.35
3,669.000 ROCHE HOLDING AG ES7110384	346.53	679,221.47	1,271,401.14	1.89	592,179.67
912.000 ADECCO GROUP AG ES7110723	46.92	34,917.85	42,791.96	0.06	7,874.11
1,868.000 LAFARGEHOLCIM LTD ES7110756	43.81	72,239.91	81,832.81	0.12	9,592.90
1,714.000 CLARIANT AG ES7113990	19.64	30,980.65	33,663.17	0.05	2,682.52
15,635.000 NESTLE SA ES7123874	110.54	901,096.15	1,728,256.98	2.57	827,160.83

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
206.000 BALOISE HOLDING AG ES7124591	149.97	18,644.45	30,892.93	0.05	12,248.48
228.000 TEMENOS AG ES7147899	155.30	31,106.98	35,407.31	0.05	4,300.33
276.000 SONOVA HOLDING AG ES7156031	199.62	45,364.08	55,095.14	0.08	9,731.06
44.000 STRAUMANN HOLDING AG ES7156833	859.06	31,553.04	37,798.53	0.06	6,245.49
10,458.000 CREDIT SUISSE GROUP AG ES7171584	10.34	85,950.39	108,139.39	0.16	22,189.00
311.000 LONZA GROUP AG ES7333374	527.89	60,865.68	164,173.08	0.24	103,307.40
247.000 SWISS LIFE HOLDING AG ES7437803	370.43	48,682.89	91,495.96	0.14	42,813.07
47.000 EMS-CHEMIE HOLDING AG ES7635612	774.63	29,124.83	36,407.58	0.05	7,282.75
737.000 SWISS PRIME SITE AG ESB083BH9	92.45	56,781.13	68,134.87	0.10	11,353.74
114.000 PARTNERS GROUP HOLDING AG ESB119QG7	906.97	29,614.44	103,394.65	0.15	73,780.21

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
298.000	SCHINDLER HOLDING AG ESB11TCY9	235.34	38,071.29	70,132.45	0.10	32,061.16
219.000	KUEHNE + NAGEL INTERNATIONAL A ESB142S69	166.11	24,724.47	36,378.66	0.05	11,654.19
188.000	GEBERIT AG ESB1WGG94	500.45	40,106.87	94,084.32	0.14	53,977.45
1,159.000	JULIUS BAER GROUP LTD ESB4R2R51	41.84	41,614.32	48,498.07	0.07	6,883.75
1,847.000	SWISS RE AG ESB545MG7	77.10	95,379.83	142,411.29	0.21	47,031.46
2,523.000	CIE FINANCIERE RICHEMONT SA ESBCRWZ17	63.79	105,380.07	160,930.95	0.24	55,550.88
697.000	IDORSIA LTD ESBF0YK60	31.98	5,589.56	22,288.11	0.03	16,698.55
889.000	SIKA AG ESBF2DSG4	192.44	40,829.13	171,082.42	0.25	130,253.29
554.000	GROUPE BRUXELLES LAMBERT SA ESBHZLGZ7	89.23	46,519.03	49,433.49	0.07	2,914.46
2,274.000	ALCON INC ESBJT1GR2	57.37	77,335.98	130,457.12	0.19	53,121.14

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Shares/Par Security ID	Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
357.000	BANQUE CANTONALE VAUDOISE ESBMFY8R7	97.20	34,244.07	34,699.70	0.05	455.63
10,694.000	UBS GROUP AG ESBRJL171	11.51	91,559.26	123,073.26	0.18	31,514.00
245.000	VIFOR PHARMA AG ESBZ12TW9	150.44	27,478.60	36,857.95	0.05	9,379.35
	TOTAL EQUITY SWISS FRANC		**3,966,882.24**	**6,808,030.51**	**10.14**	**2,841,148.27**
	TOTAL ASSETS SWISS FRANC		**4,031,100.73**	**6,874,967.24**	**10.24**	**2,843,866.51**
U.S. DOLLAR						
CASH & CASH EQUIVALENTS						
100,485.350	BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	100,485.35	100,485.35	0.15	0.00
	DIVIDENDS RECEIVABLE		2,438.93	2,438.93	0.00	0.00
	INTEREST RECEIVABLE		9.29	9.29	0.00	0.00
	TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**102,933.57**	**102,933.57**	**0.15**	**0.00**
EQUITY						
201.000	BEIGENE LTD 07725L102 ADR	188.40	30,816.32	37,868.40	0.06	7,052.08
1,963.000	MELCO RESORTS & ENTERTAINMENT 585464100 ADR	15.52	32,870.44	30,465.76	0.05	-2,404.68

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PARAMETRIC EAFE PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
7,794.000 TEVA PHARMACEUTICAL INDUSTRIES 881624209 ADR	12.33	55,336.81	96,100.02	0.14	40,763.21
800.000 JARDINE MATHESON HOLDINGS LTD FM6472118	41.74	34,118.68	33,392.00	0.05	-726.68
2,000.000 JARDINE STRATEGIC HOLDINGS LTD FM6472969	21.55	42,235.95	43,100.00	0.06	864.05
699.000 CHECK POINT SOFTWARE TECHNOLOG M22465104	107.43	56,619.15	75,093.57	0.11	18,474.42
310.000 CYBERARK SOFTWARE LTD M2682V108	99.27	26,898.70	30,773.70	0.05	3,875.00
242.000 WIX.COM LTD M98068105	256.22	25,286.58	62,005.24	0.09	36,718.66
623.000 NXP SEMICONDUCTORS NV N6596X109	114.04	47,981.00	71,046.92	0.11	23,065.92
TOTAL EQUITY U.S. DOLLAR		**352,163.63**	**479,845.61**	**0.71**	**127,681.98**
TOTAL ASSETS U.S. DOLLAR		**455,097.20**	**582,779.18**	**0.87**	**127,681.98**
TOTAL ASSETS		**45,005,808.03**	**67,166,472.87**	**100.00**	**22,160,664.84**

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WELLINGTON EMD PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
FIXED INCOME SECURITIES					
2,307,938.878 WTC-CTF JPM PAG EMERGING 99VVAJY68 MARKETS DEBT	10.53	23,077,787.58	24,302,596.39	100.00	1,224,808.81

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STEPSTONE PI2 - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
PRIVATE EQUITY					
54,933,236.000 STEPSTONE XL OPP FUND LP 99VVAKD50		40,238,388.98	54,933,236.00	58.21	14,694,847.02
25,693,451.000 STEPSTONE XL OP FUND II-A 99VVBMW13		23,601,012.64	25,693,451.00	27.23	2,092,438.36
13,743,699.000 STEPSTONE CAP PARTNERS IV LP 99VVBNR66		12,672,578.00	13,743,699.00	14.56	1,071,121.00
TOTAL PRIVATE EQUITY U.S. DOLLAR		**76,511,979.62**	**94,370,386.00**	**100.00**	**17,858,406.38**
TOTAL ASSETS U.S. DOLLAR		**76,511,979.62**	**94,370,386.00**	**100.00**	**17,858,406.38**
TOTAL ASSETS		**76,511,979.62**	**94,370,386.00**	**100.00**	**17,858,406.38**

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FIRST PRINCIPLES PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
2,603,363.340 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	2,603,363.34	2,603,363.34	2.14	0.00
-200,000.000 SWAP COLLATERAL WITH BARCLAYS 99QAAAPN2		-200,000.00	-200,000.00	-0.16	0.00
CASH		9,648.84	9,648.84	0.01	0.00
INTEREST RECEIVABLE		879,669.95	879,669.95	0.72	0.00
PAYABLE FOR INVESTMENTS PURCHASED		-754,687.50	-754,687.50	-0.62	0.00
TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**2,537,994.63**	**2,537,994.63**	**2.09**	**0.00**
FIXED INCOME SECURITIES					
180,000.000 AT&T INC 00206RDH2 5.150% 03/15/2042 DD 03/15/16	124.82	176,588.16	224,677.80	0.18	48,089.64
840,000.000 AT&T INC 00206RGQ9 4.300% 02/15/2030 DD 08/15/18	117.20	940,131.94	984,438.00	0.81	44,306.06
375,000.000 AT&T INC 00206RHK1 4.850% 03/01/2039 DD 02/19/19	120.61	380,320.20	452,295.00	0.37	71,974.80

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FIRST PRINCIPLES PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
570,000.000 AERCAP IRELAND CAPITAL DAC / A 00774MAE5 3.875% 01/23/2028 DD 01/23/18	90.32	592,328.19	514,841.10	0.42	-77,487.09
600,000.000 AIR LEASE CORP 00912XAV6 3.625% 04/01/2027 DD 03/08/17	98.08	586,632.09	588,480.00	0.48	1,847.91
850,000.000 AIRCASTLE LTD 00928QAQ4 4.125% 05/01/2024 DD 03/20/17	93.95	889,273.30	798,532.50	0.66	-90,740.80
1,050,000.000 ALIBABA GROUP HOLDING LTD 01609WAT9 3.400% 12/06/2027 DD 12/06/17	111.10	1,100,053.73	1,166,508.00	0.96	66,454.27
500,000.000 ALLY FINANCIAL INC 02005NBK5 3.050% 06/05/2023 DD 06/03/20	101.20	505,754.59	506,010.00	0.42	255.41
450,000.000 AMAZON.COM INC 023135BF2 3.875% 08/22/2037 DD 02/22/18	123.82	459,326.16	557,194.50	0.46	97,868.34
300,000.000 AMAZON.COM INC 023135BJ4 4.050% 08/22/2047 DD 02/22/18	130.09	313,048.37	390,267.00	0.32	77,218.63
490,000.000 AMGEN INC 031162CD0 4.563% 06/15/2048 DD 12/15/16	130.22	581,519.77	638,078.00	0.52	56,558.23
1,000,000.000 AMGEN INC 031162CF5 4.663% 06/15/2051 DD 12/15/16	133.32	1,290,715.64	1,333,160.00	1.10	42,444.36
160,000.000 ANHEUSER-BUSCH INBEV WORLDWIDE 03523TBF4 8.200% 01/15/2039 DD 01/15/11	157.70	246,372.14	252,313.60	0.21	5,941.46

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
500,000.000 ANHEUSER-BUSCH INBEV FINANCE I 035242AN6 4.900% 02/01/2046 DD 01/25/16	121.70	569,272.37	608,515.00	0.50	39,242.63
280,000.000 ANTHEM INC 036752AG8 4.101% 03/01/2028 DD 03/02/18	117.19	308,000.94	328,134.80	0.27	20,133.86
490,000.000 APPLE INC 037833BX7 4.650% 02/23/2046 DD 02/23/16	137.72	632,490.67	674,803.50	0.56	42,312.83
300,000.000 APPLE INC 037833DD9 3.750% 09/12/2047 DD 09/12/17	119.95	298,379.02	359,844.00	0.30	61,464.98
750,000.000 ARES XXXIV CLO LTD 2A BR2 144A 04015GAR0 VAR RT 04/17/2033 DD 03/20/20	100.00	750,000.00	750,000.00	0.62	0.00
280,000.000 ASTRAZENECA PLC 046353AD0 6.450% 09/15/2037 DD 09/12/07	152.07	402,645.34	425,782.00	0.35	23,136.66
300,000.000 AUSTRALIA & NEW ZEALAND B 144A 052528AL0 VAR RT 07/22/2030 DD 01/22/20	101.99	300,000.00	305,979.00	0.25	5,979.00
280,000.000 AUTOZONE INC 053332AV4 3.750% 06/01/2027 DD 04/18/17	112.07	302,709.77	313,784.80	0.26	11,075.03
290,000.000 BANK OF AMERICA CORP 06051GHS1 VAR RT 03/15/2050 DD 03/15/19	129.23	346,163.12	374,767.00	0.31	28,603.88
1,000,000.000 BANK OF AMERICA CORP 06051GJB6 VAR RT 04/29/2031 DD 04/29/20	105.82	1,027,678.46	1,058,150.00	0.87	30,471.54

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
250,000.000 BARRICK GOLD CORP 067901AH1 5.250% 04/01/2042 DD 04/03/12	131.78	313,798.83	329,445.00	0.27	15,646.17
490,000.000 BECTON DICKINSON AND CO 075887BV0 3.363% 06/06/2024 DD 06/06/17	107.93	513,664.38	528,842.30	0.43	15,177.92
300,000.000 BECTON DICKINSON AND CO 075887BW8 3.700% 06/06/2027 DD 06/06/17	111.77	315,987.11	335,313.00	0.28	19,325.89
450,000.000 BOEING CO/THE 097023AS4 6.625% 02/15/2038 DD 02/24/98	119.32	615,993.71	536,953.50	0.44	-79,040.21
700,000.000 BOSTON SCIENTIFIC CORP 101137AX5 4.000% 03/01/2029 DD 02/25/19	114.42	784,830.93	800,961.00	0.66	16,130.07
490,000.000 BP CAPITAL MARKETS AMERICA INC 10373QBE9 3.410% 02/11/2026 DD 02/11/19	110.60	523,158.06	541,930.20	0.45	18,772.14
680,000.000 BRISTOL-MYERS SQUIBB CO 144A 110122CC0 4.125% 06/15/2039 DD 05/16/19	127.31	760,899.63	865,694.40	0.71	104,794.77
300,000.000 BRISTOL-MYERS SQUIBB CO 144A 110122CD8 4.250% 10/26/2049 DD 05/16/19	131.92	319,584.94	395,760.00	0.33	76,175.06
280,000.000 BROADCOM CORP / BROADCOM CAYMA 11134LAP4 3.125% 01/15/2025 DD 10/17/17	106.82	279,947.44	299,096.00	0.25	19,148.56
280,000.000 BURLINGTON NORTHERN SANTA FE L 12189LAW1 4.150% 04/01/2045 DD 03/09/15	123.07	330,069.09	344,582.00	0.28	14,512.91

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
490,000.000 CIGNA CORP 144A 125523CA6 3.400% 03/01/2027 DD 09/01/19	110.16	516,659.37	539,759.50	0.44	23,100.13
200,000.000 CIT GROUP INC 125581GV4 4.125% 03/09/2021 DD 03/09/18	100.00	194,263.38	200,000.00	0.16	5,736.62
1,480,000.000 CIT GROUP INC 125581GW2 5.250% 03/07/2025 DD 03/09/18	103.60	1,616,283.89	1,533,339.20	1.26	-82,944.69
490,000.000 CVS HEALTH CORP 126650CX6 4.300% 03/25/2028 DD 03/09/18	116.96	541,094.87	573,089.30	0.47	31,994.43
1,120,000.000 CAPITAL ONE FINANCIAL CORP 14040HBW4 3.800% 01/31/2028 DD 01/30/18	111.33	1,215,140.52	1,246,918.40	1.03	31,777.88
250,000.000 CENTENE CORP 15135BAR2 4.250% 12/15/2027 DD 12/06/19	103.19	257,187.38	257,977.50	0.21	790.12
300,000.000 CHARTER COMMUNICATIONS OPERATI 161175AY0 4.908% 07/23/2025 DD 07/23/16	114.61	310,084.84	343,824.00	0.28	33,739.16
480,000.000 CHARTER COMMUNICATIONS OPERATI 161175BJ2 3.750% 02/15/2028 DD 07/06/17	109.01	449,771.29	523,252.80	0.43	73,481.51
280,000.000 CHARTER COMMUNICATIONS OPERATI 161175BR4 5.050% 03/30/2029 DD 01/17/19	118.04	319,860.21	330,514.80	0.27	10,654.59
700,000.000 CITIGROUP INC 172967KR1 4.750% 05/18/2046 DD 05/18/16	127.20	857,870.87	890,407.00	0.73	32,536.13

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600,000.000 CITIGROUP INC 172967LP4 VAR RT 07/24/2028 DD 07/24/17	111.49	605,006.07	668,958.00	0.55	63,951.93
630,000.000 CITIGROUP INC 172967LS8 VAR RT 10/27/2028 DD 10/27/17	110.21	630,000.00	694,291.50	0.57	64,291.50
1,500,000.000 CITIGROUP INC 172967ME8 VAR RT 03/20/2030 DD 03/20/19	114.92	1,563,717.49	1,723,755.00	1.42	160,037.51
250,000.000 COMCAST CORP 20030NCE9 3.999% 11/01/2049 DD 10/19/17	120.76	261,126.54	301,910.00	0.25	40,783.46
1,000,000.000 CONSUMERS ENERGY CO 210518CZ7 3.250% 08/15/2046 DD 08/10/16	111.60	1,098,290.68	1,116,000.00	0.92	17,709.32
760,000.000 CREDIT SUISSE AG 144A 22546DAA4 6.500% 08/08/2023 DD 08/08/13	109.03	835,342.98	828,597.60	0.68	-6,745.38
730,000.000 CROWN CASTLE INTERNATIONAL COR 22822VAB7 4.450% 02/15/2026 DD 02/08/16	114.63	806,067.79	836,791.70	0.69	30,723.91
490,000.000 DR HORTON INC 23331ABM0 2.500% 10/15/2024 DD 10/10/19	104.45	497,649.61	511,780.50	0.42	14,130.89
150,000.000 DAIMLER FINANCE NORTH AME 144A 233851CS1 2.850% 01/06/2022 DD 01/06/17	102.24	149,947.70	153,354.00	0.13	3,406.30
1,226,562.500 DAVITA 8/19 DELAYED DRAW TLA 23918VAW4	96.50	1,223,771.70	1,183,632.81	0.97	-40,138.89

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
420,000.000 JOHN DEERE CAPITAL CORP 24422EUU1 3.450% 03/07/2029 DD 03/07/19	115.93	460,521.16	486,897.60	0.40	26,376.44
820,000.000 DELL INTERNATIONAL LLC / 144A 24703DAY7 4.000% 07/15/2024 DD 03/20/19	107.80	856,379.64	883,919.00	0.73	27,539.36
1,430,000.000 DELTA AIR LINES INC 247361ZU5 2.900% 10/28/2024 DD 10/28/19	81.10	1,422,480.69	1,159,758.60	0.95	-262,722.09
300,000.000 DELL INTERNATIONAL LLC / 144A 25272KAK9 6.020% 06/15/2026 DD 06/01/16	114.65	314,001.30	343,944.00	0.28	29,942.70
280,000.000 DISCOVERY COMMUNICATIONS LLC 25470DBF5 4.125% 05/15/2029 DD 05/21/19	114.18	305,887.34	319,698.40	0.26	13,811.06
410,000.000 DOMINION ENERGY INC 25746UCZ0 4.600% 03/15/2049 DD 03/13/19	125.95	456,245.37	516,403.20	0.42	60,157.83
250,000.000 DOW CHEMICAL CO/THE 260543CR2 5.550% 11/30/2048 DD 05/30/19	130.67	281,773.47	326,662.50	0.27	44,889.03
375,000.000 DUKE ENERGY CORP 26441CAS4 2.650% 09/01/2026 DD 08/12/16	108.50	362,978.56	406,860.00	0.33	43,881.44
450,000.000 DUKE ENERGY CORP 26441CBF1 4.200% 06/15/2049 DD 06/07/19	122.00	457,662.83	548,991.00	0.45	91,328.17
280,000.000 EASTMAN CHEMICAL CO 277432AW0 4.500% 12/01/2028 DD 11/06/18	114.89	315,333.45	321,703.20	0.26	6,369.75

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290,000.000 ENERGY TRANSFER OPERATING LP 29273RBD0 4.050% 03/15/2025 DD 03/12/15	106.11	302,110.10	307,727.70	0.25	5,617.60
400,000.000 ENERGY TRANSFER OPERATING LP 29278NAF0 4.950% 06/15/2028 DD 06/08/18	107.39	433,516.46	429,556.00	0.35	-3,960.46
770,000.000 ENERGY TRANSFER OPERATING LP 29278NAN3 5.500% 06/01/2027 DD 12/01/18	111.46	852,005.77	858,242.00	0.71	6,236.23
175,000.000 ENTERPRISE PRODUCTS OPERATING 29379VBA0 4.850% 03/15/2044 DD 03/18/13	115.85	183,512.67	202,732.25	0.17	19,219.58
1,640,000.000 EQUINIX INC 29444UAR7 5.375% 05/15/2027 DD 03/22/17	109.10	1,753,168.28	1,789,240.00	1.47	36,071.72
170,000.000 FEDEX CORP 31428XBM7 3.300% 03/15/2027 DD 01/06/17	107.71	171,083.44	183,107.00	0.15	12,023.56
280,000.000 FISERV INC 337738AU2 3.500% 07/01/2029 DD 06/24/19	112.41	300,231.03	314,753.60	0.26	14,522.57
300,000.000 FOX CORP 35137LAH8 4.709% 01/25/2029 DD 01/25/20	120.13	332,627.15	360,378.00	0.30	27,750.85
1,500,000.000 GENERAL MOTORS CO 37045VAW0 5.400% 10/02/2023 DD 05/12/20	108.13	1,548,660.73	1,621,875.00	1.33	73,214.27
250,000.000 GENERAL MOTORS FINANCIAL CO IN 37045XBR6 VAR RT 01/14/2022 DD 01/17/17	99.34	251,537.29	248,352.50	0.20	-3,184.79

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
490,000.000 GENERAL MOTORS FINANCIAL CO IN 37045XBW5 3.950% 04/13/2024 DD 04/13/17	103.45	514,044.68	506,905.00	0.42	-7,139.68
5,000.000 GEORGIA-PACIFIC LLC 373298CF3 8.000% 01/15/2024 DD 12/11/03	124.95	5,712.88	6,247.60	0.01	534.72
490,000.000 GILEAD SCIENCES INC 375558BG7 4.600% 09/01/2035 DD 09/14/15	131.22	603,698.89	642,987.80	0.53	39,288.91
625,000.000 GOLDMAN SACHS GROUP INC/THE 38141GFD1 6.750% 10/01/2037 DD 10/03/07	145.59	812,197.44	909,912.50	0.75	97,715.06
580,000.000 GOLDMAN SACHS GROUP INC/THE 38141GXD1 VAR RT 05/15/2026 DD 05/17/18	99.27	585,873.94	575,766.00	0.47	-10,107.94
340,000.000 HCA INC 404119BN8 5.000% 03/15/2024 DD 03/17/14	111.15	355,637.43	377,910.00	0.31	22,272.57
1,020,000.000 HCA INC 404119BQ1 5.250% 04/15/2025 DD 10/17/14	114.69	1,129,751.00	1,169,797.20	0.96	40,046.20
400,000.000 HCA INC 404119BU2 4.500% 02/15/2027 DD 08/15/16	111.50	406,516.18	445,988.00	0.37	39,471.82
840,000.000 HSBC HOLDINGS PLC 404280AW9 4.300% 03/08/2026 DD 03/08/16	112.88	922,624.95	948,192.00	0.78	25,567.05
420,000.000 WELLTOWER INC 42217KBF2 4.000% 06/01/2025 DD 05/26/15	110.53	455,801.95	464,221.80	0.38	8,419.85

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
750,000.000 HILTON HOTELS 6/19 COV-LITE 43289DAH6 0.000% 06/18/2026 DD 06/10/19	94.23	754,687.50	706,740.00	0.58	-47,947.50
250,000.000 HONEYWELL INTERNATIONAL INC 438516BZ8 1.950% 06/01/2030 DD 05/18/20	104.51	249,730.48	261,272.50	0.21	11,542.02
450,000.000 HUNTINGTON INGALLS INDUST 144A 446413AH9 5.000% 11/15/2025 DD 11/17/15	103.54	462,697.50	465,907.50	0.38	3,210.00
300,000.000 HYUNDAI CAPITAL AMERICA 144A 44891AAR8 3.250% 09/20/2022 DD 09/20/17	102.72	299,993.38	308,145.00	0.25	8,151.62
125,000.000 INTERCONTINENTAL EXCHANGE INC 45866FAL8 3.000% 06/15/2050 DD 05/26/20	104.40	123,123.79	130,496.86	0.11	7,373.07
300,000.000 INTERNATIONAL BUSINESS MACHINE 459200KC4 4.250% 05/15/2049 DD 05/15/19	127.32	306,796.42	381,963.00	0.31	75,166.58
490,000.000 IPALCO ENTERPRISES INC 462613AM2 3.700% 09/01/2024 DD 08/22/17	106.91	511,339.28	523,859.00	0.43	12,519.72
360,000.000 JPMORGAN CHASE & CO 46625HLL2 4.950% 06/01/2045 DD 05/29/15	134.53	409,218.27	484,311.60	0.40	75,093.33
425,000.000 JPMORGAN CHASE & CO 46647PAJ5 VAR RT 07/24/2038 DD 07/24/17	117.44	426,825.17	499,098.75	0.41	72,273.58
140,000.000 JPMORGAN CHASE & CO 46647PAN6 VAR RT 01/23/2049 DD 01/23/18	120.87	140,000.00	169,213.80	0.14	29,213.80

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
300,000.000 JOHNSON & JOHNSON 478160CF9 3.625% 03/03/2037 DD 03/03/17	119.33	299,330.66	357,984.00	0.29	58,653.34
740,000.000 KINDER MORGAN INC 49456BAF8 4.300% 06/01/2025 DD 11/26/14	112.19	798,208.28	830,235.60	0.68	32,027.32
300,000.000 KROGER CO/THE 501044DE8 2.650% 10/15/2026 DD 10/03/16	108.68	285,155.50	326,046.00	0.27	40,890.50
1,126,831.230 LFS 2019A LLC A A 144A 50201NAA9 5.250% 05/15/2031 DD 05/30/19	100.00	1,126,831.23	1,126,831.23	0.93	0.00
1,010,000.000 LENNAR CORP 526057BZ6 4.500% 04/30/2024 DD 04/28/17	103.98	1,068,566.53	1,050,187.90	0.86	-18,378.63
730,000.000 LLOYDS BANKING GROUP PLC 539439AQ2 VAR RT 11/07/2028 DD 11/07/17	108.69	775,084.41	793,407.80	0.65	18,323.39
490,000.000 LOCKHEED MARTIN CORP 539830BB4 4.070% 12/15/2042 DD 12/14/12	126.84	583,100.61	621,516.00	0.51	38,415.39
360,000.000 LOWE'S COS INC 548661DR5 3.650% 04/05/2029 DD 04/05/19	114.68	392,203.42	412,844.40	0.34	20,640.98
375,000.000 LOWE'S COS INC 548661DS3 4.550% 04/05/2049 DD 04/05/19	125.85	378,098.70	471,937.50	0.39	93,838.80
280,000.000 LYONDELLBASELL INDUSTRIES NV 552081AK7 5.750% 04/15/2024 DD 04/09/12	115.12	316,592.98	322,330.40	0.27	5,737.42

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
390,000.000 MARATHON PETROLEUM CORP 56585ABC5 5.125% 12/15/2026 DD 12/15/18	115.06	419,789.52	448,749.60	0.37	28,960.08
280,000.000 MARRIOTT INTERNATIONAL INC/MD 571903AS2 3.125% 06/15/2026 DD 06/10/16	97.27	292,070.08	272,358.80	0.22	-19,711.28
280,000.000 MCDONALD'S CORP 58013MER1 3.625% 05/01/2043 DD 05/06/13	109.73	295,275.86	307,238.40	0.25	11,962.54
200,000.000 MCDONALD'S CORP 58013MFC3 4.450% 03/01/2047 DD 03/09/17	121.69	199,075.00	243,370.00	0.20	44,295.00
475,000.000 BERKSHIRE HATHAWAY ENERGY CO 59562VAM9 6.125% 04/01/2036 DD 10/01/06	144.48	633,373.22	686,289.50	0.56	52,916.28
840,000.000 MITSUBISHI UFJ FINANCIAL GROUP 606822BM5 3.195% 07/18/2029 DD 07/18/19	109.35	886,230.66	918,573.60	0.76	32,342.94
300,000.000 MIZUHO FINANCIAL GROUP INC 60687YAK5 3.663% 02/28/2027 DD 02/28/17	110.34	300,000.00	331,029.00	0.27	31,029.00
900,000.000 MORGAN STANLEY 61744YAK4 VAR RT 07/22/2028 DD 07/24/17	112.45	906,386.70	1,012,032.00	0.83	105,645.30
510,000.000 MORGAN STANLEY 61746BEG7 4.375% 01/22/2047 DD 01/20/17	128.84	537,528.50	657,063.60	0.54	119,535.10
1,150,000.000 MOUNTAIN VIEW CLO X 2A B1 144A 62432PAL6 VAR RT 01/15/2033 DD 01/24/20	100.00	1,150,000.00	1,150,000.00	0.95	0.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
280,000.000 NXP BV / NXP FUNDING LLC 144A 62947QAZ1 4.875% 03/01/2024 DD 12/06/18	111.68	306,869.76	312,715.20	0.26	5,845.44
280,000.000 NEWMONT CORP 651639AX4 2.800% 10/01/2029 DD 09/16/19	105.46	286,956.85	295,293.60	0.24	8,336.75
280,000.000 NEXTERA ENERGY CAPITAL HOLDING 65339KAT7 3.550% 05/01/2027 DD 04/28/17	113.36	300,936.61	317,396.80	0.26	16,460.19
290,000.000 NORFOLK SOUTHERN CORP 655844BQ0 4.450% 06/15/2045 DD 06/02/15	124.60	302,493.59	361,348.70	0.30	58,855.11
280,000.000 NORFOLK SOUTHERN CORP 655844CE6 2.550% 11/01/2029 DD 11/04/19	106.31	283,802.56	297,662.40	0.24	13,859.84
450,000.000 NORTHROP GRUMMAN CORP 666807BJ0 3.850% 04/15/2045 DD 02/06/15	117.36	440,775.68	528,111.00	0.43	87,335.32
490,000.000 OHIO POWER CO 677415CR0 4.000% 06/01/2049 DD 05/22/19	121.23	571,409.95	594,036.80	0.49	22,626.85
490,000.000 ORACLE CORP 68389XBN4 3.250% 11/15/2027 DD 11/09/17	112.58	527,519.32	551,637.10	0.45	24,117.78
490,000.000 PACCAR FINANCIAL CORP 69371RQ25 2.150% 08/15/2024 DD 08/15/19	105.30	495,916.92	515,945.50	0.42	20,028.58
320,000.000 PFIZER INC 717081DE0 4.300% 06/15/2043 DD 06/03/13	126.61	346,976.49	405,155.20	0.33	58,178.71

BNY MELLON

Asset Detail - By Currency

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FIRST PRINCIPLES PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
330,000.000 REPUBLIC SERVICES INC 760759AP5 3.550% 06/01/2022 DD 05/21/12	105.05	335,867.57	346,678.20	0.29	10,810.63
280,000.000 NATWEST GROUP PLC 780097BD2 3.875% 09/12/2023 DD 09/12/16	107.81	293,796.12	301,879.20	0.25	8,083.08
310,000.000 SHELL INTERNATIONAL FINANCE BV 822582BQ4 4.000% 05/10/2046 DD 05/10/16	116.91	313,641.55	362,424.10	0.30	48,782.55
490,000.000 SOUTHERN CO/THE 842587CX3 4.400% 07/01/2046 DD 05/24/16	118.67	564,440.59	581,483.00	0.48	17,042.41
500,000.000 STARBUCKS CORP 855244BA6 3.500% 11/15/2050 DD 05/07/20	105.36	509,042.64	526,800.00	0.43	17,757.36
300,000.000 SUMITOMO MITSUI FINANCIAL GROU 86562MBP4 3.040% 07/16/2029 DD 07/16/19	107.58	312,585.07	322,752.00	0.27	10,166.93
360,000.000 SUNOCO LOGISTICS PARTNERS OPER 86765BAU3 4.000% 10/01/2027 DD 09/21/17	102.44	358,589.46	368,794.80	0.30	10,205.34
1,430,000.000 SYNCHRONY FINANCIAL 87165BAG8 4.500% 07/23/2025 DD 07/23/15	106.25	1,527,647.25	1,519,375.00	1.25	-8,272.25
500,000.000 SYSCO CORP 871829BJ5 3.300% 02/15/2050 DD 02/13/20	94.17	501,022.27	470,870.00	0.39	-30,152.27
1,500,000.000 SYSCO CORP 871829BL0 5.950% 04/01/2030 DD 04/02/20	125.61	1,821,433.45	1,884,165.00	1.55	62,731.55

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Asset Detail - By Currency

Report ID : IACS0005
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FIRST PRINCIPLES PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
280,000.000 TRANSCONTINENTAL GAS PIPE LINE 893574AH6 7.850% 02/01/2026 DD 08/01/16	130.17	354,865.02	364,464.80	0.30	9,599.78
280,000.000 UNION PACIFIC CORP 907818EB0 3.375% 02/01/2035 DD 01/29/15	112.54	299,648.23	315,117.60	0.26	15,469.37
1,025,786.700 US TREAS-CPI INFLAT 912810FQ6 3.375% 04/15/2032 DD 10/15/01	148.81	1,334,789.32	1,526,462.93	1.26	191,673.61
2,274,501.323 US TREAS-CPI INFLAT 912810QF8 2.125% 02/15/2040 DD 02/15/10	147.32	2,939,856.16	3,350,886.33	2.76	411,030.17
3,001,863.400 US TREAS-CPI INFLAT 912810QV3 0.750% 02/15/2042 DD 02/15/12	119.65	2,891,775.06	3,591,849.63	2.95	700,074.57
3,346,259.999 US TREAS-CPI INFLAT 912810RA8 0.625% 02/15/2043 DD 02/15/13	117.60	3,149,708.12	3,935,134.83	3.24	785,426.71
3,637,360.203 US TREAS-CPI INFLAT 912810RL4 0.750% 02/15/2045 DD 02/15/15	122.20	3,801,607.18	4,444,890.54	3.66	643,283.36
3,338,926.350 US TREAS-CPI INFLAT 912810RR1 1.000% 02/15/2046 DD 02/15/16	129.37	3,545,799.88	4,319,502.24	3.55	773,702.36
2,549,664.000 US TREAS-CPI INFLAT 912810RW0 0.875% 02/15/2047 DD 02/15/17	127.39	2,704,799.28	3,247,889.49	2.67	543,090.21
1,913,489.600 US TREAS-CPI INFLAT 912810SB5 1.000% 02/15/2048 DD 02/15/18	132.07	1,890,929.55	2,527,050.04	2.08	636,120.49

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
150,000.000 U S TREASURY BOND 912810SC3 3.125% 05/15/2048 DD 05/15/18	140.15	151,041.76	210,222.00	0.17	59,180.24
1,559,253.600 US TREAS-CPI INFLAT 912810SG4 1.000% 02/15/2049 DD 02/15/19	133.27	1,684,702.30	2,077,939.31	1.71	393,237.01
530,000.000 U S TREASURY BOND 912810SH2 2.875% 05/15/2049 DD 05/15/19	135.29	622,916.48	717,031.70	0.59	94,115.22
625,000.000 U S TREASURY BOND 912810SJ8 2.250% 08/15/2049 DD 08/15/19	120.26	650,163.53	751,637.50	0.62	101,473.97
447,500.000 U S TREASURY BOND 912810SK5 2.375% 11/15/2049 DD 11/15/19	123.52	544,455.33	552,734.10	0.45	8,278.77
668,311.600 US TREAS-CPI INFLAT 912810SM1 0.250% 02/15/2050 DD 02/15/20	112.17	700,530.43	749,631.76	0.62	49,101.33
350,000.000 U S TREASURY NOTE 9128286T2 2.375% 05/15/2029 DD 05/15/19	115.41	358,953.88	403,921.00	0.33	44,967.12
350,000.000 RAYTHEON TECHNOLOGIES CORP 913017BT5 4.500% 06/01/2042 DD 06/01/12	124.63	386,671.58	436,208.50	0.36	49,536.92
280,000.000 RAYTHEON TECHNOLOGIES CORP 913017CY3 4.125% 11/16/2028 DD 08/16/18	117.79	320,308.59	329,806.40	0.27	9,497.81
200,000.000 UNITEDHEALTH GROUP INC 91324PCZ3 4.250% 04/15/2047 DD 03/13/17	128.41	209,458.88	256,822.00	0.21	47,363.12

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
900,000.000 UNITEDHEALTH GROUP INC 91324PDF6 3.750% 10/15/2047 DD 10/25/17	119.33	941,720.67	1,073,934.00	0.88	132,213.33
490,000.000 VALERO ENERGY CORP 91913YAW0 4.000% 04/01/2029 DD 03/25/19	111.24	528,870.31	545,061.30	0.45	16,190.99
420,000.000 VENTAS REALTY LP 92277GAE7 3.500% 02/01/2025 DD 01/14/15	103.21	442,888.36	433,494.60	0.36	-9,393.76
330,000.000 VERIZON COMMUNICATIONS INC 92343VCX0 4.522% 09/15/2048 DD 03/13/15	132.28	409,202.28	436,527.30	0.36	27,325.02
290,000.000 VERIZON COMMUNICATIONS INC 92343VCZ5 4.672% 03/15/2055 DD 03/13/15	135.94	303,107.02	394,220.20	0.32	91,113.18
300,000.000 VISA INC 92826CAJ1 3.650% 09/15/2047 DD 09/11/17	121.50	301,427.41	364,497.00	0.30	63,069.59
1,400,000.000 VISTRA OPERATIONS CO LLC 144A 92840VAD4 3.550% 07/15/2024 DD 06/11/19	103.21	1,415,782.48	1,444,912.00	1.19	29,129.52
490,000.000 VODAFONE GROUP PLC 92857WBJ8 4.125% 05/30/2025 DD 05/30/18	113.38	533,318.09	555,537.50	0.46	22,219.41
360,000.000 WALGREENS BOOTS ALLIANCE INC 931427AQ1 3.450% 06/01/2026 DD 06/01/16	108.32	360,006.21	389,952.00	0.32	29,945.79
730,000.000 WESTPAC BANKING CORP 961214DW0 3.400% 01/25/2028 DD 01/25/18	114.04	792,797.44	832,521.20	0.68	39,723.76

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
625,000.000 ZAIS CLO 14 LTD 14A B 144A 98888BAC0 VAR RT 04/15/2032 DD 03/26/20	100.00	625,000.00	625,000.00	0.51	0.00
-3,250,000.000 IRS R US0003M P 6.75% 99QACLUW0 2034 JAN 27 **4996859B**	0.00	0.00	0.00	0.00	0.00
3,250,000.000 IRS-R US0003M P 6.75% 99QACLUU4 2034 JAN 29 **4996859B**	0.00	86,125.00	0.75	0.00	-86,124.25
12,500,000.000 IFL UL CPURNSA INDEX 99QAFKQR5 R_1.376% 2025 JUN 30 **SL3350X1**	-0.00	0.00	-25,337.50	-0.02	-25,337.50
-12,500,000.000 IFL UL CPURNSA INDEX 99QAFKQQ7 R 1.376% 2025 JUN 30 **SL3350X1**	0.00	0.00	0.00	0.00	0.00
-1,635,000.000 IRS R US0003M P 6.75% 99QACF2J3 2038 JUN 19 **SWPNDT00005**	0.00	0.00	0.00	0.00	0.00
1,635,000.000 IRS_R US0003M P 6.75% 99QACF2K0 2038 JUN 19 **SWPNDT00005**	0.00	52,810.50	27.80	0.00	-52,782.70
TOTAL FIXED INCOME SECURITIES U.S. DOLLAR		**109,925,125.02**	**119,037,123.85**	**97.91**	**9,111,998.83**
TOTAL ASSETS U.S. DOLLAR		**112,463,119.65**	**121,575,118.48**	**100.00**	**9,111,998.83**
TOTAL ASSETS		**112,463,119.65**	**121,575,118.48**	**100.00**	**9,111,998.83**

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MARATHON EAFE PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
EQUITY					
15,609.290 MARATHON EAFE 99VVA3995	1,595.16	22,235,851.50	24,899,363.90	100.00	2,663,512.40

BNY MELLON

Asset Detail - By Currency

Report ID : IACS0005
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EATON VANCE HY PI2 - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
EURO CURRENCY UNIT					
CASH & CASH EQUIVALENTS					
INTEREST RECEIVABLE		17,639.14	18,041.29	0.05	402.15
NON-BASE CURRENCY		5,464.15	5,464.15	0.02	0.00
FFX CONTRACTS RECEIVABLE		105,968.09	106,209.32	0.32	241.23
PAYABLE FOR FORWARD FOREIGN		-1,289,531.20	-1,331,955.43	-3.97	-42,424.23
TOTAL CASH & CASH EQUIVALENTS EURO CURRENCY UNIT		**-1,160,459.82**	**-1,202,240.67**	**-3.58**	**-41,780.85**
FIXED INCOME SECURITIES					
100,000.000 CATALENT PHARMA SOLUTIONS 144A 14879EAG3 2.375% 03/01/2028 DD 03/02/20	106.14	108,035.00	106,137.68	0.32	-1,897.32
100,000.000 ALTICE FINCO SA REGS ELBF2DYR8 4.750% 01/15/2028	102.22	114,887.19	102,223.95	0.30	-12,663.24
189,000.000 ALTICE FINANCING SA 144A ELBJLVWS9 2.250% 01/15/2025	105.01	210,158.55	198,477.45	0.59	-11,681.10
159,000.000 ARD FINANCE SA REGS ELBKDLTB8 5.000% 06/30/2027	107.71	176,076.60	171,253.68	0.51	-4,822.92

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Asset Detail - By Currency

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EATON VANCE HY PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
200,000.000 VIVION INVESTMENTS SARL REGS ELBKLVKS9 3.000% 08/08/2024	102.29	220,403.67	204,579.53	0.61	-15,824.14
147,000.000 ALTICE FRANCE HOLDING SA REGS ELBM636G6 4.000% 02/15/2028	101.08	162,368.85	148,592.75	0.44	-13,776.10
256,000.000 STANDARD INDUSTRIES INC/N 144A NABL4PZ32 2.250% 11/21/2026	105.50	281,638.40	270,076.47	0.80	-11,561.93
TOTAL FIXED INCOME SECURITIES EURO CURRENCY UNIT		**1,273,568.26**	**1,201,341.51**	**3.58**	**-72,226.75**
TOTAL ASSETS EURO CURRENCY UNIT		**113,108.44**	**-899.16**	**-0.00**	**-114,007.60**
U.S. DOLLAR					
CASH & CASH EQUIVALENTS					
993,565.680 BLACKROCK LIQ T FUND INSTL 996229696 VAR RT 12/31/2049 DD 01/31/12	100.00	993,565.68	993,565.68	2.96	0.00
RECEIVABLE FOR INVESTMENTS SOLD		263,114.97	263,114.97	0.78	0.00
INTEREST RECEIVABLE		468,156.50	468,156.50	1.39	0.00
FFX CONTRACTS RECEIVABLE		1,289,531.20	1,289,531.20	3.84	0.00
PAYABLE FOR INVESTMENTS PURCHASED		-557,444.59	-557,444.59	-1.66	0.00

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Asset Detail - By Currency

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EATON VANCE HY PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
PAYABLE FOR FORWARD FOREIGN		-105,968.09	-105,968.09	-0.32	0.00
TOTAL CASH & CASH EQUIVALENTS U.S. DOLLAR		**2,350,955.67**	**2,350,955.67**	**7.00**	**0.00**
CONVERTIBLE OR EXCHANGEABLE SE					
55,000.000 AIR TRANSPORT SERVICES GROUP I 00922RAB1 1.125% 10/15/2024 DD 09/29/17	94.17	49,557.76	51,791.30	0.15	2,233.54
9,000.000 ROYAL CARIBBEAN CRUISES L 144A 780153BA9 4.250% 06/15/2023 DD 06/09/20	93.00	9,000.00	8,370.00	0.02	-630.00
TOTAL CONVERTIBLE OR EXCHANGEABLE SE U.S. DOLLAR		**58,557.76**	**60,161.30**	**0.18**	**1,603.54**
EQUITY					
1,904.000 CLEAR CHANNEL OUTDOOR HOLDINGS 18453H106	1.04	9,044.00	1,980.16	0.01	-7,063.84
399.000 IHEARTMEDIA INC 45174J509	8.35	24,936.36	3,331.65	0.01	-21,604.71
TOTAL EQUITY U.S. DOLLAR		**33,980.36**	**5,311.81**	**0.02**	**-28,668.55**
FIXED INCOME SECURITIES					
110,000.000 AG ISSUER LLC 144A 00119LAA9 6.250% 03/01/2028 DD 02/13/20	93.00	110,437.68	102,300.00	0.30	-8,137.68
154,000.000 AES CORP/THE 00130HBX2 6.000% 05/15/2026 DD 05/25/16	103.88	160,034.17	159,967.50	0.48	-66.67
29,000.000 AES CORP/THE 00130HBY0 5.125% 09/01/2027 DD 08/28/17	103.75	30,631.60	30,087.50	0.09	-544.10

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EATON VANCE HY PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
70,000.000 AMC ENTERTAINMENT HOLDING 144A 00165CAN4 10.500% 04/15/2025 DD 04/24/20	81.07	68,641.10	56,749.00	0.17	-11,892.10
54,000.000 ACADIA HEALTHCARE CO INC 144A 00404AAN9 5.500% 07/01/2028 DD 06/24/20	100.25	54,000.00	54,135.00	0.16	135.00
106,000.000 ALBERTSONS COS INC / SAFE 144A 013092AB7 5.875% 02/15/2028 DD 08/15/19	103.18	106,000.00	109,367.62	0.33	3,367.62
85,000.000 ALBERTSONS COS INC / SAFE 144A 013092AE1 4.875% 02/15/2030 DD 02/05/20	102.31	85,493.64	86,966.05	0.26	1,472.41
147,208.280 ALIXPARTNERS 4/17 COV-LITE TLB 01642PAW6	96.46	146,416.59	141,994.16	0.42	-4,422.43
168,000.000 ALLEGHENY TECHNOLOGIES INC 01741RAH5 5.875% 12/01/2027 DD 11/22/19	92.50	168,000.00	155,400.00	0.46	-12,600.00
117,000.000 ALLIANCE DATA SYSTEMS COR 144A 018581AK4 4.750% 12/15/2024 DD 12/20/19	90.00	117,000.00	105,300.00	0.31	-11,700.00
269,000.000 ALLIANT HOLDINGS INTERMED 144A 01883LAA1 6.750% 10/15/2027 DD 10/11/19	99.66	269,000.00	268,090.78	0.80	-909.22
98,000.000 ALLIED UNIVERSAL HOLDCO L 144A 019576AA5 6.625% 07/15/2026 DD 07/12/19	105.00	100,042.59	102,900.00	0.31	2,857.41
46,000.000 ALLIED UNIVERSAL HOLDCO L 144A 019576AB3 9.750% 07/15/2027 DD 07/12/19	105.38	48,582.52	48,472.50	0.14	-110.02

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
300,000.000 ALTICE FRANCE SA/FRANCE 144A 02156LAA9 8.125% 02/01/2027 DD 07/31/18	109.38	317,628.97	328,125.00	0.98	10,496.03
5,000.000 AMERIGAS PARTNERS LP / AMERIGA 030981AK0 5.500% 05/20/2025 DD 12/28/16	103.00	5,016.54	5,150.00	0.02	133.46
46,000.000 AMWINS GROUP INC 144A 031921AA7 7.750% 07/01/2026 DD 07/06/18	105.00	45,622.53	48,300.00	0.14	2,677.47
98,000.000 ANTERO MIDSTREAM PARTNERS 144A 03690AAD8 5.750% 03/01/2027 DD 02/25/19	79.00	92,585.08	77,420.00	0.23	-15,165.08
7,000.000 APACHE CORP 037411AY1 5.250% 02/01/2042 DD 12/03/10	81.61	5,010.59	5,712.84	0.02	702.25
8,000.000 APACHE CORP 037411BA2 4.750% 04/15/2043 DD 04/09/12	80.51	5,566.52	6,440.72	0.02	874.20
26,000.000 APACHE CORP 037411BE4 4.375% 10/15/2028 DD 08/23/18	88.31	21,247.76	22,959.56	0.07	1,711.80
62,000.000 APACHE CORP 037411BF1 4.250% 01/15/2030 DD 06/19/19	86.45	49,181.36	53,596.52	0.16	4,415.16
110,000.000 ARCHROCK PARTNERS LP / AR 144A 03959KAA8 6.875% 04/01/2027 DD 03/21/19	94.20	115,671.60	103,620.00	0.31	-12,051.60
54,000.000 ARCHROCK PARTNERS LP / AR 144A 03959KAC4 6.250% 04/01/2028 DD 12/20/19	91.00	54,000.00	49,140.00	0.15	-4,860.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
118,000.000 ARCONIC CORP 144A 03966VAA5 6.125% 02/15/2028 DD 02/07/20	99.98	121,302.14	117,970.50	0.35	-3,331.64
400,000.000 ARDAGH PACKAGING FINANCE 144A 03969AAP5 5.250% 08/15/2027 DD 08/12/19	98.24	406,000.00	392,952.00	1.17	-13,048.00
8,000.000 ASBURY AUTOMOTIVE GROUP I 144A 043436AS3 4.500% 03/01/2028 DD 02/19/20	97.00	8,000.00	7,760.00	0.02	-240.00
10,000.000 ASBURY AUTOMOTIVE GROUP I 144A 043436AT1 4.750% 03/01/2030 DD 02/19/20	97.50	10,000.00	9,750.00	0.03	-250.00
92,000.000 ASCENT RESOURCES UTICA HO 144A 04364VAG8 7.000% 11/01/2026 DD 10/11/18	64.00	91,419.51	58,880.00	0.18	-32,539.51
325,000.000 ASURION 7/17 2ND LIEN TLB2 04649VAU4	99.25	325,387.47	322,562.50	0.96	-2,824.97
115,000.000 BWX TECHNOLOGIES INC 144A 05605HAA8 5.375% 07/15/2026 DD 05/24/18	103.04	115,703.18	118,493.70	0.35	2,790.52
53,000.000 BWX TECHNOLOGIES INC 144A 05605HAB6 4.125% 06/30/2028 DD 06/12/20	99.75	53,000.00	52,867.50	0.16	-132.50
30,000.000 BAUSCH HEALTH COS INC 144A 071734AJ6 5.250% 01/30/2030 DD 12/30/19	94.88	30,218.92	28,462.50	0.08	-1,756.42
83,000.000 BAUSCH HEALTH COS INC 144A 071734AK3 6.250% 02/15/2029 DD 05/26/20	100.50	83,000.00	83,415.00	0.25	415.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
58,792.500 BELLRING BRANDS/POST HOLDINGS 07982EAB2 0.000% 10/10/2024 DD 09/24/19	99.31	59,863.46	58,388.60	0.17	-1,474.86
97,000.000 BOMBARDIER INC 144A 097751BT7 7.875% 04/15/2027 DD 03/07/19	65.50	96,362.81	63,535.00	0.19	-32,827.81
20,000.000 BROOKFIELD RESIDENTIAL PR 144A 11283YAB6 6.250% 09/15/2027 DD 09/23/19	95.63	19,700.45	19,126.20	0.06	-574.25
37,000.000 BROOKFIELD RESIDENTIAL PR 144A 11283YAD2 4.875% 02/15/2030 DD 02/26/20	83.56	35,902.07	30,917.20	0.09	-4,984.87
81,000.000 BROOKFIELD PROPERTY REIT 144A 11284DAA3 5.750% 05/15/2026 DD 05/01/19	84.50	81,000.00	68,445.00	0.20	-12,555.00
57,000.000 BUCKEYE PARTNERS LP 144A 118230AT8 4.125% 03/01/2025 DD 02/19/20	95.93	57,000.00	54,678.39	0.16	-2,321.61
50,000.000 BUCKEYE PARTNERS LP 144A 118230AU5 4.500% 03/01/2028 DD 02/19/20	93.50	50,000.00	46,750.00	0.14	-3,250.00
183,000.000 BUILDERS FIRSTSOURCE INC 144A 12008RAM9 6.750% 06/01/2027 DD 05/30/19	102.38	193,213.54	187,346.25	0.56	-5,867.29
28,000.000 BUILDERS FIRSTSOURCE INC 144A 12008RAN7 5.000% 03/01/2030 DD 02/11/20	94.00	28,307.31	26,320.00	0.08	-1,987.31
56,000.000 BURLINGTON COAT FACTORY W 144A 121579AH9 6.250% 04/15/2025 DD 04/16/20	104.50	56,419.11	58,520.00	0.17	2,100.89

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
300,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPBT9 5.125% 05/01/2027 DD 02/06/17	103.46	299,905.83	310,380.00	0.92	10,474.17
250,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPBX0 5.000% 02/01/2028 DD 08/08/17	103.25	242,072.74	258,125.00	0.77	16,052.26
61,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPCB7 5.375% 06/01/2029 DD 05/23/19	105.50	62,123.32	64,355.00	0.19	2,231.68
96,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPCD3 4.750% 03/01/2030 DD 10/01/19	102.32	96,970.47	98,226.24	0.29	1,255.77
143,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPCE1 4.500% 08/15/2030 DD 02/18/20	102.00	143,807.58	145,860.00	0.43	2,052.42
41,000.000 CCO HOLDINGS LLC / CCO HO 144A 1248EPCJ0 4.500% 05/01/2032 DD 03/18/20	101.25	41,000.00	41,512.50	0.12	512.50
160,000.000 CDK GLOBAL INC 12508EAF8 4.875% 06/01/2027 DD 12/01/17	102.60	163,676.60	164,152.00	0.49	475.40
54,000.000 CDK GLOBAL INC 144A 12508EAJ0 5.250% 05/15/2029 DD 05/15/19	103.84	54,000.00	56,074.68	0.17	2,074.68
28,000.000 CD&R SMOKEY BUYER INC 144A 12510CAA9 6.750% 07/15/2025 DD 07/01/20	103.97	28,390.00	29,111.60	0.09	721.60
205,000.000 CIT GROUP INC 125581GX0 6.125% 03/09/2028 DD 03/09/18	107.79	209,434.13	220,965.40	0.66	11,531.27

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
214,000.000 CAESARS RESORT COLLECTION 144A 12652AAA1 5.250% 10/15/2025 DD 10/16/17	87.00	214,089.52	186,180.00	0.55	-27,909.52
139,000.000 CVR ENERGY INC 144A 12662PAD0 5.750% 02/15/2028 DD 01/27/20	87.50	139,000.00	121,625.00	0.36	-17,375.00
86,000.000 CALPINE CORP 131347CF1 5.750% 01/15/2025 DD 07/22/14	100.98	85,496.78	86,841.94	0.26	1,345.16
40,000.000 CALPINE CORP 144A 131347CK0 5.250% 06/01/2026 DD 05/31/16	100.97	40,000.00	40,388.40	0.12	388.40
58,000.000 CALPINE CORP 144A 131347CM6 4.500% 02/15/2028 DD 12/20/19	97.50	58,000.00	56,550.00	0.17	-1,450.00
85,000.000 CALPINE CORP 144A 131347CN4 5.125% 03/15/2028 DD 12/27/19	98.00	85,000.00	83,300.00	0.25	-1,700.00
78,000.000 CARGO AIRCRAFT MANAGEMENT 144A 14180LAA4 4.750% 02/01/2028 DD 01/28/20	99.13	78,131.35	77,317.50	0.23	-813.85
30,000.000 CARNIVAL CORP 144A 143658BC5 11.500% 04/01/2023 DD 04/08/20	108.50	29,720.29	32,550.00	0.10	2,829.71
100,000.000 CATALENT PHARMA SOLUTIONS 144A 14879EAD0 4.875% 01/15/2026 DD 10/18/17	101.52	100,829.08	101,520.00	0.30	690.92
68,000.000 CATALENT PHARMA SOLUTIONS 144A 14879EAE8 5.000% 07/15/2027 DD 06/27/19	103.81	68,799.35	70,592.84	0.21	1,793.49

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
189,000.000 CENTENE CORP 144A 15135BAM3 5.375% 08/15/2026 DD 08/15/19	104.02	192,578.10	196,599.69	0.59	4,021.59
110,000.000 CENTENE CORP 15135BAR2 4.250% 12/15/2027 DD 12/06/19	103.19	109,131.92	113,510.10	0.34	4,378.18
193,000.000 CENTENE CORP 15135BAT8 4.625% 12/15/2029 DD 12/06/19	105.50	193,000.00	203,615.00	0.61	10,615.00
83,000.000 CENTENE CORP 15135BAV3 3.375% 02/15/2030 DD 02/13/20	100.97	83,000.00	83,805.93	0.25	805.93
58,000.000 CENOVUS ENERGY INC 15135UAF6 6.750% 11/15/2039 DD 05/15/10	97.37	47,694.96	56,472.28	0.17	8,777.32
7,000.000 CENOVUS ENERGY INC 15135UAJ8 3.800% 09/15/2023 DD 08/15/13	94.03	6,222.55	6,582.38	0.02	359.83
29,000.000 CENOVUS ENERGY INC 15135UAR0 5.400% 06/15/2047 DD 04/07/17	85.85	22,699.54	24,895.92	0.07	2,196.38
115,000.000 CENTENE CORP 144A 15137TAA8 5.375% 06/01/2026 DD 05/23/18	103.67	115,000.00	119,215.90	0.36	4,215.90
185,000.000 CENTENNIAL RESOURCE PRODU 144A 15138AAA8 5.375% 01/15/2026 DD 11/30/17	53.00	187,673.94	98,050.00	0.29	-89,623.94
105,000.000 CENTRAL GARDEN & PET CO 153527AM8 5.125% 02/01/2028 DD 12/14/17	103.41	105,267.72	108,583.65	0.32	3,315.93

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
100,000.000 CENTURYLINK INC 156700AZ9 5.625% 04/01/2025 DD 10/01/15	103.40	100,000.00	103,400.00	0.31	3,400.00
14,000.000 CENTURYLINK INC 156700BA3 7.500% 04/01/2024 DD 04/06/16	109.88	14,321.84	15,383.48	0.05	1,061.64
46,000.000 COLFAX CORP 144A 15723RAA2 6.000% 02/15/2024 DD 02/05/19	103.13	46,000.00	47,437.50	0.14	1,437.50
175,000.000 CHARLES RIVER LABORATORIE 144A 159864AC1 5.500% 04/01/2026 DD 04/03/18	104.00	176,802.38	182,000.00	0.54	5,197.62
54,000.000 CHARLES RIVER LABORATORIE 144A 159864AE7 4.250% 05/01/2028 DD 10/23/19	99.95	54,000.00	53,972.46	0.16	-27.54
183,000.000 CHENIERE ENERGY PARTNERS LP 16411QAG6 4.500% 10/01/2029 DD 04/01/20	96.88	184,941.03	177,281.25	0.53	-7,659.78
76,000.000 CINEMARK USA INC 172441AZ0 4.875% 06/01/2023 DD 05/24/13	84.50	75,666.54	64,220.00	0.19	-11,446.54
26,000.000 CLARIOS GLOBAL LP 144A 18060TAA3 6.750% 05/15/2025 DD 05/20/20	104.00	26,000.00	27,040.00	0.08	1,040.00
175,000.000 CLEAN HARBORS INC 144A 184496AP2 5.125% 07/15/2029 DD 07/02/19	103.72	179,528.66	181,503.00	0.54	1,974.34
25,000.000 CLEARWAY ENERGY OPERATING 144A 18539UAC9 4.750% 03/15/2028 DD 12/11/19	101.99	25,493.89	25,498.50	0.08	4.61

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
109,000.000 CLEVELAND-CLIFFS INC 144A 185899AG6 6.750% 03/15/2026 DD 03/13/20	96.50	107,210.81	105,185.00	0.31	-2,025.81
110,000.000 COMPASS MINERALS INTERNAT 144A 20451NAG6 6.750% 12/01/2027 DD 11/26/19	105.00	110,000.00	115,500.00	0.34	5,500.00
200,000.000 CONNECT FINCO SARL / CONN 144A 20752TAA2 6.750% 10/01/2026 DD 10/07/19	94.75	201,277.81	189,500.00	0.56	-11,777.81
2,000.000 CONTINENTAL RESOURCES INC/OK 212015AQ4 4.900% 06/01/2044 DD 05/19/14	79.63	1,597.91	1,592.50	0.00	-5.41
67,000.000 CONTINENTAL RESOURCES INC/OK 212015AS0 4.375% 01/15/2028 DD 12/08/17	88.02	60,108.98	58,974.74	0.18	-1,134.24
160,000.000 COVANTA HOLDING CORP 22282EAF9 5.875% 03/01/2024 DD 03/06/14	100.88	160,371.65	161,400.00	0.48	1,028.35
70,000.000 COVANTA HOLDING CORP 22282EAG7 5.875% 07/01/2025 DD 03/16/17	101.25	71,910.37	70,875.00	0.21	-1,035.37
95,000.000 CROWN AMERICAS LLC / CROWN AME 228187AB6 4.750% 02/01/2026 DD 02/01/19	101.90	95,081.51	96,807.85	0.29	1,726.34
60,000.000 CROWN AMERICAS LLC / CROWN AME 22819KAB6 4.250% 09/30/2026 DD 03/31/17	102.25	55,502.93	61,350.00	0.18	5,847.07
135,000.000 CROWNROCK LP / CROWNROCK 144A 228701AF5 5.625% 10/15/2025 DD 10/11/17	89.63	134,889.36	120,993.75	0.36	-13,895.61

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
28,000.000 DELL INTERNATIONAL LLC / 144A 24703DBB6 5.850% 07/15/2025 DD 04/09/20	114.92	27,963.23	32,177.60	0.10	4,214.37
57,000.000 DELL INTERNATIONAL LLC / 144A 24703DBC4 6.100% 07/15/2027 DD 04/09/20	115.53	56,868.03	65,849.25	0.20	8,981.22
29,000.000 DELL INTERNATIONAL LLC / 144A 24703DBD2 6.200% 07/15/2030 DD 04/09/20	117.25	28,947.89	34,003.37	0.10	5,055.48
37,000.000 DELTA AIR LINES INC 247361ZZ4 7.375% 01/15/2026 DD 06/12/20	96.74	36,994.90	35,793.80	0.11	-1,201.10
139,000.000 DIAMOND SPORTS GROUP LLC 144A 25277LAA4 5.375% 08/15/2026 DD 08/02/19	72.38	127,546.47	100,601.25	0.30	-26,945.22
28,000.000 DISH DBS CORP 25470XAY1 7.750% 07/01/2026 DD 06/13/16	106.00	27,542.35	29,680.00	0.09	2,137.65
200,000.000 DRAX FINCO PLC 144A 26151AAA7 6.625% 11/01/2025 DD 04/26/18	102.50	206,247.89	205,000.00	0.61	-1,247.89
200,000.000 VISTRA CORP 144A 26817RBA5 8.125% 01/30/2026 DD 08/21/17	104.25	208,104.09	208,500.00	0.62	395.91
225,000.000 EIG INVESTORS CORP 26854XAB5 10.875% 02/01/2024 DD 02/01/17	97.00	235,944.95	218,250.00	0.65	-17,694.95
97,000.000 EP ENERGY LLC / EVEREST A 144A 268787AJ7 7.750% 05/15/2026 DD 05/23/18	20.00	85,478.58	19,400.00	0.06	-66,078.58

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
33,000.000 EQT CORP 26884LAG4 VAR RT 02/01/2030 DD 01/21/20	103.00	34,197.12	33,990.99	0.10	-206.13
22,000.000 EQT CORP 26884LAH2 VAR RT 02/01/2025 DD 01/21/20	99.65	21,962.61	21,923.44	0.07	-39.17
38,000.000 EQM MIDSTREAM PARTNERS LP 144A 26885BAF7 6.000% 07/01/2025 DD 06/18/20	101.29	38,000.00	38,490.96	0.11	490.96
38,000.000 EQM MIDSTREAM PARTNERS LP 144A 26885BAH3 6.500% 07/01/2027 DD 06/18/20	102.42	38,000.00	38,920.36	0.12	920.36
110,000.000 ESH HOSPITALITY INC 144A 26907YAB0 4.625% 10/01/2027 DD 09/18/19	93.63	109,100.07	102,987.50	0.31	-6,112.57
59,000.000 EDGEWELL PERSONAL CARE CO 144A 28035QAA0 5.500% 06/01/2028 DD 05/22/20	102.75	59,464.89	60,622.50	0.18	1,157.61
137,000.000 COLT MERGER SUB INC 144A 28470RAH5 6.250% 07/01/2025 DD 07/06/20	99.38	137,000.00	136,143.75	0.41	-856.25
109,000.000 COLT MERGER SUB INC 144A 28470RAK8 8.125% 07/01/2027 DD 07/06/20	96.63	109,337.50	105,321.25	0.31	-4,016.25
55,000.000 ELDORADO GOLD CORP 144A 284902AE3 9.500% 06/01/2024 DD 06/05/19	106.50	54,098.09	58,575.00	0.17	4,476.91
160,000.000 ENDEAVOR ENERGY RESOURCES 144A 29260FAD2 5.500% 01/30/2026 DD 12/07/17	95.75	158,620.04	153,200.00	0.46	-5,420.04

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
76,000.000 ENCOMPASS HEALTH CORP 29261AAA8 4.500% 02/01/2028 DD 09/18/19	95.91	75,743.62	72,893.12	0.22	-2,850.50
86,000.000 ENCOMPASS HEALTH CORP 29261AAB6 4.750% 02/01/2030 DD 09/18/19	95.50	85,614.05	82,130.00	0.24	-3,484.05
13,000.000 ENERGIZER HOLDINGS INC 144A 29272WAA7 6.375% 07/15/2026 DD 07/06/18	103.40	13,284.87	13,441.48	0.04	156.61
59,000.000 ENERGIZER HOLDINGS INC 144A 29272WAB5 7.750% 01/15/2027 DD 01/28/19	106.63	62,426.50	62,909.93	0.19	483.43
53,000.000 ENTEGRIS INC 144A 29362UAC8 4.375% 04/15/2028 DD 04/30/20	101.75	53,000.00	53,927.50	0.16	927.50
145,963.290 ENVISION HEALTHCARE 9/18 29373UAC5 0.000% 10/10/2025 DD 06/11/18	65.25	123,920.46	95,241.05	0.28	-28,679.41
192,000.000 ENVIVA PARTNERS LP / ENVI 144A 29413XAD9 6.500% 01/15/2026 DD 12/09/19	104.00	192,937.50	199,680.00	0.59	6,742.50
27,000.000 EXPEDIA GROUP INC 144A 30212PAS4 6.250% 05/01/2025 DD 05/05/20	106.53	27,000.00	28,762.29	0.09	1,762.29
14,000.000 EXPEDIA GROUP INC 144A 30212PAU9 7.000% 05/01/2025 DD 05/05/20	103.95	14,000.00	14,552.30	0.04	552.30
154,000.000 EXTRACTION OIL & GAS INC 144A 30227MAB1 5.625% 02/01/2026 DD 01/25/18	19.25	150,019.41	29,645.00	0.09	-120,374.41

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108,000.000 FIVE POINT OPERATING CO L 144A 33834YAA6 7.875% 11/15/2025 DD 11/22/17	94.50	109,438.35	102,060.00	0.30	-7,378.35
54,000.000 FORD MOTOR CO 345370CA6 7.450% 07/16/2031 DD 07/16/99	105.25	58,483.87	56,835.00	0.17	-1,648.87
133,000.000 FORD MOTOR CO 345370CV0 8.500% 04/21/2023 DD 04/22/20	105.75	133,000.00	140,647.50	0.42	7,647.50
160,000.000 FORD MOTOR CO 345370CW8 9.000% 04/22/2025 DD 04/22/20	108.22	159,738.40	173,152.00	0.52	13,413.60
67,000.000 FORD MOTOR CO 345370CX6 9.625% 04/22/2030 DD 04/22/20	118.43	66,685.00	79,348.10	0.24	12,663.10
200,000.000 FORD MOTOR CREDIT CO LLC 345397A29 3.087% 01/09/2023 DD 01/09/20	95.25	176,256.10	190,500.00	0.57	14,243.90
121,000.000 FREEPORT-MCMORAN INC 35671DBC8 5.450% 03/15/2043 DD 09/15/13	98.00	111,060.39	118,580.00	0.35	7,519.61
239,000.000 GEMS MENASA CAYMAN LTD / 144A 36166LAA5 7.125% 07/31/2026 DD 08/08/19	95.00	242,341.84	227,050.00	0.68	-15,291.84
198,000.000 GFL ENVIRONMENTAL INC 144A 36168QAE4 8.500% 05/01/2027 DD 04/23/19	108.75	204,067.36	215,325.00	0.64	11,257.64
50,000.000 GARTNER INC 144A 366651AC1 4.500% 07/01/2028 DD 06/22/20	101.17	50,062.34	50,585.00	0.15	522.66

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
220,000.000 GATEWAY CASINOS & ENTERTA 144A 36760BAE9 8.250% 03/01/2024 DD 02/22/17	82.00	228,106.91	180,400.00	0.54	-47,706.91
126,000.000 GO DADDY OPERATING CO LLC 144A 38016LAA3 5.250% 12/01/2027 DD 06/04/19	101.75	127,094.75	128,205.00	0.38	1,110.25
142,000.000 GOLDEN NUGGET INC 144A 38113YAE9 6.750% 10/15/2024 DD 10/04/16	71.88	141,061.30	102,062.50	0.30	-38,998.80
150,000.000 WR GRACE & CO-CONN 144A 383909AF5 5.625% 10/01/2024 DD 09/16/14	105.25	160,102.86	157,875.00	0.47	-2,227.86
63,000.000 WR GRACE & CO-CONN 144A 383909AG3 4.875% 06/15/2027 DD 06/26/20	101.30	63,000.00	63,820.89	0.19	820.89
118,000.000 GREAT WESTERN PETROLEUM L 144A 39143GAA8 9.000% 09/30/2021 DD 09/22/16	60.00	119,001.29	70,800.00	0.21	-48,201.29
20,000.000 GREYSTAR REAL ESTATE PART 144A 39807UAB2 5.750% 12/01/2025 DD 11/24/17	100.52	19,666.83	20,104.00	0.06	437.17
114,000.000 GTCR AP FINANCE INC 144A 40060QAA3 8.000% 05/15/2027 DD 05/13/19	102.94	116,976.42	117,348.18	0.35	371.76
103,000.000 HCA INC 404119BW8 5.875% 02/01/2029 DD 01/30/19	113.16	103,000.00	116,553.77	0.35	13,553.77
84,000.000 HCA INC 404119CA5 3.500% 09/01/2030 DD 02/26/20	96.32	84,000.00	80,906.28	0.24	-3,093.72

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315,000.000 HCA INC 404121AJ4 5.625% 09/01/2028 DD 08/23/18	111.63	314,665.69	351,618.75	1.05	36,953.06
157,200.000 HERBALIFE 8/18 COV-LITE 40421YAF9 TLB	96.38	157,716.66	151,501.50	0.45	-6,215.16
40,000.000 HAT HOLDINGS I LLC / HAT 144A 418751AB9 6.000% 04/15/2025 DD 04/21/20	104.75	40,000.00	41,900.00	0.12	1,900.00
65,000.000 HERBALIFE NUTRITION LTD / 144A 42704MAA0 7.875% 09/01/2025 DD 05/29/20	103.25	65,000.00	67,112.50	0.20	2,112.50
155,000.000 HILCORP ENERGY I LP / HIL 144A 431318AS3 6.250% 11/01/2028 DD 10/16/18	80.25	145,716.73	124,387.50	0.37	-21,329.23
65,168.750 HILLMAN 5/18 COV-LITE TLB 43162TAK6	93.50	63,758.70	60,932.78	0.18	-2,825.92
15,000.000 HOLOGIC INC 144A 436440AK7 4.375% 10/15/2025 DD 10/10/17	100.98	15,130.23	15,146.85	0.05	16.62
94,000.000 HOWMET AEROSPACE INC 443201AA6 6.875% 05/01/2025 DD 04/24/20	108.49	94,000.00	101,976.84	0.30	7,976.84
155,000.000 HUB INTERNATIONAL LTD 144A 44332PAD3 7.000% 05/01/2026 DD 04/25/18	99.79	153,890.00	154,674.50	0.46	784.50
150,000.000 HUGHES SATELLITE SYSTEMS CORP 444454AF9 6.625% 08/01/2026 DD 02/01/17	103.79	159,993.72	155,682.00	0.46	-4,311.72

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
139,000.000 IAA INC 144A 449253AB9 5.500% 06/15/2027 DD 06/06/19	103.16	140,554.51	143,395.18	0.43	2,840.67
26,000.000 IRB HOLDING CORP 144A 44988MAC9 7.000% 06/15/2025 DD 05/21/20	103.07	26,156.97	26,798.20	0.08	641.23
163,000.000 ICAHN ENTERPRISES LP / ICAHN E 451102BT3 6.250% 05/15/2026 DD 05/10/19	100.07	163,000.00	163,114.10	0.49	114.10
71,000.000 ICAHN ENTERPRISES LP / ICAHN E 451102BZ9 5.250% 05/15/2027 DD 12/12/19	96.50	71,000.00	68,515.00	0.20	-2,485.00
9,152.000 IHEARTCOMMUNICATIONS INC 45174HBC0 6.375% 05/01/2026 DD 05/01/19	99.00	9,488.47	9,060.48	0.03	-427.99
77,869.000 IHEARTCOMMUNICATIONS INC 45174HBD8 8.375% 05/01/2027 DD 05/01/19	91.64	80,929.55	71,356.82	0.21	-9,572.73
106,000.000 INFRABUILD AUSTRALIA PTY 144A 45682RAA8 12.000% 10/01/2024 DD 10/03/19	90.25	106,000.00	95,665.00	0.29	-10,335.00
130,000.000 INTELSAT JACKSON HOLDINGS SA 45824TAP0 5.500% 08/01/2023 DD 06/05/13	57.00	119,029.98	74,100.00	0.22	-44,929.98
56,000.000 INTELSAT JACKSON HOLDINGS 144A 45824TBA2 8.500% 10/15/2024 DD 09/19/18	60.13	56,689.67	33,670.00	0.10	-23,019.67
64,000.000 IRON MOUNTAIN INC 144A 46284VAJ0 5.250% 07/15/2030 DD 06/22/20	98.50	64,000.00	63,040.00	0.19	-960.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
44,000.000 IRON MOUNTAIN INC 144A 46284VAL5 5.625% 07/15/2032 DD 06/22/20	99.79	44,000.00	43,907.60	0.13	-92.40
108,000.000 JBS USA LUX SA / JBS USA 144A 46590XAB2 5.500% 01/15/2030 DD 08/06/19	102.50	115,886.82	110,700.00	0.33	-5,186.82
57,000.000 JAGUAR HOLDING CO II / PP 144A 47010LAA0 5.000% 06/15/2028 DD 06/05/20	102.38	57,000.00	58,353.75	0.17	1,353.75
65,000.000 JAGUAR HOLDING CO II / PP 144A 47010LAB8 4.625% 06/15/2025 DD 06/05/20	101.77	65,000.00	66,150.50	0.20	1,150.50
125,000.000 KFC HOLDING CO/PIZZA HUT 144A 48250NAA3 5.000% 06/01/2024 DD 06/16/16	101.88	125,000.00	127,343.75	0.38	2,343.75
25,000.000 KFC HOLDING CO/PIZZA HUT 144A 48250NAC9 4.750% 06/01/2027 DD 06/15/17	102.50	25,000.00	25,625.00	0.08	625.00
39,000.000 KORN FERRY 144A 50067PAA7 4.625% 12/15/2027 DD 12/16/19	97.00	39,000.00	37,830.00	0.11	-1,170.00
166,000.000 KRAFT HEINZ FOODS CO 50077LAB2 4.375% 06/01/2046 DD 05/24/16	98.31	158,272.50	163,192.94	0.49	4,920.44
66,000.000 KRAFT HEINZ FOODS CO 144A 50077LBA3 3.875% 05/15/2027 DD 05/18/20	104.50	66,000.00	68,969.34	0.21	2,969.34
66,000.000 KRAFT HEINZ FOODS CO 144A 50077LBD7 4.250% 03/01/2031 DD 05/18/20	106.03	66,000.00	69,979.14	0.21	3,979.14

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
66,000.000 KRAFT HEINZ FOODS CO 144A 50077LBG0 5.500% 06/01/2050 DD 05/18/20	106.60	66,000.00	70,353.36	0.21	4,353.36
77,000.000 L BRANDS INC 501797AL8 6.875% 11/01/2035 DD 10/30/15	83.19	78,717.14	64,056.30	0.19	-14,660.84
24,000.000 L BRANDS INC 144A 501797AS3 6.875% 07/01/2025 DD 06/18/20	103.25	24,252.51	24,780.00	0.07	527.49
17,000.000 L BRANDS INC 144A 501797AU8 9.375% 07/01/2025 DD 06/18/20	100.12	17,000.00	17,020.40	0.05	20.40
45,000.000 LAREDO PETROLEUM INC 516806AF3 9.500% 01/15/2025 DD 01/24/20	69.13	45,000.00	31,106.25	0.09	-13,893.75
68,000.000 LAREDO PETROLEUM INC 516806AG1 10.125% 01/15/2028 DD 01/24/20	69.00	68,000.00	46,920.00	0.14	-21,080.00
225,000.000 LEVEL 3 FINANCING INC 527298BM4 5.250% 03/15/2026 DD 10/15/16	102.75	229,631.32	231,187.50	0.69	1,556.18
117,000.000 REGIONALCARE HOSPITAL PAR 144A 53219LAR0 9.750% 12/01/2026 DD 11/16/18	103.00	125,058.94	120,510.00	0.36	-4,548.94
78,000.000 LIFEPOINT HEALTH INC 144A 53219LAS8 4.375% 02/15/2027 DD 02/13/20	94.50	78,322.11	73,710.00	0.22	-4,612.11
41,000.000 LIFEPOINT HEALTH INC 144A 53219LAT6 6.750% 04/15/2025 DD 04/13/20	103.25	41,000.00	42,332.50	0.13	1,332.50

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
14,000.000 L BRANDS INC 532716AN7 7.600% 07/15/2037 DD 07/17/07	68.00	13,930.66	9,520.00	0.03	-4,410.66
55,000.000 LITHIA MOTORS INC 144A 536797AE3 4.625% 12/15/2027 DD 12/09/19	99.00	55,000.00	54,450.00	0.16	-550.00
122,000.000 LIVE NATION ENTERTAINMENT 144A 538034AR0 4.750% 10/15/2027 DD 10/17/19	86.02	119,482.49	104,945.62	0.31	-14,536.87
150,000.000 MEG ENERGY CORP 144A 552704AE8 7.125% 02/01/2027 DD 01/31/20	83.13	150,000.00	124,687.50	0.37	-25,312.50
145,000.000 MGM RESORTS INTERNATIONAL 552953CC3 6.000% 03/15/2023 DD 11/25/14	101.00	149,805.31	146,450.00	0.44	-3,355.31
130,000.000 MGM GROWTH PROPERTIES OPERATIN 55303XAJ4 5.750% 02/01/2027 DD 08/01/19	102.50	132,603.64	133,250.00	0.40	646.36
50,000.000 M/I HOMES INC 55305BAS0 4.950% 02/01/2028 DD 01/22/20	99.38	50,000.00	49,687.50	0.15	-312.50
333,000.000 MPH ACQUISITION HOLDINGS 144A 553283AB8 7.125% 06/01/2024 DD 06/07/16	93.00	344,349.96	309,690.00	0.92	-34,659.96
28,000.000 MSCI INC 144A 55354GAK6 3.625% 09/01/2030 DD 03/04/20	99.50	28,000.00	27,860.00	0.08	-140.00
47,285.000 MANITOWOC 10/18 TLB 56356XAE9	86.00	37,227.32	40,665.10	0.12	3,437.78

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
119,000.000 MASONITE INTERNATIONAL CO 144A 575385AD1 5.375% 02/01/2028 DD 07/25/19	102.25	122,063.75	121,677.50	0.36	-386.25
100,000.000 MATADOR RESOURCES CO 576485AE6 5.875% 09/15/2026 DD 08/21/18	74.00	100,000.00	74,000.00	0.22	-26,000.00
69,000.000 MOLINA HEALTHCARE INC 144A 60855RAJ9 4.375% 06/15/2028 DD 06/02/20	99.88	69,000.00	68,913.75	0.21	-86.25
80,000.000 MOOG INC 144A 615394AM5 4.250% 12/15/2027 DD 12/13/19	97.00	80,383.34	77,600.00	0.23	-2,783.34
115,000.000 MOSS CREEK RESOURCES HOLD 144A 61965RAA3 7.500% 01/15/2026 DD 01/18/18	50.00	115,755.52	57,500.00	0.17	-58,255.52
120,000.000 MURPHY OIL USA INC 626738AD0 5.625% 05/01/2027 DD 04/25/17	103.25	125,817.65	123,900.00	0.37	-1,917.65
77,000.000 MURPHY OIL USA INC 626738AE8 4.750% 09/15/2029 DD 09/13/19	102.25	77,154.30	78,732.50	0.23	1,578.20
58,000.000 NCL CORP LTD 144A 62886HAP6 3.625% 12/15/2024 DD 12/16/19	61.13	54,533.08	35,452.50	0.11	-19,080.58
110,000.000 NRG ENERGY INC 629377CE0 5.750% 01/15/2028 DD 07/15/18	105.50	110,000.00	116,050.00	0.35	6,050.00
68,000.000 NRG ENERGY INC 144A 629377CH3 5.250% 06/15/2029 DD 05/14/19	105.00	68,000.00	71,400.00	0.21	3,400.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
67,000.000 NABORS INDUSTRIES LTD 144A 629571AA8 7.250% 01/15/2026 DD 01/10/20	61.50	67,000.00	41,205.00	0.12	-25,795.00
54,000.000 NAVISTAR INTERNATIONAL CO 144A 63934EAW8 9.500% 05/01/2025 DD 04/27/20	107.16	54,000.00	57,863.70	0.17	3,863.70
50,000.000 NAVIENT CORP 63938CAA6 5.000% 10/26/2020 DD 11/06/14	99.59	50,000.00	49,793.50	0.15	-206.50
275,000.000 NEPTUNE ENERGY BONDCO PLC 144A 64073KAA1 6.625% 05/15/2025 DD 05/11/18	87.00	273,272.27	239,250.00	0.71	-34,022.27
155,000.000 NETFLIX INC 64110LAT3 5.875% 11/15/2028 DD 04/26/18	113.88	155,000.00	176,506.25	0.53	21,506.25
23,000.000 NEW GOLD INC 144A 644532AA1 6.375% 05/15/2025 DD 05/18/17	101.00	22,067.09	23,230.00	0.07	1,162.91
89,000.000 NEW GOLD INC 144A 644535AH9 7.500% 07/15/2027 DD 06/24/20	103.17	89,000.00	91,820.41	0.27	2,820.41
82,000.000 NEXTERA ENERGY OPERATING 144A 65342QAB8 4.500% 09/15/2027 DD 09/25/17	104.53	75,639.04	85,717.06	0.26	10,078.02
50,000.000 NEXTERA ENERGY OPERATING 144A 65342QAC6 4.250% 09/15/2024 DD 09/25/17	100.60	50,000.00	50,298.00	0.15	298.00
138,000.000 NEXSTAR BROADCASTING INC 144A 65343HAA9 5.625% 07/15/2027 DD 07/03/19	99.26	140,554.83	136,973.28	0.41	-3,581.55

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
46,000.000 NINE ENERGY SERVICE INC 144A 65441VAA9 8.750% 11/01/2023 DD 10/25/18	48.75	46,000.00	22,425.00	0.07	-23,575.00
150,000.000 NOVELIS CORP 144A 670001AC0 5.875% 09/30/2026 DD 09/14/16	99.88	154,257.01	149,812.50	0.45	-4,444.51
148,000.000 NUFARM AUSTRALIA LTD / NU 144A 67052NAA3 5.750% 04/30/2026 DD 04/26/18	96.50	145,023.58	142,820.00	0.43	-2,203.58
2,000.000 OCCIDENTAL PETROLEUM CORP 674599CC7 3.125% 02/15/2022 DD 08/18/11	95.77	1,667.90	1,915.40	0.01	247.50
28,000.000 OCCIDENTAL PETROLEUM CORP 674599CF0 4.625% 06/15/2045 DD 06/23/15	70.00	20,914.13	19,600.00	0.06	-1,314.13
15,000.000 OCCIDENTAL PETROLEUM CORP 674599CK9 2.600% 04/15/2022 DD 04/04/16	95.28	12,967.38	14,292.00	0.04	1,324.62
51,000.000 OCCIDENTAL PETROLEUM CORP 674599CN3 4.200% 03/15/2048 DD 03/02/18	67.72	36,093.85	34,537.20	0.10	-1,556.65
18,000.000 OCCIDENTAL PETROLEUM CORP 674599CP8 2.700% 08/15/2022 DD 08/08/19	93.10	15,051.12	16,757.10	0.05	1,705.98
15,000.000 OCCIDENTAL PETROLEUM CORP 674599CQ6 VAR RT 08/15/2022 DD 08/08/19	92.02	11,815.20	13,802.85	0.04	1,987.65
34,000.000 OCCIDENTAL PETROLEUM CORP 674599CS2 3.500% 08/15/2029 DD 08/08/19	73.16	23,598.71	24,874.40	0.07	1,275.69

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
5,000.000 OCCIDENTAL PETROLEUM CORP 674599CW3 2.900% 08/15/2024 DD 08/08/19	85.45	3,802.21	4,272.40	0.01	470.19
41,000.000 OCCIDENTAL PETROLEUM CORP 674599CY9 4.400% 08/15/2049 DD 08/08/19	69.00	29,318.35	28,290.00	0.08	-1,028.35
13,000.000 OCCIDENTAL PETROLEUM CORP 674599DA0 3.450% 07/15/2024 DD 07/15/19	83.00	9,348.55	10,790.00	0.03	1,441.45
27,000.000 OCCIDENTAL PETROLEUM CORP 674599DJ1 6.200% 03/15/2040 DD 09/15/19	83.75	19,483.58	22,612.50	0.07	3,128.92
107,000.000 OCCIDENTAL PETROLEUM CORP 674599DZ5 8.500% 07/15/2027 DD 07/13/20	99.88	107,000.00	106,866.25	0.32	-133.75
91,000.000 OCCIDENTAL PETROLEUM CORP 674599EA9 8.875% 07/15/2030 DD 07/13/20	99.88	91,000.00	90,886.25	0.27	-113.75
130,000.000 1011778 BC ULC / NEW RED 144A 68245XAE9 5.000% 10/15/2025 DD 08/28/17	99.41	130,936.06	129,234.30	0.39	-1,701.76
71,000.000 1011778 BC ULC / NEW RED 144A 68245XAH2 3.875% 01/15/2028 DD 09/24/19	97.02	71,000.00	68,882.07	0.21	-2,117.93
110,000.000 1011778 BC ULC / NEW RED 144A 68245XAJ8 4.375% 01/15/2028 DD 11/19/19	98.02	110,000.00	107,820.90	0.32	-2,179.10
21,000.000 1011778 BC ULC / NEW RED 144A 68245XAK5 5.750% 04/15/2025 DD 04/07/20	105.00	21,000.00	22,050.00	0.07	1,050.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
109,000.000 OPEN TEXT CORP 144A 683715AC0 3.875% 02/15/2028 DD 02/18/20	96.28	109,000.00	104,946.29	0.31	-4,053.71
95,000.000 OPEN TEXT HOLDINGS INC 144A 683720AA4 4.125% 02/15/2030 DD 02/18/20	98.25	95,000.00	93,337.50	0.28	-1,662.50
53,000.000 OUTFRONT MEDIA CAPITAL LL 144A 69007TAD6 6.250% 06/15/2025 DD 05/15/20	100.66	53,000.00	53,347.15	0.16	347.15
100,000.000 PBF HOLDING CO LLC / PBF 144A 69318FAH1 6.000% 02/15/2028 DD 01/24/20	83.00	100,000.00	83,000.00	0.25	-17,000.00
200,000.000 PERFORMANCE FOOD GROUP IN 144A 69346VAA7 5.500% 10/15/2027 DD 09/27/19	96.50	211,302.80	193,000.00	0.58	-18,302.80
54,000.000 PTC INC 144A 69370CAB6 3.625% 02/15/2025 DD 02/13/20	99.25	54,000.00	53,595.00	0.16	-405.00
54,000.000 PTC INC 144A 69370CAC4 4.000% 02/15/2028 DD 02/13/20	99.01	54,000.00	53,466.48	0.16	-533.52
167,000.000 CLARIOS GLOBAL LP / CLARI 144A 69867DAA6 6.250% 05/15/2026 DD 04/01/19	103.13	168,656.48	172,218.75	0.51	3,562.27
194,000.000 CLARIOS GLOBAL LP / CLARI 144A 69867DAC2 8.500% 05/15/2027 DD 04/01/19	100.50	194,589.52	194,960.30	0.58	370.78
130,000.000 SEVEN GENERATIONS ENERGY 144A 699320AH0 6.875% 06/30/2023 DD 06/05/15	96.75	132,333.14	125,775.00	0.37	-6,558.14

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
220,000.000 PARSLEY ENERGY LLC / PARS 144A 701885AH8 5.625% 10/15/2027 DD 10/11/17	98.50	223,644.71	216,700.00	0.65	-6,944.71
50,000.000 PATTERN ENERGY GROUP INC 144A 70338PAC4 5.875% 02/01/2024 DD 01/25/17	100.50	51,072.71	50,250.00	0.15	-822.71
160,117.920 PETSMART 9/16 TLB 71677HAG0	98.53	160,167.77	157,770.59	0.47	-2,397.18
25,000.000 PICASSO FINANCE SUB INC 144A 71953LAA9 6.125% 06/15/2025 DD 06/15/20	102.25	25,000.00	25,562.50	0.08	562.50
174,525.000 PLAYTIKA 12/19 COV-LITE TLB 72814CAE8 0.000% 12/10/2024 DD 11/08/19	99.75	171,420.82	174,088.69	0.52	2,667.87
200,000.000 POST HOLDINGS INC 144A 737446AM6 5.750% 03/01/2027 DD 02/14/17	103.25	197,778.82	206,500.00	0.62	8,721.18
66,999.987 PRECISION DRILLING CORP 740212AE5 6.500% 12/15/2021 DD 12/15/11	93.00	66,893.66	62,309.99	0.19	-4,583.67
7,000.000 PRECISION DRILLING CORP 740212AK1 7.750% 12/15/2023 DD 06/15/17	68.50	7,000.00	4,795.00	0.01	-2,205.00
40,000.000 PRECISION DRILLING CORP 144A 740212AL9 7.125% 01/15/2026 DD 11/22/17	61.00	40,000.00	24,400.00	0.07	-15,600.00
38,000.000 PRESIDIO HOLDINGS INC 144A 74101XAE0 4.875% 02/01/2027 DD 01/22/20	97.75	38,000.00	37,145.00	0.11	-855.00

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Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

EATON VANCE HY PI2 - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
52,000.000 PRESIDIO HOLDINGS INC 144A 74101XAF7 8.250% 02/01/2028 DD 01/22/20	100.00	52,620.98	52,000.00	0.15	-620.98
39,000.000 PRESTIGE BRANDS INC 144A 74112BAL9 5.125% 01/15/2028 DD 12/02/19	98.50	39,000.00	38,415.00	0.11	-585.00
116,000.000 RIVERBED TECHNOLOGY INC 144A 74339KAA0 8.875% 03/01/2023 DD 03/09/15	60.75	111,758.03	70,470.00	0.21	-41,288.03
50,000.000 RHP HOTEL PROPERTIES LP / RHP 749571AD7 5.000% 04/15/2023 DD 04/14/15	93.25	48,521.31	46,625.00	0.14	-1,896.31
71,000.000 REYNOLDS GROUP ISSUER INC 144A 761735AT6 5.125% 07/15/2023 DD 06/27/16	100.76	67,714.65	71,538.89	0.21	3,824.24
25,000.000 ROYAL CARIBBEAN CRUISES L 144A 780153BC5 9.125% 06/15/2023 DD 06/09/20	99.12	25,000.00	24,781.00	0.07	-219.00
6,000.000 SM ENERGY CO 78454LAH3 5.000% 01/15/2024 DD 01/15/14	54.00	5,590.69	3,240.00	0.01	-2,350.69
73,000.000 SM ENERGY CO 78454LAL4 5.625% 06/01/2025 DD 05/21/15	53.00	68,369.91	38,690.00	0.12	-29,679.91
27,000.000 SM ENERGY CO 78454LAN0 6.750% 09/15/2026 DD 09/12/16	50.29	25,653.52	13,577.76	0.04	-12,075.76
53,000.000 SS&C TECHNOLOGIES INC 144A 78466CAC0 5.500% 09/30/2027 DD 03/28/19	101.46	55,138.43	53,775.92	0.16	-1,362.51

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Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
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EATON VANCE HY PI2 - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
200,000.000 SPCM SA 144A 7846ELAC1 4.875% 09/15/2025 DD 04/20/17	100.78	195,908.14	201,554.00	0.60	5,645.86
19,000.000 SCIENCE APPLICATIONS INTE 144A 808625AA5 4.875% 04/01/2028 DD 03/13/20	99.41	19,000.00	18,887.14	0.06	-112.86
106,000.000 SCRIPPS ESCROW INC 144A 81104PAA7 5.875% 07/15/2027 DD 07/26/19	94.75	106,779.26	100,435.00	0.30	-6,344.26
78,800.000 SEDGWICK CMS 12/18 COV-LITE TL 81527CAL1 0.000% 11/06/2025 DD 10/29/18	94.18	79,023.05	74,213.05	0.22	-4,810.00
165,000.000 SERVICEMASTER CO LLC/THE 817609AB6 7.450% 08/15/2027 DD 08/19/97	108.22	177,142.46	178,563.00	0.53	1,420.54
115,000.000 SERVICEMASTER CO LLC/THE 144A 817610AA6 5.125% 11/15/2024 DD 11/08/16	101.38	115,452.29	116,581.25	0.35	1,128.96
55,000.000 SERVICE PROPERTIES TRUST 81761LAA0 7.500% 09/15/2025 DD 06/17/20	105.35	55,685.72	57,944.15	0.17	2,258.43
78,000.000 SHEA HOMES LP / SHEA HOME 144A 82088KAE8 4.750% 02/15/2028 DD 02/20/20	95.00	78,280.68	74,100.00	0.22	-4,180.68
120,000.000 SHELF DRILLING HOLDINGS L 144A 822538AE4 8.250% 02/15/2025 DD 02/07/18	45.00	120,796.63	54,000.00	0.16	-66,796.63
113,000.000 SINCLAIR TELEVISION GROUP 144A 829259AY6 5.500% 03/01/2030 DD 11/27/19	92.50	113,000.00	104,525.00	0.31	-8,475.00

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
300,000.000 SIRIUS XM RADIO INC 144A 82967NBA5 5.000% 08/01/2027 DD 07/05/17	102.21	300,806.20	306,621.00	0.91	5,814.80
170,000.000 SONIC AUTOMOTIVE INC 83545GBC5 6.125% 03/15/2027 DD 03/10/17	99.00	169,327.25	168,300.00	0.50	-1,027.25
97,905.410 HARD ROCK NORTHERN INDIANA 12/ 84752PAC2 0.000% 12/23/2025 DD 09/24/19	92.00	95,268.66	90,072.98	0.27	-5,195.68
7,094.590 HARD ROCK NORTHERN INDIANA 12/ 84752PAD0 0.000% 12/23/2025 DD 09/24/19	92.00	6,903.38	6,527.02	0.02	-376.36
225,000.000 SPECTRUM BRANDS INC 84762LAS4 6.125% 12/15/2024 DD 12/15/15	102.75	224,745.65	231,187.50	0.69	6,441.85
43,000.000 SPECTRUM BRANDS INC 144A 84762LAV7 5.000% 10/01/2029 DD 09/24/19	98.75	43,000.00	42,462.50	0.13	-537.50
37,000.000 SPECTRUM BRANDS INC 144A 84762LAW5 5.500% 07/15/2030 DD 06/30/20	100.13	37,044.99	37,046.25	0.11	1.26
131,000.000 SPRINT CAPITAL CORP 852060AD4 6.875% 11/15/2028 DD 11/16/98	121.75	143,864.63	159,492.50	0.48	15,627.87
6,000.000 SPRINT COMMUNICATIONS INC 852061AR1 7.000% 08/15/2020 DD 08/14/12	100.41	6,016.67	6,024.30	0.02	7.63
110,000.000 SPRINT COMMUNICATIONS INC 852061AS9 6.000% 11/15/2022 DD 11/14/12	105.47	106,010.12	116,020.30	0.35	10,010.18

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Asset Detail - By Currency

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
125,000.000 SPRINT CORP 85207UAF2 7.875% 09/15/2023 DD 09/15/14	112.63	127,167.26	140,781.25	0.42	13,613.99
125,000.000 SPRINT CORP 85207UAH8 7.125% 06/15/2024 DD 06/15/14	112.91	123,598.81	141,142.50	0.42	17,543.69
84,000.000 SPRINT CORP 85207UAK1 7.625% 03/01/2026 DD 02/22/18	118.04	84,000.00	99,151.08	0.30	15,151.08
25,000.000 STANDARD INDUSTRIES INC/N 144A 853496AC1 5.000% 02/15/2027 DD 02/07/17	101.25	24,876.73	25,312.50	0.08	435.77
63,000.000 STANDARD INDUSTRIES INC/N 144A 853496AG2 4.375% 07/15/2030 DD 06/30/20	99.75	63,000.00	62,842.50	0.19	-157.50
32,000.000 SUNOCO LP / SUNOCO FINANCE COR 86765LAL1 5.500% 02/15/2026 DD 08/15/18	97.00	32,000.00	31,040.00	0.09	-960.00
125,000.000 T-MOBILE USA INC 87264AAP0 6.500% 01/15/2026 DD 11/05/15	104.51	130,310.55	130,638.75	0.39	328.20
25,000.000 T-MOBILE USA INC 87264AAT2 5.375% 04/15/2027 DD 03/16/17	105.25	25,000.00	26,312.50	0.08	1,312.50
80,000.000 T-MOBILE USA INC 87264AAU9 4.500% 02/01/2026 DD 01/25/18	101.20	80,000.00	80,956.80	0.24	956.80
70,000.000 T-MOBILE USA INC 87264AAV7 4.750% 02/01/2028 DD 01/25/18	105.64	68,310.79	73,948.00	0.22	5,637.21

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
50,000.000 TRI POINTE GROUP INC 87265HAF6 5.250% 06/01/2027 DD 06/08/17	99.50	50,000.00	49,750.00	0.15	-250.00
18,000.000 TRI POINTE GROUP INC 87265HAG4 5.700% 06/15/2028 DD 06/10/20	101.50	18,000.00	18,270.00	0.05	270.00
55,000.000 TARGA RESOURCES PARTNERS LP / 87612BBL5 6.500% 07/15/2027 DD 01/17/19	100.25	55,000.00	55,137.50	0.16	137.50
110,000.000 TARGA RESOURCES PARTNERS LP / 87612BBN1 6.875% 01/15/2029 DD 01/17/19	104.75	110,616.15	115,225.00	0.34	4,608.85
132,000.000 TAYLOR MORRISON COMMUNITI 144A 87724RAA0 5.875% 06/15/2027 DD 06/05/19	103.57	136,612.13	136,717.68	0.41	105.55
66,000.000 TEGNA INC 144A 87901JAE5 4.625% 03/15/2028 DD 01/09/20	92.00	66,000.00	60,720.00	0.18	-5,280.00
200,000.000 TELECOM ITALIA CAPITAL SA 87927VAM0 6.000% 09/30/2034 DD 09/30/05	108.70	230,967.65	217,400.00	0.65	-13,567.65
155,000.000 TELEFLEX INC 879369AF3 4.625% 11/15/2027 DD 11/20/17	105.72	157,411.60	163,867.55	0.49	6,455.95
13,000.000 TELEFLEX INC 144A 879369AG1 4.250% 06/01/2028 DD 05/27/20	102.50	13,000.00	13,325.00	0.04	325.00
33,000.000 TENET HEALTHCARE CORP 88033GCS7 4.625% 07/15/2024 DD 06/14/17	97.98	33,000.00	32,333.07	0.10	-666.93

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Asset Detail - By Currency

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
100,000.000 TENET HEALTHCARE CORP 88033GCU2 5.125% 05/01/2025 DD 06/14/17	96.52	100,000.00	96,521.00	0.29	-3,479.00
170,000.000 TENET HEALTHCARE CORP 144A 88033GDA5 5.125% 11/01/2027 DD 08/26/19	98.67	170,000.00	167,739.00	0.50	-2,261.00
28,000.000 TENET HEALTHCARE CORP 144A 88033GDC1 4.625% 09/01/2024 DD 08/26/19	97.75	28,000.00	27,370.00	0.08	-630.00
21,000.000 TENET HEALTHCARE CORP 144A 88033GDG2 4.625% 06/15/2028 DD 06/16/20	97.42	21,000.00	20,458.20	0.06	-541.80
73,000.000 TEAM HEALTH HOLDINGS INC 144A 88047PAA2 6.375% 02/01/2025 DD 02/01/17	58.00	70,768.56	42,340.00	0.13	-28,428.56
64,000.000 TERRAFORM POWER OPERATING 144A 88104LAE3 5.000% 01/31/2028 DD 12/12/17	104.25	69,238.42	66,720.00	0.20	-2,518.42
218,000.000 TERRIER MEDIA BUYER INC 144A 88146LAA1 8.875% 12/15/2027 DD 12/17/19	95.88	219,227.12	209,007.50	0.62	-10,219.62
111,000.000 TRANSDIGM INC 893647BH9 7.500% 03/15/2027 DD 09/15/19	95.95	112,678.21	106,504.50	0.32	-6,173.71
222,000.000 TRANSDIGM INC 893647BL0 5.500% 11/15/2027 DD 05/15/20	87.27	222,000.00	193,739.40	0.58	-28,260.60
68,761.242 TRANSDIGM 2/20 COV-LITE TLE 89364MBQ6 0.000% 05/30/2025 DD 01/23/20	89.56	68,967.02	61,584.63	0.18	-7,382.39

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Asset Detail - By Currency

Report ID : IACS0005
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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
55,000.000 TRANSOCEAN INC 144A 893830BF5 7.500% 01/15/2026 DD 10/17/17	54.50	56,969.86	29,975.00	0.09	-26,994.86
37,000.000 TRANSOCEAN INC 144A 893830BK4 7.250% 11/01/2025 DD 10/25/18	54.50	37,000.00	20,165.00	0.06	-16,835.00
28,000.000 TRANSOCEAN POSEIDON LTD 144A 89383JAA6 6.875% 02/01/2027 DD 02/01/19	85.00	27,819.62	23,800.00	0.07	-4,019.62
140,000.000 US FOODS INC 144A 90290MAB7 5.875% 06/15/2024 DD 06/27/16	95.00	140,864.00	133,000.00	0.40	-7,864.00
40,000.000 UNIVAR SOLUTIONS USA INC/ 144A 91337CAA4 5.125% 12/01/2027 DD 11/22/19	101.16	40,000.00	40,464.80	0.12	464.80
165,000.000 USI INC/NY 144A 91739VAA6 6.875% 05/01/2025 DD 04/18/17	100.88	161,883.03	166,443.75	0.50	4,560.72
10,000.000 BAUSCH HEALTH COS INC 144A 91831AAB7 5.875% 05/15/2023 DD 03/27/15	99.75	9,570.01	9,975.00	0.03	404.99
19,000.000 BAUSCH HEALTH COS INC 144A 91911KAE2 5.500% 03/01/2023 DD 01/30/15	100.00	18,529.11	19,000.00	0.06	470.89
50,000.000 BAUSCH HEALTH COS INC 144A 91911KAN2 5.500% 11/01/2025 DD 10/17/17	102.50	50,000.00	51,250.00	0.15	1,250.00
130,000.000 BAUSCH HEALTH COS INC 144A 91911KAP7 9.000% 12/15/2025 DD 12/18/17	107.72	128,643.79	140,037.30	0.42	11,393.51

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Asset Detail - By Currency

Report ID : IACS0005
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EATON VANCE HY PI2 - [redacted] **6/30/2020**

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
220,000.000 BAUSCH HEALTH AMERICAS IN 144A 91911XAV6 9.250% 04/01/2026 DD 03/26/18	108.49	231,475.02	238,678.00	0.71	7,202.98
203,000.000 BAUSCH HEALTH AMERICAS IN 144A 91911XAW4 8.500% 01/31/2027 DD 06/01/18	106.13	213,909.89	215,433.75	0.64	1,523.86
150,000.000 VALVOLINE INC 92047WAB7 4.375% 08/15/2025 DD 08/08/17	100.50	152,168.05	150,750.00	0.45	-1,418.05
42,000.000 VALVOLINE INC 144A 92047WAD3 4.250% 02/15/2030 DD 02/25/20	98.50	42,000.00	41,370.00	0.12	-630.00
21,000.000 VERSCEND ESCROW CORP 144A 92535WAA8 9.750% 08/15/2026 DD 08/27/18	107.44	22,603.44	22,561.35	0.07	-42.09
80,000.000 VIASAT INC 144A 92552VAL4 5.625% 04/15/2027 DD 03/27/19	102.38	80,000.00	81,900.00	0.24	1,900.00
172,000.000 VICI PROPERTIES LP / VICI 144A 92564RAB1 4.625% 12/01/2029 DD 11/26/19	97.50	172,000.00	167,700.00	0.50	-4,300.00
120,000.000 VICI PROPERTIES LP / VICI 144A 92564RAE5 4.125% 08/15/2030 DD 02/05/20	95.38	120,000.00	114,450.00	0.34	-5,550.00
294,000.000 VIKING CRUISES LTD 144A 92676XAD9 5.875% 09/15/2027 DD 09/20/17	59.54	299,161.97	175,038.78	0.52	-124,123.19
30,000.000 WASTE PRO USA INC 144A 94107JAA1 5.500% 02/15/2026 DD 02/01/18	95.45	29,740.62	28,634.70	0.09	-1,105.92

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Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
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EATON VANCE HY PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
103,000.000 WATCO COS LLC / WATCO FIN 144A 941130AB2 6.500% 06/15/2027 DD 06/18/20	102.46	103,000.00	105,531.74	0.31	2,531.74
57,000.000 WESCO DISTRIBUTION INC 144A 95081QAN4 7.125% 06/15/2025 DD 06/12/20	105.31	57,000.00	60,028.41	0.18	3,028.41
51,000.000 WESCO DISTRIBUTION INC 144A 95081QAP9 7.250% 06/15/2028 DD 06/12/20	105.75	50,616.32	53,932.50	0.16	3,316.18
8,000.000 WESTERN MIDSTREAM OPERATING LP 958254AH7 4.500% 03/01/2028 DD 03/02/18	93.50	7,146.37	7,480.00	0.02	333.63
71,000.000 WESTERN MIDSTREAM OPERATING LP 958667AC1 VAR RT 02/01/2030 DD 01/13/20	96.26	63,514.45	68,343.89	0.20	4,829.44
20,000.000 TRI POINTE GROUP INC / TRI POI 962178AN9 5.875% 06/15/2024 DD 06/15/15	102.70	20,341.16	20,540.20	0.06	199.04
80,000.000 WILLIAM CARTER CO/THE 144A 96926JAC1 5.625% 03/15/2027 DD 03/14/19	103.00	80,276.20	82,400.00	0.25	2,123.80
18,000.000 WILLIAM CARTER CO/THE 144A 96926JAE7 5.500% 05/15/2025 DD 05/11/20	103.13	18,000.00	18,562.50	0.06	562.50
36,000.000 WINNEBAGO INDUSTRIES INC 144A 974637AC4 6.250% 07/15/2028 DD 07/08/20	102.00	36,137.50	36,720.00	0.11	582.50
132,000.000 WYNN LAS VEGAS LLC / WYNN 144A 983130AX3 5.250% 05/15/2027 DD 05/11/17	86.45	130,938.92	114,114.00	0.34	-16,824.92

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Report ID : IACS0005
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Status : FINAL

EATON VANCE HY PI2 - [redacted]

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Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
250,000.000 ZIGGO BV 144A 98954NAA7 5.500% 01/15/2027 DD 09/23/16	101.26	255,652.03	253,140.00	0.75	-2,512.03
23,000.000 VNU 5/20 B5 TLB 99AAF8931 0.000% 06/06/2025 DD 05/07/20	98.88	22,540.00	22,741.25	0.07	201.25
51,435.050 AMAYA 6/18 (USD) TL N8233BAC6 0.000% 07/10/2025 DD 04/23/18	99.30	51,569.35	51,072.95	0.15	-496.40
TOTAL FIXED INCOME SECURITIES U.S. DOLLAR		**32,462,426.91**	**31,147,217.13**	**92.80**	**-1,315,209.78**
TOTAL ASSETS U.S. DOLLAR		**34,905,920.70**	**33,563,645.91**	**100.00**	**-1,342,274.79**
TOTAL ASSETS		**35,019,029.14**	**33,562,746.75**	**100.00**	**-1,456,282.39**

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Asset Detail - By Currency

Report ID : IACS0005
Base Currency : USD
Status : FINAL

MARATHON EMD PI2 - [redacted]

6/30/2020

Shares/Par Security ID Description Link Ref	Price Base	Cost Base	Market Value Base	Percent Of Total	Net Unrealized Gain/Loss Base
U.S. DOLLAR					
FIXED INCOME SECURITIES					
16,300,000.000 MARATHON EM BOND FUND 99VVBK5X7	1.10	16,300,000.00	17,874,868.06	100.00	1,574,868.06

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MONTICELLO-MINN - [redacted]

Statement of Change in Net Assets
Book Value
1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: FINAL

NET ASSETS - BEGINNING OF PERIOD		**582,627,194.54**
RECEIPTS:		
CONTRIBUTIONS:		
COMPANY	6,696,114.00	
		6,696,114.00
MASTER TRUST INVESTMENT GAIN/LOSS		
	1,164.53	
		1,164.53
MASTER TRUST ALLOCATED EXPENSES		
	-147,155.79	
		-147,155.79
MASTER TRUST CHANGE IN REALIZED G/L		
	-2,306,001.72	
		-2,306,001.72
MASTER TRUST INTEREST INCOME EARNED		
	3,864,328.58	
		3,864,328.58
MASTER TRUST DIVIDEND INCOME EARNED		
	4,013,685.74	
		4,013,685.74
TOTAL RECEIPTS:		**12,122,135.34**
NET ASSETS - END OF PERIOD		**594,749,329.88**

BNY MELLON

MONTICELLO-MINN - [redacted]

Statement of Change in Net Assets
Book Value
1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: FINAL

NET ASSETS - BEGINNING OF PERIOD		**10,136,587.81**
RECEIPTS:		
MASTER TRUST INVESTMENT GAIN/LOSS		
	21.41	
		21.41
MASTER TRUST ALLOCATED EXPENSES		
	-2,558.01	
		-2,558.01
MASTER TRUST CHANGE IN REALIZED G/L		
	-42,204.01	
		-42,204.01
MASTER TRUST INTEREST INCOME EARNED		
	71,044.05	
		71,044.05
MASTER TRUST DIVIDEND INCOME EARNED		
	73,765.82	
		73,765.82
TOTAL RECEIPTS:		**100,069.26**
NET ASSETS - END OF PERIOD		**10,236,657.07**

BNY MELLON

MONTICELLO-WIS - [redacted]

Statement of Change in Net Assets
Book Value
1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: FINAL

NET ASSETS - BEGINNING OF PERIOD		**10,726,290.91**
RECEIPTS:		
MASTER TRUST INVESTMENT GAIN/LOSS		
	21.45	
		21.45
MASTER TRUST ALLOCATED EXPENSES		
	-2,562.18	
		-2,562.18
MASTER TRUST CHANGE IN REALIZED G/L		
	-42,273.01	
		-42,273.01
MASTER TRUST INTEREST INCOME EARNED		
	71,160.22	
		71,160.22
MASTER TRUST DIVIDEND INCOME EARNED		
	73,886.41	
		73,886.41
TOTAL RECEIPTS:		**100,232.89**
NET ASSETS - END OF PERIOD		**10,826,523.80**

BNY MELLON

PRAIRIE 1 MINN - [redacted]

Statement of Change in Net Assets
Book Value
1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: REVISED

NET ASSETS - BEGINNING OF PERIOD		**330,055,758.78**
RECEIPTS:		
CONTRIBUTIONS:		
COMPANY	24,632.00	
		24,632.00
MASTER TRUST INVESTMENT GAIN/LOSS		
	163.89	
		163.89
MASTER TRUST ALLOCATED EXPENSES		
	483,871.15	
		483,871.15
MASTER TRUST CHANGE IN REALIZED G/L		
	570,898.86	
		570,898.86
MASTER TRUST INTEREST INCOME EARNED		
	2,321,740.10	
		2,321,740.10
MASTER TRUST DIVIDEND INCOME EARNED		
	2,405,886.54	
		2,405,886.54
TOTAL RECEIPTS:		**5,807,192.54**
NET ASSETS - END OF PERIOD		**335,862,951.32**

BNY MELLON

PRAIRIE 1 MINN - [redacted]

Statement of Change in Net Assets
Book Value
1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: REVISED

NET ASSETS - BEGINNING OF PERIOD		**8,112,332.43**
RECEIPTS:		
MASTER TRUST INVESTMENT GAIN/LOSS		
	4.13	
		4.13
MASTER TRUST ALLOCATED EXPENSES		
	12,195.46	
		12,195.46
MASTER TRUST CHANGE IN REALIZED G/L		
	14,387.83	
		14,387.83
MASTER TRUST INTEREST INCOME EARNED		
	58,511.46	
		58,511.46
MASTER TRUST DIVIDEND INCOME EARNED		
	60,631.91	
		60,631.91
TOTAL RECEIPTS:		**145,730.79**
NET ASSETS - END OF PERIOD		**8,258,063.22**

BNY MELLON

PRAIRIE 1 WIS - [redacted]

Statement of Change in Net Assets
Book Value
1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: REVISED

NET ASSETS - BEGINNING OF PERIOD		**6,416,304.13**
RECEIPTS:		
MASTER TRUST INVESTMENT GAIN/LOSS		
	2.55	
		2.55
MASTER TRUST ALLOCATED EXPENSES		
	7,517.61	
		7,517.61
MASTER TRUST CHANGE IN REALIZED G/L		
	8,869.03	
		8,869.03
MASTER TRUST INTEREST INCOME EARNED		
	36,068.00	
		36,068.00
MASTER TRUST DIVIDEND INCOME EARNED		
	37,375.06	
		37,375.06
TOTAL RECEIPTS:		**89,832.25**
NET ASSETS - END OF PERIOD		**6,506,136.38**

Xcel Energy
Qualified Trust Analysis, Statements and Balances

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BNY MELLON

PRAIRIE 2 MINN - [redacted]

Statement of Change in Net Assets
Book Value
1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: FINAL

NET ASSETS - BEGINNING OF PERIOD		**369,069,094.67**
RECEIPTS:		
CONTRIBUTIONS:		
COMPANY	294,670.00	
		294,670.00
MASTER TRUST INVESTMENT GAIN/LOSS		
	344.77	
		344.77
MASTER TRUST ALLOCATED EXPENSES		
	947,376.17	
		947,376.17
MASTER TRUST CHANGE IN REALIZED G/L		
	244,242.00	
		244,242.00
MASTER TRUST INTEREST INCOME EARNED		
	2,595,041.13	
		2,595,041.13
MASTER TRUST DIVIDEND INCOME EARNED		
	2,606,756.39	
		2,606,756.39
TOTAL RECEIPTS:		**6,688,430.46**
NET ASSETS - END OF PERIOD		**375,757,525.13**

BNY MELLON

PRAIRIE 2 MINN - [redacted]

Statement of Change in Net Assets
Book Value
1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: FINAL

NET ASSETS - BEGINNING OF PERIOD		**7,528,545.58**
RECEIPTS:		
MASTER TRUST INVESTMENT GAIN/LOSS		
	7.05	
		7.05
MASTER TRUST ALLOCATED EXPENSES		
	19,387.59	
		19,387.59
MASTER TRUST CHANGE IN REALIZED G/L		
	4,999.43	
		4,999.43
MASTER TRUST INTEREST INCOME EARNED		
	53,070.69	
		53,070.69
MASTER TRUST DIVIDEND INCOME EARNED		
	53,308.70	
		53,308.70
TOTAL RECEIPTS:		**130,773.46**
NET ASSETS - END OF PERIOD		**7,659,319.04**

BNY MELLON

PRAIRIE 2 WIS - [redacted]

Statement of Change in Net Assets
Book Value
1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: FINAL

NET ASSETS - BEGINNING OF PERIOD		**6,060,873.32**
RECEIPTS:		
MASTER TRUST INVESTMENT GAIN/LOSS		
	5.56	
		5.56
MASTER TRUST ALLOCATED EXPENSES		
	15,316.91	
		15,316.91
MASTER TRUST CHANGE IN REALIZED G/L		
	3,949.72	
		3,949.72
MASTER TRUST INTEREST INCOME EARNED		
	41,927.78	
		41,927.78
MASTER TRUST DIVIDEND INCOME EARNED		
	42,115.87	
		42,115.87
TOTAL RECEIPTS:		**103,315.84**
NET ASSETS - END OF PERIOD		**6,164,189.16**

Xcel Energy
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BNY MELLON

Statement of Change in Net Assets Market Value

Report ID: GL8800
Base Currency: USD
Status: FINAL

MONTICELLO-MINN - [redacted]

1/1/2020 - 6/30/2020

NET ASSETS - BEGINNING OF PERIOD		**806,346,482.41**
RECEIPTS:		
CONTRIBUTIONS:		
COMPANY	6,696,114.00	
		6,696,114.00
INVESTMENT INCOME:		
UNREALIZED GAIN/LOSS-INVESTMENT	-24,691,355.96	
		-24,691,355.96
MASTER TRUST INVESTMENT GAIN/LOSS		
	1,164.53	
		1,164.53
MASTER TRUST ALLOCATED EXPENSES		
	-147,155.79	
		-147,155.79
MASTER TRUST CHANGE IN REALIZED G/L		
	-2,306,001.72	
		-2,306,001.72
MASTER TRUST INTEREST INCOME EARNED		
	3,864,328.58	
		3,864,328.58
MASTER TRUST DIVIDEND INCOME EARNED		
	4,013,685.74	
		4,013,685.74
TOTAL RECEIPTS:		**-12,569,220.62**
NET ASSETS - END OF PERIOD		**793,777,261.79**

BNY MELLON

Statement of Change in Net Assets Market Value

1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: FINAL

MONTICELLO-MINN - [redacted]

NET ASSETS - BEGINNING OF PERIOD		**14,874,976.61**
RECEIPTS:		
INVESTMENT INCOME:		
UNREALIZED GAIN/LOSS-INVESTMENT	-457,094.56	
		-457,094.56
MASTER TRUST INVESTMENT GAIN/LOSS		
	21.41	
		21.41
MASTER TRUST ALLOCATED EXPENSES		
	-2,558.01	
		-2,558.01
MASTER TRUST CHANGE IN REALIZED G/L		
	-42,204.01	
		-42,204.01
MASTER TRUST INTEREST INCOME EARNED		
	71,044.05	
		71,044.05
MASTER TRUST DIVIDEND INCOME EARNED		
	73,765.82	
		73,765.82
TOTAL RECEIPTS:		**-357,025.30**
NET ASSETS - END OF PERIOD		**14,517,951.31**

BNY MELLON

Statement of Change in Net Assets Market Value

MONTICELLO-WIS - [redacted]

1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: FINAL

NET ASSETS - BEGINNING OF PERIOD		**14,899,292.29**
RECEIPTS:		
INVESTMENT INCOME:		
UNREALIZED GAIN/LOSS-INVESTMENT	-457,841.81	
		-457,841.81
MASTER TRUST INVESTMENT GAIN/LOSS		
	21.45	
		21.45
MASTER TRUST ALLOCATED EXPENSES		
	-2,562.18	
		-2,562.18
MASTER TRUST CHANGE IN REALIZED G/L		
	-42,273.01	
		-42,273.01
MASTER TRUST INTEREST INCOME EARNED		
	71,160.22	
		71,160.22
MASTER TRUST DIVIDEND INCOME EARNED		
	73,886.41	
		73,886.41
TOTAL RECEIPTS:		**-357,608.92**
NET ASSETS - END OF PERIOD		**14,541,683.37**

Xcel Energy
Qualified Trust Analysis, Statements and Balances

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BNY MELLON

Statement of Change in Net Assets Market Value

Report ID: GL8800
Base Currency: USD
Status: REVISED

PRAIRIE 1 MINN - [redacted]

1/1/2020 - 6/30/2020

NET ASSETS - BEGINNING OF PERIOD		**468,406,635.81**
RECEIPTS:		
CONTRIBUTIONS:		
COMPANY	24,632.00	
		24,632.00
INVESTMENT INCOME:		
UNREALIZED GAIN/LOSS-INVESTMENT	-15,867,940.84	
		-15,867,940.84
MASTER TRUST INVESTMENT GAIN/LOSS		
	163.89	
		163.89
MASTER TRUST ALLOCATED EXPENSES		
	483,871.15	
		483,871.15
MASTER TRUST CHANGE IN REALIZED G/L		
	570,898.86	
		570,898.86
MASTER TRUST INTEREST INCOME EARNED		
	2,321,740.10	
		2,321,740.10
MASTER TRUST DIVIDEND INCOME EARNED		
	2,405,886.54	
		2,405,886.54
TOTAL RECEIPTS:		**-10,060,748.30**
NET ASSETS - END OF PERIOD		**458,345,887.51**

BNY MELLON

Statement of Change in Net Assets Market Value

1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: REVISED

PRAIRIE 1 MINN - [redacted]

NET ASSETS - BEGINNING OF PERIOD		**11,804,824.69**
RECEIPTS:		
INVESTMENT INCOME:		
UNREALIZED GAIN/LOSS-INVESTMENT	-399,910.61	
		-399,910.61
MASTER TRUST INVESTMENT GAIN/LOSS		
	4.13	
		4.13
MASTER TRUST ALLOCATED EXPENSES		
	12,195.46	
		12,195.46
MASTER TRUST CHANGE IN REALIZED G/L		
	14,387.83	
		14,387.83
MASTER TRUST INTEREST INCOME EARNED		
	58,511.46	
		58,511.46
MASTER TRUST DIVIDEND INCOME EARNED		
	60,631.91	
		60,631.91
TOTAL RECEIPTS:		**-254,179.82**
NET ASSETS - END OF PERIOD		**11,550,644.87**

Xcel Energy
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BNY MELLON

Statement of Change in Net Assets Market Value

Report ID: GL8800
Base Currency: USD
Status: REVISED

PRAIRIE 1 WIS - [redacted]

1/1/2020 - 6/30/2020

NET ASSETS - BEGINNING OF PERIOD		**7,276,797.30**
RECEIPTS:		
INVESTMENT INCOME:		
UNREALIZED GAIN/LOSS-INVESTMENT	-246,515.22	
		-246,515.22
MASTER TRUST INVESTMENT GAIN/LOSS		
	2.55	
		2.55
MASTER TRUST ALLOCATED EXPENSES		
	7,517.61	
		7,517.61
MASTER TRUST CHANGE IN REALIZED G/L		
	8,869.03	
		8,869.03
MASTER TRUST INTEREST INCOME EARNED		
	36,068.00	
		36,068.00
MASTER TRUST DIVIDEND INCOME EARNED		
	37,375.06	
		37,375.06
TOTAL RECEIPTS:		**-156,682.97**
NET ASSETS - END OF PERIOD		**7,120,114.33**

Xcel Energy
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BNY MELLON

Statement of Change in Net Assets Market Value

Report ID: GL8800
Base Currency: USD
Status: FINAL

PRAIRIE 2 MINN - [redacted]

1/1/2020 - 6/30/2020

NET ASSETS - BEGINNING OF PERIOD		**523,597,459.61**
RECEIPTS:		
CONTRIBUTIONS:		
COMPANY	294,670.00	
		294,670.00
INVESTMENT INCOME:		
UNREALIZED GAIN/LOSS-INVESTMENT	-17,708,453.82	
		-17,708,453.82
MASTER TRUST INVESTMENT GAIN/LOSS		
	344.77	
		344.77
MASTER TRUST ALLOCATED EXPENSES		
	947,376.17	
		947,376.17
MASTER TRUST CHANGE IN REALIZED G/L		
	244,242.00	
		244,242.00
MASTER TRUST INTEREST INCOME EARNED		
	2,595,041.13	
		2,595,041.13
MASTER TRUST DIVIDEND INCOME EARNED		
	2,606,756.39	
		2,606,756.39
TOTAL RECEIPTS:		**-11,020,023.36**
NET ASSETS - END OF PERIOD		**512,577,436.25**

BNY MELLON

Statement of Change in Net Assets Market Value

1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: FINAL

PRAIRIE 2 MINN - [redacted]

NET ASSETS - BEGINNING OF PERIOD		**10,710,404.69**
RECEIPTS:		
INVESTMENT INCOME:		
UNREALIZED GAIN/LOSS-INVESTMENT	-362,289.99	
		-362,289.99
MASTER TRUST INVESTMENT GAIN/LOSS		
	7.05	
		7.05
MASTER TRUST ALLOCATED EXPENSES		
	19,387.59	
		19,387.59
MASTER TRUST CHANGE IN REALIZED G/L		
	4,999.43	
		4,999.43
MASTER TRUST INTEREST INCOME EARNED		
	53,070.69	
		53,070.69
MASTER TRUST DIVIDEND INCOME EARNED		
	53,308.70	
		53,308.70
TOTAL RECEIPTS:		**-231,516.53**
NET ASSETS - END OF PERIOD		**10,478,888.16**

BNY MELLON

Statement of Change in Net Assets Market Value

1/1/2020 - 6/30/2020

Report ID: GL8800
Base Currency: USD
Status: FINAL

PRAIRIE 2 WIS - [redacted]

NET ASSETS - BEGINNING OF PERIOD		**8,461,619.70**
RECEIPTS:		
INVESTMENT INCOME:		
UNREALIZED GAIN/LOSS-INVESTMENT	-286,222.55	
		-286,222.55
MASTER TRUST INVESTMENT GAIN/LOSS		
	5.56	
		5.56
MASTER TRUST ALLOCATED EXPENSES		
	15,316.91	
		15,316.91
MASTER TRUST CHANGE IN REALIZED G/L		
	3,949.72	
		3,949.72
MASTER TRUST INTEREST INCOME EARNED		
	41,927.78	
		41,927.78
MASTER TRUST DIVIDEND INCOME EARNED		
	42,115.87	
		42,115.87
TOTAL RECEIPTS:		**-182,906.71**
NET ASSETS - END OF PERIOD		**8,278,712.99**

Xcel Energy
Nuclear Decommissioning Accrual
42-Year Decommissioning Period
DECON Method - No Recasking

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Proposed

2022 ACCRUAL COMPARISON

	Present	Proposed	Difference
Monticello	$8,507,110	$6,384,444	($2,122,666)
Prairie Island Unit 1	12,399,703	11,586,169	(813,534)
Prairie Island Unit 2	6,511,608	7,210,183	698,575
TOTAL	$27,418,421	$25,180,796	($2,237,625)

Xcel Energy
Nuclear Decommissioning Accrual
42-Year Decommissioning Period
DECON Method - No Recasking

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Proposed

2022 MN RETAIL SUMMARY

	Remaining Life (yrs)	Operational Earnings Rate	Post-Shutdown Earnings Rate	Market Value Balance 6/30/2020	Book Value 6/30/2020	Unrealized Gain/Loss 6/30/2020	Tax-Effect Adjustment	Tax-Adjusted Fund Balance 6/30/2020	2022-2024 Decommissioning Accrual
Monticello	9.67	3.79%	2.70%	$814,968,100	$610,109,002	$204,859,098	$57,032,773	$757,935,327	**$6,384,444**
Prairie Island Unit 1	13.25	4.01%	2.68%	471,960,960	346,629,286	125,331,674	34,892,338	437,068,622	**11,586,169**
Prairie Island Unit 2	14.42	3.98%	2.60%	526,255,835	385,837,890	140,417,945	39,092,356	487,163,479	**7,210,183**
TOTAL DECOMMISSIONING ACCRUAL				**$1,813,184,895**	**$1,342,576,178**	**$470,608,717**	**$131,017,467**	**$1,682,167,428**	**$25,180,796**

INPUT DATA

Escalation Rate (Labor)	3.78%
Escalation Rate (Non-Labor)	2.58%
Escalation Rate (PIIC)	0.00%
Jurisdictional Factor	72.9219%
Tax Rate for tax-effect adjustment	27.84%

Xcel Energy
Nuclear Decommissioning Accrual
42-Year Decommissioning Period
DECON Method - No Recasking

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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Monticello																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2030	$22,675,886	$0	$22,675,886	$16,535,687	1.4492	$23,963,517	$9,374,135	$0	$9,374,135	$6,835,797	1.2901	$8,818,862	$0	$0	1.0000	$0	$32,050,021	$23,371,484	$32,782,380
2031	77,446,501	-	77,446,501	$56,475,460	1.5040	84,939,091	46,796,397	-	46,796,397	34,124,822	1.3234	45,160,789	0	0	1.0000	0	124,242,898	90,600,282	130,099,881
2032	85,157,508	-	85,157,508	$62,098,473	1.5609	96,929,507	130,974,261	-	130,974,261	95,508,920	1.3575	129,653,358	0	0	1.0000	0	216,131,769	157,607,393	226,582,865
2033	95,842,498	-	95,842,498	$69,890,170	1.6199	113,215,087	152,215,926	-	152,215,926	110,998,745	1.3926	154,576,853	0	0	1.0000	0	248,058,423	180,888,916	267,791,939
2034	97,504,414	-	97,504,414	$71,102,071	1.6811	119,529,692	130,971,769	-	130,971,769	95,507,102	1.4285	136,431,895	0	0	1.0000	0	228,476,182	166,609,173	255,961,587
2035	53,100,313	-	53,100,313	$38,721,757	1.7446	67,553,977	22,930,079	-	22,930,079	16,721,049	1.4653	24,501,353	0	0	1.0000	0	76,030,391	55,442,806	92,055,330
2036	38,066,633	-	38,066,633	$27,758,912	1.8106	50,260,286	16,909,923	-	16,909,923	12,331,037	1.5032	18,536,015	0	0	1.0000	0	54,976,556	40,089,949	68,796,301
2037	32,984,663	-	32,984,663	$24,053,043	1.8790	45,195,668	18,214,155	-	18,214,155	13,282,108	1.5419	20,479,682	0	0	1.0000	0	51,198,818	37,335,151	65,675,350
2038	6,573,045	4,781,312	1,791,733	$1,306,566	1.9501	2,547,933	3,105,374	1,883,616	1,221,759	890,930	1.5817	1,409,183	0	0	1.0000	0	3,013,491	2,197,495	3,957,117
2039	7,472,920	4,781,312	2,691,608	$1,962,771	2.0238	3,972,257	5,804,999	1,883,616	3,921,384	2,859,547	1.6225	4,639,616	0	0	1.0000	0	6,612,991	4,822,319	8,611,873
2040	7,850,336	4,781,312	3,069,024	$2,237,990	2.1003	4,700,451	6,891,730	1,883,616	5,008,114	3,652,012	1.6644	6,078,409	0	0	1.0000	0	8,077,138	5,890,003	10,778,860
2041	6,375,082	4,781,312	1,593,771	$1,162,208	2.1797	2,533,264	2,511,488	1,883,616	627,872	457,856	1.7073	781,698	0	0	1.0000	0	2,221,643	1,620,064	3,314,962
2042	6,375,082	4,781,312	1,593,771	$1,162,208	2.2620	2,628,914	2,511,488	1,883,616	627,872	457,856	1.7514	801,889	0	0	1.0000	0	2,221,643	1,620,064	3,430,803
2043	6,375,082	4,781,312	1,593,771	$1,162,208	2.3475	2,728,283	2,511,488	1,883,616	627,872	457,856	1.7966	822,585	0	0	1.0000	0	2,221,643	1,620,064	3,550,867
2044	6,392,548	4,781,312	1,611,237	$1,174,944	2.4363	2,862,517	2,518,369	1,883,616	634,753	462,874	1.8429	853,030	0	0	1.0000	0	2,245,989	1,637,818	3,715,547
2045	6,375,082	4,781,312	1,593,771	$1,162,208	2.5284	2,938,526	2,511,488	1,883,616	627,872	457,856	1.8905	865,577	0	0	1.0000	0	2,221,643	1,620,064	3,804,103
2046	6,375,082	4,781,312	1,593,771	$1,162,208	2.6239	3,049,517	2,511,488	1,883,616	627,872	457,856	1.9392	887,875	0	0	1.0000	0	2,221,643	1,620,064	3,937,392
2047	6,375,082	4,781,312	1,593,771	$1,162,208	2.7231	3,164,808	2,511,488	1,883,616	627,872	457,856	1.9893	910,813	0	0	1.0000	0	2,221,643	1,620,064	4,075,621
2048	7,112,034	4,781,312	2,330,723	$1,699,607	2.8261	4,803,260	4,676,827	1,883,616	2,793,211	2,036,862	2.0406	4,156,421	0	0	1.0000	0	5,123,933	3,736,469	8,959,681
2049	6,375,082	4,781,312	1,593,771	$1,162,208	2.9329	3,408,639	2,511,488	1,883,616	627,872	457,856	2.0932	958,385	0	0	1.0000	0	2,221,643	1,620,064	4,367,024
2050	6,375,082	4,781,312	1,593,771	$1,162,208	3.0438	3,537,528	2,511,488	1,883,616	627,872	457,856	2.1472	983,109	0	0	1.0000	0	2,221,643	1,620,064	4,520,637
2051	6,375,082	4,781,312	1,593,771	$1,162,208	3.1588	3,671,182	2,511,488	1,883,616	627,872	457,856	2.2026	1,008,474	0	0	1.0000	0	2,221,643	1,620,064	4,679,656
2052	6,496,336	4,781,312	1,715,024	$1,250,628	3.2782	4,099,809	2,829,731	1,883,616	946,115	689,925	2.2595	1,558,886	0	0	1.0000	0	2,661,139	1,940,553	5,658,695
2053	6,686,445	4,781,312	1,905,133	$1,389,259	3.4021	4,726,399	3,445,575	1,883,616	1,561,960	1,139,011	2.3178	2,639,999	0	0	1.0000	0	3,467,093	2,528,270	7,366,398
2054	6,582,657	4,781,312	1,801,346	$1,313,575	3.5307	4,637,841	3,134,213	1,883,616	1,250,597	911,959	2.3776	2,168,274	0	0	1.0000	0	3,051,943	2,225,535	6,806,115
2055	6,582,657	4,781,312	1,801,346	$1,313,575	3.6642	4,813,203	3,134,213	1,883,616	1,250,597	911,959	2.4389	2,224,177	0	0	1.0000	0	3,051,943	2,225,535	7,037,380
2056	7,015,273	4,781,312	2,233,962	$1,629,047	3.8027	6,194,778	4,386,544	1,883,616	2,502,928	1,825,183	2.5018	4,566,242	0	0	1.0000	0	4,736,889	3,454,230	10,761,020
2057	6,894,020	4,781,312	2,112,708	$1,540,627	3.9464	6,079,930	4,068,300	1,883,616	2,184,685	1,593,113	2.5664	4,088,566	0	0	1.0000	0	4,297,393	3,133,740	10,168,496
2058	6,894,020	4,781,312	2,112,708	$1,540,627	4.0956	6,309,791	4,068,300	1,883,616	2,184,685	1,593,113	2.6326	4,194,031	0	0	1.0000	0	4,297,393	3,133,740	10,503,822
2059	6,894,020	4,781,312	2,112,708	$1,540,627	4.2504	6,548,280	4,068,300	1,883,616	2,184,685	1,593,113	2.7005	4,302,203	0	0	1.0000	0	4,297,393	3,133,740	10,850,483
2060	6,703,911	4,781,312	1,922,599	$1,401,996	4.4111	6,184,343	3,452,456	1,883,616	1,568,840	1,144,028	2.7702	3,169,187	0	0	1.0000	0	3,491,439	2,546,024	9,353,530
2061	6,582,657	4,781,312	1,801,346	$1,313,575	4.5778	6,013,286	3,134,213	1,883,616	1,250,597	911,959	2.8416	2,591,423	0	0	1.0000	0	3,051,943	2,225,535	8,604,709
2062	6,686,445	4,781,312	1,905,133	$1,389,259	4.7509	6,600,232	3,445,575	1,883,616	1,561,960	1,139,011	2.9150	3,320,216	0	0	1.0000	0	3,467,093	2,528,270	9,920,448
2063	6,582,657	4,781,312	1,801,346	$1,313,575	4.9305	6,476,584	3,134,213	1,883,616	1,250,597	911,959	2.9902	2,726,940	0	0	1.0000	0	3,051,943	2,225,535	9,203,524
2064	6,600,123	4,781,312	1,818,812	$1,326,312	5.1168	6,786,473	3,141,094	1,883,616	1,257,478	916,977	3.0673	2,812,643	0	0	1.0000	0	3,076,289	2,243,289	9,599,116
2065	6,686,445	4,781,312	1,905,133	$1,389,259	5.3103	7,377,383	3,445,575	1,883,616	1,561,960	1,139,011	3.1465	3,583,897	0	0	1.0000	0	3,467,093	2,528,270	10,961,280
2066	6,582,657	4,781,312	1,801,346	$1,313,575	5.5110	7,239,114	3,134,213	1,883,616	1,250,597	911,959	3.2276	2,943,439	0	0	1.0000	0	3,051,943	2,225,535	10,182,553
2067	6,582,657	4,781,312	1,801,346	$1,313,575	5.7193	7,512,732	3,134,213	1,883,616	1,250,597	911,959	3.3109	3,019,406	0	0	1.0000	0	3,051,943	2,225,535	10,532,137
2068	6,703,911	4,781,312	1,922,599	$1,401,996	5.9355	8,321,546	3,452,456	1,883,616	1,568,840	1,144,028	3.3963	3,885,463	0	0	1.0000	0	3,491,439	2,546,024	12,207,009
2069	6,790,232	4,781,312	2,008,921	$1,464,943	6.1598	9,023,756	3,756,938	1,883,616	1,873,322	1,366,062	3.4840	4,759,360	0	0	1.0000	0	3,882,243	2,831,005	13,783,116
2070	6,582,657	4,781,312	1,801,346	$1,313,575	6.3927	8,397,294	3,134,213	1,883,616	1,250,597	911,959	3.5738	3,259,160	0	0	1.0000	0	3,051,943	2,225,535	11,656,453
2071	6,790,232	4,781,312	2,008,921	$1,464,943	6.6343	9,718,872	3,756,938	1,883,616	1,873,322	1,366,062	3.6660	5,007,983	0	0	1.0000	0	3,882,243	2,831,005	14,726,855
2072	6,807,698	4,781,312	2,026,387	$1,477,680	6.8851	10,173,972	10,069,489	1,883,616	8,185,873	5,969,294	3.7606	22,448,127	0	0	1.0000	0	10,212,259	7,446,974	32,622,099
2073	1,956,375	4,781,312	(2,824,936)	($2,059,997)	7.1454	(14,719,505)	13,550,559	1,883,616	11,666,943	8,507,757	3.8576	32,819,522	0	0	1.0000	0	8,842,007	6,447,759	18,100,017
	$738,239,129	$172,127,227	$566,111,902	$412,819,555		$776,650,017	$666,864,659	$67,810,173	$599,054,486	$436,841,913		$685,405,016	$0	$0		$0	$1,165,166,389	$849,661,469	$1,462,055,033

Xcel Energy
Nuclear Decommissioning Accrual
42-Year Decommissioning Period
DECON Method - No Recasking

Docket No. E002/M-20-___
Schedule E.1
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 1																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2033	$23,781,625	$0	$23,781,625	$17,342,013	1.6199	$28,092,326	$10,730,370	$0	$10,730,370	$7,824,790	1.3926	$10,896,802	$1,250,000	$911,524	1.0000	$911,524	$35,761,995	$26,078,326	$39,900,652
2034	67,414,177	-	67,414,177	49,159,699	1.6811	82,642,369	37,794,295	-	37,794,295	27,560,318	1.4285	39,369,914	1,250,000	911,524	1.0000	911,524	106,458,472	77,631,540	122,923,807
2035	68,590,730	-	68,590,730	50,017,664	1.7446	87,260,816	77,836,646	-	77,836,646	56,759,961	1.4653	83,170,371	1,250,000	911,524	1.0000	911,524	147,677,376	107,689,149	171,342,711
2036	64,154,194	-	64,154,194	46,782,457	1.8106	84,704,317	79,888,287	-	79,888,287	58,256,057	1.5032	87,570,505	1,250,000	911,524	1.0000	911,524	145,292,481	105,950,038	173,186,345
2037	45,558,348	-	45,558,348	33,222,013	1.8790	62,424,163	66,524,694	-	66,524,694	48,511,071	1.5419	74,799,220	1,250,000	911,524	1.0000	911,524	113,333,042	82,644,608	138,134,907
2038	25,711,788	-	25,711,788	18,749,524	1.9501	36,563,447	43,716,000	-	43,716,000	31,878,537	1.5817	50,422,283	1,250,000	911,524	1.0000	911,524	70,677,787	51,539,585	87,897,254
2039	34,084,468	-	34,084,468	24,855,041	2.0238	50,301,633	15,248,152	-	15,248,152	11,119,242	1.6225	18,040,971	1,250,000	911,524	1.0000	911,524	50,582,620	36,885,807	69,254,127
2040	20,888,933	-	20,888,933	15,232,607	2.1003	31,993,044	10,148,162	-	10,148,162	7,400,233	1.6644	12,316,947	1,250,000	911,524	1.0000	911,524	32,287,095	23,544,363	45,221,514
2041	15,746,873	2,455,937	13,290,937	9,692,004	2.1797	21,125,660	12,162,642	1,636,181	10,526,461	7,676,095	1.7073	13,105,397	1,250,000	911,524	1.0000	911,524	25,067,398	18,279,623	35,142,581
2042	9,316,574	2,455,937	6,860,638	5,002,907	2.2620	11,316,576	7,378,445	1,636,181	5,742,263	4,187,368	1.7514	7,333,756	1,250,000	911,524	1.0000	911,524	13,852,901	10,101,799	19,561,856
2043	3,430,264	2,455,937	974,327	710,498	2.3475	1,667,893	2,647,764	1,636,181	1,011,583	737,665	1.7966	1,325,289	1,250,000	911,524	1.0000	911,524	3,235,910	2,359,687	3,904,707
2044	3,387,341	2,455,937	931,405	679,198	2.4363	1,654,730	2,501,482	1,636,181	865,301	630,994	1.8429	1,162,858	1,250,000	911,524	1.0000	911,524	3,046,705	2,221,715	3,729,112
2045	3,482,157	2,455,937	1,026,221	748,340	2.5284	1,892,102	2,803,445	1,636,181	1,167,264	851,191	1.8905	1,609,177	1,250,000	911,524	1.0000	911,524	3,443,485	2,511,054	4,412,802
2046	3,482,157	2,455,937	1,026,221	748,340	2.6239	1,963,568	2,803,445	1,636,181	1,167,264	851,191	1.9392	1,650,630	1,250,000	911,524	1.0000	911,524	3,443,485	2,511,054	4,525,722
2047	3,430,264	2,455,937	974,327	710,498	2.7231	1,934,756	2,647,764	1,636,181	1,011,583	737,665	1.9893	1,467,438	1,250,000	911,524	1.0000	911,524	3,235,910	2,359,687	4,313,718
2048	3,491,129	2,455,937	1,035,192	754,882	2.8261	2,133,372	2,812,844	1,636,181	1,176,663	858,045	2.0406	1,750,927	1,250,000	911,524	1.0000	911,524	3,461,855	2,524,451	4,795,822
2049	3,482,157	2,455,937	1,026,221	748,340	2.9329	2,194,805	2,803,445	1,636,181	1,167,264	851,191	2.0932	1,781,713	1,250,000	911,524	1.0000	911,524	3,443,485	2,511,054	4,888,042
2050	3,430,264	2,455,937	974,327	710,498	3.0438	2,162,613	2,647,764	1,636,181	1,011,583	737,665	2.1472	1,583,915	1,250,000	911,524	1.0000	911,524	3,235,910	2,359,687	4,658,052
2051	3,482,157	2,455,937	1,026,221	748,340	3.1588	2,363,855	2,803,445	1,636,181	1,167,264	851,191	2.2026	1,874,833	1,250,000	911,524	1.0000	911,524	3,443,485	2,511,054	5,150,212
2052	3,439,235	2,455,937	983,298	717,040	3.2782	2,350,600	2,657,163	1,636,181	1,020,982	744,519	2.2595	1,682,242	1,250,000	911,524	1.0000	911,524	3,254,280	2,373,083	4,944,366
2053	3,378,370	2,455,937	922,433	672,656	3.4021	2,288,442	2,492,083	1,636,181	855,901	624,140	2.3178	1,446,631	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	4,646,597
2054	3,378,370	2,455,937	922,433	672,656	3.5307	2,374,946	2,492,083	1,636,181	855,901	624,140	2.3776	1,483,954	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	4,770,424
2055	3,378,370	2,455,937	922,433	672,656	3.6642	2,464,746	2,492,083	1,636,181	855,901	624,140	2.4389	1,522,214	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	4,898,483
2056	3,283,554	2,455,937	827,617	603,514	3.8027	2,294,983	2,190,119	1,636,181	553,938	403,942	2.5018	1,010,583	1,250,000	911,524	1.0000	911,524	2,631,555	1,918,980	4,217,090
2057	3,274,582	2,455,937	818,646	596,972	3.9464	2,355,890	2,180,720	1,636,181	544,539	397,088	2.5664	1,019,087	1,250,000	911,524	1.0000	911,524	2,613,185	1,905,584	4,286,501
2058	3,274,582	2,455,937	818,646	596,972	4.0956	2,444,959	2,180,720	1,636,181	544,539	397,088	2.6326	1,045,374	1,250,000	911,524	1.0000	911,524	2,613,185	1,905,584	4,401,857
2059	3,274,582	2,455,937	818,646	596,972	4.2504	2,537,370	2,180,720	1,636,181	544,539	397,088	2.7005	1,072,336	1,250,000	911,524	1.0000	911,524	2,613,185	1,905,584	4,521,230
2060	3,387,341	2,455,937	931,405	679,198	4.4111	2,996,010	2,501,482	1,636,181	865,301	630,994	2.7702	1,747,979	1,250,000	911,524	1.0000	911,524	3,046,705	2,221,715	5,655,513
2061	3,378,370	2,455,937	922,433	672,656	4.5778	3,079,284	2,492,083	1,636,181	855,901	624,140	2.8416	1,773,555	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	5,764,363
2062	3,378,370	2,455,937	922,433	672,656	4.7509	3,195,721	2,492,083	1,636,181	855,901	624,140	2.9150	1,819,367	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	5,926,611
2063	3,378,370	2,455,937	922,433	672,656	4.9305	3,316,530	2,492,083	1,636,181	855,901	624,140	2.9902	1,866,302	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	6,094,356
2064	3,387,341	2,455,937	931,405	679,198	5.1168	3,475,320	2,501,482	1,636,181	865,301	630,994	3.0673	1,935,447	1,250,000	911,524	1.0000	911,524	3,046,705	2,221,715	6,322,291
2065	3,378,370	2,455,937	922,433	672,656	5.3103	3,572,004	2,492,083	1,636,181	855,901	624,140	3.1465	1,963,855	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	6,447,383
2066	3,378,370	2,455,937	922,433	672,656	5.5110	3,707,006	2,492,083	1,636,181	855,901	624,140	3.2276	2,014,473	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	6,633,003
2067	3,378,370	2,455,937	922,433	672,656	5.7193	3,847,121	2,492,083	1,636,181	855,901	624,140	3.3109	2,066,464	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	6,825,108
2068	3,387,341	2,455,937	931,405	679,198	5.9355	4,031,380	2,501,482	1,636,181	865,301	630,994	3.3963	2,143,044	1,250,000	911,524	1.0000	911,524	3,046,705	2,221,715	7,085,947
2069	3,378,370	2,455,937	922,433	672,656	6.1598	4,143,425	2,492,083	1,636,181	855,901	624,140	3.4840	2,174,502	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	7,229,452
2070	3,378,370	2,455,937	922,433	672,656	6.3927	4,300,087	2,492,083	1,636,181	855,901	624,140	3.5738	2,230,550	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	7,442,161
2071	3,378,370	2,455,937	922,433	672,656	6.6343	4,462,601	2,492,083	1,636,181	855,901	624,140	3.6660	2,288,096	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	7,662,220
2072	3,387,341	2,455,937	931,405	679,198	6.8851	4,676,346	2,501,482	1,636,181	865,301	630,994	3.7606	2,372,915	1,250,000	911,524	1.0000	911,524	3,046,705	2,221,715	7,960,785
2073	3,378,370	2,455,937	922,433	672,656	7.1454	4,806,395	2,492,083	1,636,181	855,901	624,140	3.8576	2,407,681	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	8,125,600
2074	3,378,370	2,455,937	922,433	672,656	7.4155	4,988,079	14,274,093	1,636,181	12,637,912	9,215,806	3.9572	36,468,786	1,250,000	911,524	1.0000	911,524	14,810,345	10,799,985	42,368,389
2075	885,735	2,455,937	(1,570,201)	(1,145,021)	7.6958	(8,811,850)	4,413,185	1,636,181	2,777,004	2,025,044	4.0593	8,220,260	1,250,000	911,524	1.0000	911,524	2,456,802	1,791,547	319,934
	$484,624,416	$85,957,783	$398,666,633	$290,715,283		$583,289,444	$458,378,810	$57,266,339	$401,112,471	$292,498,835		$495,008,642	$53,750,000	$39,195,521		$39,195,521	$853,529,104	$622,409,640	$1,117,493,606

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	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 2																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2034	$8,345,549	$0	$8,345,549	$6,085,733	1.6811	$10,230,726	$4,974,446	$0	$4,974,446	$3,627,461	1.4285	$5,181,828	$1,250,000	$911,524	1.0000	$911,524	$14,569,995	$10,624,717	$16,324,077
2035	49,894,469	-	49,894,469	36,383,994	1.7446	63,475,517	37,951,792	-	37,951,792	27,675,168	1.4653	40,552,423	1,250,000	911,524	1.0000	911,524	89,096,260	64,970,686	104,939,464
2036	67,056,940	-	67,056,940	48,899,195	1.8106	88,536,882	73,743,397	-	73,743,397	53,775,086	1.5032	80,834,709	1,250,000	911,524	1.0000	911,524	142,050,336	103,585,804	170,283,115
2037	75,292,006	-	75,292,006	54,904,361	1.8790	103,165,294	91,702,704	-	91,702,704	66,871,354	1.5419	103,108,941	1,250,000	911,524	1.0000	911,524	168,244,709	122,687,239	207,185,759
2038	82,522,109	-	82,522,109	60,176,690	1.9501	117,350,563	102,667,333	-	102,667,333	74,866,970	1.5817	118,417,086	1,250,000	911,524	1.0000	911,524	186,439,442	135,955,184	236,679,173
2039	39,422,933	-	39,422,933	28,747,952	2.0238	58,180,105	16,666,675	-	16,666,675	12,153,656	1.6225	19,719,307	1,250,000	911,524	1.0000	911,524	57,339,608	41,813,132	78,810,936
2040	25,047,260	-	25,047,260	18,264,938	2.1003	38,361,849	15,041,293	-	15,041,293	10,968,396	1.6644	18,255,799	1,250,000	911,524	1.0000	911,524	41,338,552	30,144,858	57,529,171
2041	18,516,011	-	18,516,011	13,502,227	2.1797	29,430,805	19,635,276	-	19,635,276	14,318,416	1.7073	24,445,832	1,250,000	911,524	1.0000	911,524	39,401,287	28,732,167	54,788,161
2042	10,621,483	2,462,665	8,158,818	5,949,565	2.2620	13,457,916	10,899,795	1,640,664	9,259,132	6,751,935	1.7514	11,825,338	1,250,000	911,524	1.0000	911,524	18,667,949	13,613,023	26,194,778
2043	3,430,264	2,462,665	967,598	705,591	2.3475	1,656,375	2,647,764	1,640,664	1,007,100	734,396	1.7966	1,319,417	1,250,000	911,524	1.0000	911,524	3,224,698	2,351,511	3,887,316
2044	3,387,341	2,462,665	924,676	674,291	2.4363	1,642,776	2,501,482	1,640,664	860,818	627,725	1.8429	1,156,834	1,250,000	911,524	1.0000	911,524	3,035,494	2,213,540	3,711,134
2045	3,482,157	2,462,665	1,019,492	743,433	2.5284	1,879,696	2,803,445	1,640,664	1,162,781	847,922	1.8905	1,602,997	1,250,000	911,524	1.0000	911,524	3,432,273	2,502,879	4,394,217
2046	3,482,157	2,462,665	1,019,492	743,433	2.6239	1,950,694	2,803,445	1,640,664	1,162,781	847,922	1.9392	1,644,291	1,250,000	911,524	1.0000	911,524	3,432,273	2,502,879	4,506,508
2047	3,430,264	2,462,665	967,598	705,591	2.7231	1,921,395	2,647,764	1,640,664	1,007,100	734,396	1.9893	1,460,935	1,250,000	911,524	1.0000	911,524	3,224,698	2,351,511	4,293,854
2048	3,491,129	2,462,665	1,028,464	749,975	2.8261	2,119,505	2,812,844	1,640,664	1,172,180	854,776	2.0406	1,744,256	1,250,000	911,524	1.0000	911,524	3,450,644	2,516,275	4,775,285
2049	3,482,157	2,462,665	1,019,492	743,433	2.9329	2,180,415	2,803,445	1,640,664	1,162,781	847,922	2.0932	1,774,871	1,250,000	911,524	1.0000	911,524	3,432,273	2,502,879	4,866,809
2050	3,430,264	2,462,665	967,598	705,591	3.0438	2,147,678	2,647,764	1,640,664	1,007,100	734,396	2.1472	1,576,896	1,250,000	911,524	1.0000	911,524	3,224,698	2,351,511	4,636,098
2051	3,482,157	2,462,665	1,019,492	743,433	3.1588	2,348,356	2,803,445	1,640,664	1,162,781	847,922	2.2026	1,867,633	1,250,000	911,524	1.0000	911,524	3,432,273	2,502,879	5,127,513
2052	3,439,235	2,462,665	976,570	712,133	3.2782	2,334,515	2,657,163	1,640,664	1,016,499	741,251	2.2595	1,674,856	1,250,000	911,524	1.0000	911,524	3,243,069	2,364,908	4,920,895
2053	3,378,370	2,462,665	915,705	667,749	3.4021	2,271,750	2,492,083	1,640,664	851,419	620,871	2.3178	1,439,054	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	4,622,328
2054	3,378,370	2,462,665	915,705	667,749	3.5307	2,357,622	2,492,083	1,640,664	851,419	620,871	2.3776	1,476,182	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	4,745,328
2055	3,378,370	2,462,665	915,705	667,749	3.6642	2,446,767	2,492,083	1,640,664	851,419	620,871	2.4389	1,514,242	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	4,872,532
2056	3,283,554	2,462,665	820,889	598,608	3.8027	2,276,325	2,190,119	1,640,664	549,455	400,673	2.5018	1,002,405	1,250,000	911,524	1.0000	911,524	2,620,344	1,910,805	4,190,253
2057	3,274,582	2,462,665	811,917	592,065	3.9464	2,336,527	2,180,720	1,640,664	540,056	393,819	2.5664	1,010,698	1,250,000	911,524	1.0000	911,524	2,601,973	1,897,408	4,258,748
2058	3,274,582	2,462,665	811,917	592,065	4.0956	2,424,863	2,180,720	1,640,664	540,056	393,819	2.6326	1,036,769	1,250,000	911,524	1.0000	911,524	2,601,973	1,897,408	4,373,155
2059	3,274,582	2,462,665	811,917	592,065	4.2504	2,516,515	2,180,720	1,640,664	540,056	393,819	2.7005	1,063,509	1,250,000	911,524	1.0000	911,524	2,601,973	1,897,408	4,491,547
2060	3,387,341	2,462,665	924,676	674,291	4.4111	2,974,367	2,501,482	1,640,664	860,818	627,725	2.7702	1,738,923	1,250,000	911,524	1.0000	911,524	3,035,494	2,213,540	5,624,814
2061	3,378,370	2,462,665	915,705	667,749	4.5778	3,056,822	2,492,083	1,640,664	851,419	620,871	2.8416	1,764,266	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	5,732,612
2062	3,378,370	2,462,665	915,705	667,749	4.7509	3,172,410	2,492,083	1,640,664	851,419	620,871	2.9150	1,809,838	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	5,893,772
2063	3,378,370	2,462,665	915,705	667,749	4.9305	3,292,338	2,492,083	1,640,664	851,419	620,871	2.9902	1,856,528	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	6,060,389
2064	3,387,341	2,462,665	924,676	674,291	5.1168	3,450,214	2,501,482	1,640,664	860,818	627,725	3.0673	1,925,420	1,250,000	911,524	1.0000	911,524	3,035,494	2,213,540	6,287,158
2065	3,378,370	2,462,665	915,705	667,749	5.3103	3,545,949	2,492,083	1,640,664	851,419	620,871	3.1465	1,953,570	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	6,411,042
2066	3,378,370	2,462,665	915,705	667,749	5.5110	3,679,966	2,492,083	1,640,664	851,419	620,871	3.2276	2,003,922	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	6,595,412
2067	3,378,370	2,462,665	915,705	667,749	5.7193	3,819,058	2,492,083	1,640,664	851,419	620,871	3.3109	2,055,641	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	6,786,223
2068	3,387,341	2,462,665	924,676	674,291	5.9355	4,002,257	2,501,482	1,640,664	860,818	627,725	3.3963	2,131,942	1,250,000	911,524	1.0000	911,524	3,035,494	2,213,540	7,045,722
2069	3,378,370	2,462,665	915,705	667,749	6.1598	4,113,202	2,492,083	1,640,664	851,419	620,871	3.4840	2,163,114	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	7,187,839
2070	3,378,370	2,462,665	915,705	667,749	6.3927	4,268,720	2,492,083	1,640,664	851,419	620,871	3.5738	2,218,868	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	7,399,112
2071	3,378,370	2,462,665	915,705	667,749	6.6343	4,430,049	2,492,083	1,640,664	851,419	620,871	3.6660	2,276,112	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	7,617,684
2072	3,387,341	2,462,665	924,676	674,291	6.8851	4,642,564	2,501,482	1,640,664	860,818	627,725	3.7606	2,360,622	1,250,000	911,524	1.0000	911,524	3,035,494	2,213,540	7,914,709
2073	3,378,370	2,462,665	915,705	667,749	7.1454	4,771,335	2,492,083	1,640,664	851,419	620,871	3.8576	2,395,071	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	8,077,930
2074	3,378,370	2,462,665	915,705	667,749	7.4155	4,951,694	14,274,093	1,640,664	12,633,429	9,212,537	3.9572	36,455,851	1,250,000	911,524	1.0000	911,524	14,799,134	10,791,810	42,319,069
2075	885,735	2,462,665	(1,576,930)	(1,149,927)	7.6958	(8,849,610)	4,413,185	1,640,664	2,772,521	2,021,775	4.0593	8,206,991	1,250,000	911,524	1.0000	911,524	2,445,591	1,783,371	268,905
	$486,095,466	$83,730,618	$402,364,847	$293,412,092		$608,322,765	$470,233,829	$55,782,569	$414,451,259	$302,225,733		$520,023,785	$52,500,000	$38,283,998		$38,283,998	$869,316,107	$633,921,822	$1,166,630,547
	$1,708,959,011	$341,815,628	$1,367,143,383	$996,946,931		$1,968,262,225	$1,595,477,298	$180,859,081	$1,414,618,216	$1,031,566,481		$1,700,437,442	$106,250,000	$77,479,519		$77,479,519	$2,888,011,599	$2,105,992,930	$3,746,179,186

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EXTERNAL FUND CALCULATION

Monticello

External Levelized

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$757,935,327	$14,426,320	$0	$6,696,113	$779,057,760
2021	779,057,760	29,687,499	-	8,507,110	817,252,369
2022	817,252,369	31,094,850	-	6,384,444	854,731,663
2023	854,731,663	32,515,315	-	6,384,444	893,631,422
2024	893,631,422	33,989,616	-	6,384,444	934,005,482
2025	934,005,482	35,519,793	-	6,384,444	975,909,719
2026	975,909,719	37,107,964	-	6,384,444	1,019,402,127
2027	1,019,402,127	38,756,326	-	6,384,444	1,064,542,897
2028	1,064,542,897	40,467,161	-	6,384,444	1,111,394,502
2029	1,111,394,502	42,242,837	-	6,384,444	1,160,021,783
2030	1,160,021,783	31,385,231	(32,782,380)	4,788,333	1,163,412,967
2031	1,163,412,967	31,412,150	(130,099,881)	-	1,064,725,236
2032	1,064,725,236	28,747,581	(226,582,865)	-	866,889,953
2033	866,889,953	23,406,029	(267,791,939)	-	622,504,042
2034	622,504,042	16,807,609	(255,961,587)	-	383,350,064
2035	383,350,064	10,350,452	(92,055,330)	-	301,645,185
2036	301,645,185	8,144,420	(68,796,301)	-	240,993,305
2037	240,993,305	6,506,819	(65,675,350)	-	181,824,774
2038	181,824,774	4,909,269	(3,957,117)	-	182,776,926
2039	182,776,926	4,934,977	(8,611,873)	-	179,100,031
2040	179,100,031	4,835,701	(10,778,860)	-	173,156,871
2041	173,156,871	4,675,236	(3,314,962)	-	174,517,145
2042	174,517,145	4,711,963	(3,430,803)	-	175,798,304
2043	175,798,304	4,746,554	(3,550,867)	-	176,993,991
2044	176,993,991	4,778,838	(3,715,547)	-	178,057,282
2045	178,057,282	4,807,547	(3,804,103)	-	179,060,725
2046	179,060,725	4,834,640	(3,937,392)	-	179,957,973
2047	179,957,973	4,858,865	(4,075,621)	-	180,741,217
2048	180,741,217	4,880,013	(8,959,681)	-	176,661,548
2049	176,661,548	4,769,862	(4,367,024)	-	177,064,386
2050	177,064,386	4,780,738	(4,520,637)	-	177,324,488
2051	177,324,488	4,787,761	(4,679,656)	-	177,432,593
2052	177,432,593	4,790,680	(5,658,695)	-	176,564,577
2053	176,564,577	4,767,244	(7,366,398)	-	173,965,423
2054	173,965,423	4,697,066	(6,806,115)	-	171,856,375
2055	171,856,375	4,640,122	(7,037,380)	-	169,459,117
2056	169,459,117	4,575,396	(10,761,020)	-	163,273,494
2057	163,273,494	4,408,384	(10,168,496)	-	157,513,382
2058	157,513,382	4,252,861	(10,503,822)	-	151,262,421
2059	151,262,421	4,084,085	(10,850,483)	-	144,496,023
2060	144,496,023	3,901,393	(9,353,530)	-	139,043,885

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EXTERNAL FUND CALCULATION

2061	139,043,885	3,754,185	(8,604,709)	-	134,193,361
2062	134,193,361	3,623,221	(9,920,448)	-	127,896,134
2063	127,896,134	3,453,196	(9,203,524)	-	122,145,806
2064	122,145,806	3,297,937	(9,599,116)	-	115,844,627
2065	115,844,627	3,127,805	(10,961,280)	-	108,011,152
2066	108,011,152	2,916,301	(10,182,553)	-	100,744,900
2067	100,744,900	2,720,112	(10,532,137)	-	92,932,874
2068	92,932,874	2,509,188	(12,207,009)	-	83,235,053
2069	83,235,053	2,247,346	(13,783,116)	-	71,699,283
2070	71,699,283	1,935,881	(11,656,453)	-	61,978,711
2071	61,978,711	1,673,425	(14,726,855)	-	48,925,281
2072	48,925,281	1,320,983	(32,622,099)	-	17,624,165
2073	17,624,165	475,852	(18,100,017)	-	(0)

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Prairie Island Unit 1

External Levelized

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$437,068,622	$8,763,473	$0	$24,632	$445,856,727
2021	445,856,727	18,127,469	-	12,399,703	476,383,899
2022	476,383,899	19,335,297	-	11,586,169	507,305,365
2023	507,305,365	20,575,248	-	11,586,169	539,466,781
2024	539,466,781	21,864,921	-	11,586,169	572,917,871
2025	572,917,871	23,206,309	-	11,586,169	607,710,349
2026	607,710,349	24,601,488	-	11,586,169	643,898,006
2027	643,898,006	26,052,613	-	11,586,169	681,536,787
2028	681,536,787	27,561,928	-	11,586,169	720,684,884
2029	720,684,884	29,131,767	-	11,586,169	761,402,820
2030	761,402,820	30,764,556	-	11,586,169	803,753,544
2031	803,753,544	32,462,820	-	11,586,169	847,802,533
2032	847,802,533	34,229,184	-	11,586,169	893,617,886
2033	893,617,886	24,052,980	(39,900,652)	7,762,733	885,532,947
2034	885,532,947	23,732,283	(122,923,807)	-	786,341,423
2035	786,341,423	21,073,950	(171,342,711)	-	636,072,662
2036	636,072,662	17,046,747	(173,186,345)	-	479,933,064
2037	479,933,064	12,862,206	(138,134,907)	-	354,660,364
2038	354,660,364	9,504,898	(87,897,254)	-	276,268,008
2039	276,268,008	7,403,983	(69,254,127)	-	214,417,863
2040	214,417,863	5,746,399	(45,221,514)	-	174,942,748
2041	174,942,748	4,688,466	(35,142,581)	-	144,488,632
2042	144,488,632	3,872,295	(19,561,856)	-	128,799,072
2043	128,799,072	3,451,815	(3,904,707)	-	128,346,180
2044	128,346,180	3,439,678	(3,729,112)	-	128,056,746
2045	128,056,746	3,431,921	(4,412,802)	-	127,075,864
2046	127,075,864	3,405,633	(4,525,722)	-	125,955,775
2047	125,955,775	3,375,615	(4,313,718)	-	125,017,672
2048	125,017,672	3,350,474	(4,795,822)	-	123,572,324
2049	123,572,324	3,311,738	(4,888,042)	-	121,996,020
2050	121,996,020	3,269,493	(4,658,052)	-	120,607,461
2051	120,607,461	3,232,280	(5,150,212)	-	118,689,529
2052	118,689,529	3,180,879	(4,944,366)	-	116,926,043
2053	116,926,043	3,133,618	(4,646,597)	-	115,413,064
2054	115,413,064	3,093,070	(4,770,424)	-	113,735,710
2055	113,735,710	3,048,117	(4,898,483)	-	111,885,344
2056	111,885,344	2,998,527	(4,217,090)	-	110,666,781
2057	110,666,781	2,965,870	(4,286,501)	-	109,346,150
2058	109,346,150	2,930,477	(4,401,857)	-	107,874,770
2059	107,874,770	2,891,044	(4,521,230)	-	106,244,584

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2060	106,244,584	2,847,355	(5,655,513)	-	103,436,426
2061	103,436,426	2,772,096	(5,764,363)	-	100,444,159
2062	100,444,159	2,691,903	(5,926,611)	-	97,209,451
2063	97,209,451	2,605,213	(6,094,356)	-	93,720,309
2064	93,720,309	2,511,704	(6,322,291)	-	89,909,722
2065	89,909,722	2,409,581	(6,447,383)	-	85,871,920
2066	85,871,920	2,301,367	(6,633,003)	-	81,540,284
2067	81,540,284	2,185,280	(6,825,108)	-	76,900,456
2068	76,900,456	2,060,932	(7,085,947)	-	71,875,441
2069	71,875,441	1,926,262	(7,229,452)	-	66,572,251
2070	66,572,251	1,784,136	(7,442,161)	-	60,914,227
2071	60,914,227	1,632,501	(7,662,220)	-	54,884,508
2072	54,884,508	1,470,905	(7,960,785)	-	48,394,628
2073	48,394,628	1,296,976	(8,125,600)	-	41,566,004
2074	41,566,004	1,113,969	(42,368,389)	-	311,584
2075	311,584	8,350	(319,934)	-	0

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Prairie Island Unit 2

External Levelized

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$487,163,479	$9,697,485	$0	$294,670	$497,155,635
2021	497,155,635	19,916,375	-	6,511,608	523,583,618
2022	523,583,618	20,982,111	-	7,210,183	551,775,912
2023	551,775,912	22,104,164	-	7,210,183	581,090,259
2024	581,090,259	23,270,875	-	7,210,183	611,571,317
2025	611,571,317	24,484,021	-	7,210,183	643,265,522
2026	643,265,522	25,745,450	-	7,210,183	676,221,155
2027	676,221,155	27,057,085	-	7,210,183	710,488,423
2028	710,488,423	28,420,922	-	7,210,183	746,119,528
2029	746,119,528	29,839,040	-	7,210,183	783,168,751
2030	783,168,751	31,313,599	-	7,210,183	821,692,533
2031	821,692,533	32,846,845	-	7,210,183	861,749,562
2032	861,749,562	34,441,115	-	7,210,183	903,400,860
2033	903,400,860	36,098,837	-	7,210,183	946,709,880
2034	946,709,880	24,692,255	(16,324,077)	5,984,452	961,062,510
2035	961,062,510	24,987,625	(104,939,464)	-	881,110,671
2036	881,110,671	22,908,877	(170,283,115)	-	733,736,434
2037	733,736,434	19,077,147	(207,185,759)	-	545,627,822
2038	545,627,822	14,186,323	(236,679,173)	-	323,134,973
2039	323,134,973	8,401,509	(78,810,936)	-	252,725,546
2040	252,725,546	6,570,864	(57,529,171)	-	201,767,239
2041	201,767,239	5,245,948	(54,788,161)	-	152,225,026
2042	152,225,026	3,957,851	(26,194,778)	-	129,988,099
2043	129,988,099	3,379,691	(3,887,316)	-	129,480,474
2044	129,480,474	3,366,492	(3,711,134)	-	129,135,832
2045	129,135,832	3,357,532	(4,394,217)	-	128,099,147
2046	128,099,147	3,330,578	(4,506,508)	-	126,923,217
2047	126,923,217	3,300,004	(4,293,854)	-	125,929,366
2048	125,929,366	3,274,164	(4,775,285)	-	124,428,245
2049	124,428,245	3,235,134	(4,866,809)	-	122,796,570
2050	122,796,570	3,192,711	(4,636,098)	-	121,353,183
2051	121,353,183	3,155,183	(5,127,513)	-	119,380,852
2052	119,380,852	3,103,902	(4,920,895)	-	117,563,859
2053	117,563,859	3,056,660	(4,622,328)	-	115,998,192
2054	115,998,192	3,015,953	(4,745,328)	-	114,268,817
2055	114,268,817	2,970,989	(4,872,532)	-	112,367,274
2056	112,367,274	2,921,549	(4,190,253)	-	111,098,570
2057	111,098,570	2,888,563	(4,258,748)	-	109,728,384
2058	109,728,384	2,852,938	(4,373,155)	-	108,208,167
2059	108,208,167	2,813,412	(4,491,547)	-	106,530,032

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2061	103,674,999	2,695,550	(5,732,612)	-	100,637,936
2062	100,637,936	2,616,586	(5,893,772)	-	97,360,751
2063	97,360,751	2,531,380	(6,060,389)	-	93,831,742
2064	93,831,742	2,439,625	(6,287,158)	-	89,984,209
2065	89,984,209	2,339,589	(6,411,042)	-	85,912,756
2066	85,912,756	2,233,732	(6,595,412)	-	81,551,076
2067	81,551,076	2,120,328	(6,786,223)	-	76,885,181
2068	76,885,181	1,999,015	(7,045,722)	-	71,838,473
2069	71,838,473	1,867,800	(7,187,839)	-	66,518,435
2070	66,518,435	1,729,479	(7,399,112)	-	60,848,802
2071	60,848,802	1,582,069	(7,617,684)	-	54,813,186
2072	54,813,186	1,425,143	(7,914,709)	-	48,323,620
2073	48,323,620	1,256,414	(8,077,930)	-	41,502,104
2074	41,502,104	1,079,055	(42,319,069)	-	262,090
2075	262,090	6,814	(268,905)	-	(0)

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2022 ACCRUAL COMPARISON

	Present	Proposed	Difference
Monticello	$8,507,110	$12,289,751	$3,782,641
Prairie Island Unit 1	12,399,703	11,721,046	(678,657)
Prairie Island Unit 2	6,511,608	7,358,104	846,496
TOTAL	$27,418,421	$31,368,901	$3,950,480

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2022 MN RETAIL SUMMARY

	Remaining Life (yrs)	Operational Earnings Rate	Post-Shutdown Earnings Rate	Market Value Balance 6/30/2020	Book Value 6/30/2020	Unrealized Gain/Loss 6/30/2020	Tax-Effect Adjustment	Tax-Adjusted Fund Balance 6/30/2020	2022-2024 Decommissioning Accrual
Monticello	9.67	3.80%	3.10%	$814,968,100	$610,109,002	$204,859,098	$57,032,773	$757,935,327	**$12,289,751**
Prairie Island Unit 1	13.25	4.01%	2.80%	471,960,960	346,629,286	125,331,674	34,892,338	437,068,622	**11,721,046**
Prairie Island Unit 2	14.42	3.98%	2.72%	526,255,835	385,837,890	140,417,945	39,092,356	487,163,479	**7,358,104**
TOTAL DECOMMISSIONING ACCRUAL				**$1,813,184,895**	**$1,342,576,178**	**$470,608,717**	**$131,017,467**	**$1,682,167,428**	**$31,368,901**

INPUT DATA

Escalation Rate (Labor)	3.78%
Escalation Rate (Non-Labor)	2.58%
Escalation Rate (PIIC)	0.00%
Jurisdictional Factor	72.9219%
Tax Rate for tax-effect adjustment	27.84%

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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Monticello																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2030	$22,675,886	$0	$22,675,886	$16,535,687	1.4492	$23,963,517	$9,374,135	$0	$9,374,135	$6,835,797	1.2901	$8,818,862	$0	$0	1.0000	$0	$32,050,021	$23,371,484	$32,782,380
2031	77,446,501	-	77,446,501	56,475,460	1.5040	84,939,091	46,796,397	-	46,796,397	34,124,822	1.3234	45,160,789	0	0	1.0000	0	124,242,898	90,600,282	130,099,881
2032	85,157,508	-	85,157,508	62,098,473	1.5609	96,929,507	130,974,261	-	130,974,261	95,508,920	1.3575	129,653,358	0	0	1.0000	0	216,131,769	157,607,393	226,582,865
2033	95,842,498	-	95,842,498	69,890,170	1.6199	113,215,087	152,215,926	-	152,215,926	110,998,745	1.3926	154,576,853	0	0	1.0000	0	248,058,423	180,888,916	267,791,939
2034	97,504,414	-	97,504,414	71,102,071	1.6811	119,529,692	130,971,769	-	130,971,769	95,507,102	1.4285	136,431,895	0	0	1.0000	0	228,476,182	166,609,173	255,961,587
2035	52,997,671	-	52,997,671	38,646,909	1.7446	67,423,397	22,622,163	-	22,622,163	16,496,511	1.4653	24,172,338	0	0	1.0000	0	75,619,834	55,143,420	91,595,735
2036	37,293,114	-	37,293,114	27,194,847	1.8106	49,238,990	14,589,373	-	14,589,373	10,638,848	1.5032	15,992,316	0	0	1.0000	0	51,882,487	37,833,695	65,231,306
2037	32,061,066	-	32,061,066	23,379,539	1.8790	43,930,153	15,439,793	-	15,439,793	11,258,991	1.5419	17,360,238	0	0	1.0000	0	47,500,860	34,638,529	61,290,391
2038	6,393,069	4,781,312	1,611,757	1,175,324	1.9501	2,291,998	2,518,833	1,848,653	670,180	488,708	1.5817	772,989	0	0	1.0000	0	2,281,936	1,664,031	3,064,988
2039	6,393,069	4,781,312	1,611,757	1,175,324	2.0238	2,378,620	2,518,833	1,848,653	670,180	488,708	1.6225	792,928	0	0	1.0000	0	2,281,936	1,664,031	3,171,548
2040	6,410,535	4,781,312	1,629,223	1,188,060	2.1003	2,495,283	2,525,586	1,848,653	676,933	493,632	1.6644	821,601	0	0	1.0000	0	2,306,155	1,681,692	3,316,884
2041	6,393,069	4,781,312	1,611,757	1,175,324	2.1797	2,561,853	2,518,833	1,848,653	670,180	488,708	1.7073	834,371	0	0	1.0000	0	2,281,936	1,664,031	3,396,223
2042	6,393,069	4,781,312	1,611,757	1,175,324	2.2620	2,658,582	2,518,833	1,848,653	670,180	488,708	1.7514	855,923	0	0	1.0000	0	2,281,936	1,664,031	3,514,505
2043	6,393,069	4,781,312	1,611,757	1,175,324	2.3475	2,759,072	2,518,833	1,848,653	670,180	488,708	1.7966	878,012	0	0	1.0000	0	2,281,936	1,664,031	3,637,084
2044	6,410,535	4,781,312	1,629,223	1,188,060	2.4363	2,894,471	2,525,586	1,848,653	676,933	493,632	1.8429	909,715	0	0	1.0000	0	2,306,155	1,681,692	3,804,186
2045	6,393,069	4,781,312	1,611,757	1,175,324	2.5284	2,971,688	2,518,833	1,848,653	670,180	488,708	1.8905	923,902	0	0	1.0000	0	2,281,936	1,664,031	3,895,590
2046	6,393,069	4,781,312	1,611,757	1,175,324	2.6239	3,083,931	2,518,833	1,848,653	670,180	488,708	1.9392	947,702	0	0	1.0000	0	2,281,936	1,664,031	4,031,634
2047	6,393,069	4,781,312	1,611,757	1,175,324	2.7231	3,200,524	2,518,833	1,848,653	670,180	488,708	1.9893	972,186	0	0	1.0000	0	2,281,936	1,664,031	4,172,710
2048	7,130,021	4,781,312	2,348,709	1,712,723	2.8261	4,840,326	4,684,044	1,848,653	2,835,391	2,067,621	2.0406	4,219,187	0	0	1.0000	0	5,184,099	3,780,344	9,059,513
2049	6,393,069	4,781,312	1,611,757	1,175,324	2.9329	3,447,106	2,518,833	1,848,653	670,180	488,708	2.0932	1,022,963	0	0	1.0000	0	2,281,936	1,664,031	4,470,070
2050	8,011,912	4,781,312	3,230,600	2,355,815	3.0438	7,170,630	7,375,363	1,848,653	5,526,710	4,030,182	2.1472	8,653,607	0	0	1.0000	0	8,757,310	6,385,997	15,824,236
2051	8,011,912	4,781,312	3,230,600	2,355,815	3.1588	7,441,548	7,375,363	1,848,653	5,526,710	4,030,182	2.2026	8,876,879	0	0	1.0000	0	8,757,310	6,385,997	16,318,427
2052	8,749,278	4,781,312	3,967,966	2,893,516	3.2782	9,485,525	9,541,816	1,848,653	7,693,163	5,610,001	2.2595	12,675,796	0	0	1.0000	0	11,661,129	8,503,517	22,161,321
2053	9,271,737	4,781,312	4,490,425	3,274,503	3.4021	11,140,188	11,154,838	1,848,653	9,306,185	6,786,247	2.3178	15,729,163	0	0	1.0000	0	13,796,610	10,060,750	26,869,351
2054	8,191,887	4,781,312	3,410,575	2,487,056	3.5307	8,781,049	7,915,288	1,848,653	6,066,635	4,423,905	2.3776	10,518,278	0	0	1.0000	0	9,477,210	6,910,962	19,299,327
2055	9,091,762	4,781,312	4,310,450	3,143,262	3.6642	11,517,541	10,614,913	1,848,653	8,766,260	6,392,523	2.4389	15,590,725	0	0	1.0000	0	13,076,710	9,535,785	27,108,266
2056	9,469,178	4,781,312	4,687,866	3,418,481	3.8027	12,999,458	11,701,516	1,848,653	9,852,863	7,184,895	2.5018	17,975,170	0	0	1.0000	0	14,540,729	10,603,376	30,974,628
2057	6,375,082	4,781,312	1,593,769	1,162,207	3.9464	4,586,534	2,464,871	1,848,653	616,218	449,358	2.5664	1,153,232	0	0	1.0000	0	2,209,988	1,611,565	5,739,766
2058	6,375,082	4,781,312	1,593,769	1,162,207	4.0956	4,759,935	2,464,871	1,848,653	616,218	449,358	2.6326	1,182,980	0	0	1.0000	0	2,209,988	1,611,565	5,942,915
2059	6,375,082	4,781,312	1,593,769	1,162,207	4.2504	4,939,845	2,464,871	1,848,653	616,218	449,358	2.7005	1,213,491	0	0	1.0000	0	2,209,988	1,611,565	6,153,336
2060	6,392,548	4,781,312	1,611,235	1,174,944	4.4111	5,182,793	2,471,624	1,848,653	622,971	454,283	2.7702	1,258,453	0	0	1.0000	0	2,234,207	1,629,226	6,441,247
2061	6,375,082	4,781,312	1,593,769	1,162,207	4.5778	5,320,351	2,464,871	1,848,653	616,218	449,358	2.8416	1,276,896	0	0	1.0000	0	2,209,988	1,611,565	6,597,247
2062	6,375,082	4,781,312	1,593,769	1,162,207	4.7509	5,521,529	2,464,871	1,848,653	616,218	449,358	2.9150	1,309,879	0	0	1.0000	0	2,209,988	1,611,565	6,831,408
2063	6,375,082	4,781,312	1,593,769	1,162,207	4.9305	5,730,262	2,464,871	1,848,653	616,218	449,358	2.9902	1,343,670	0	0	1.0000	0	2,209,988	1,611,565	7,073,932
2064	6,392,548	4,781,312	1,611,235	1,174,944	5.1168	6,011,951	2,471,624	1,848,653	622,971	454,283	3.0673	1,393,421	0	0	1.0000	0	2,234,207	1,629,226	7,405,372
2065	6,375,082	4,781,312	1,593,769	1,162,207	5.3103	6,171,668	2,464,871	1,848,653	616,218	449,358	3.1465	1,413,905	0	0	1.0000	0	2,209,988	1,611,565	7,585,573
2066	6,375,082	4,781,312	1,593,769	1,162,207	5.5110	6,404,923	2,464,871	1,848,653	616,218	449,358	3.2276	1,450,348	0	0	1.0000	0	2,209,988	1,611,565	7,855,271
2067	6,375,082	4,781,312	1,593,769	1,162,207	5.7193	6,647,010	2,464,871	1,848,653	616,218	449,358	3.3109	1,487,780	0	0	1.0000	0	2,209,988	1,611,565	8,134,790
2068	6,392,548	4,781,312	1,611,235	1,174,944	5.9355	6,973,877	2,471,624	1,848,653	622,971	454,283	3.3963	1,542,880	0	0	1.0000	0	2,234,207	1,629,226	8,516,757
2069	6,375,082	4,781,312	1,593,769	1,162,207	6.1598	7,158,963	2,464,871	1,848,653	616,218	449,358	3.4840	1,565,563	0	0	1.0000	0	2,209,988	1,611,565	8,724,526
2070	6,375,082	4,781,312	1,593,769	1,162,207	6.3927	7,429,641	2,464,871	1,848,653	616,218	449,358	3.5738	1,605,916	0	0	1.0000	0	2,209,988	1,611,565	9,035,556
2071	6,375,082	4,781,312	1,593,769	1,162,207	6.6343	7,710,430	2,464,871	1,848,653	616,218	449,358	3.6660	1,647,347	0	0	1.0000	0	2,209,988	1,611,565	9,357,776
2072	6,392,548	4,781,312	1,611,235	1,174,944	6.8851	8,089,604	2,471,624	1,848,653	622,971	454,283	3.7606	1,708,375	0	0	1.0000	0	2,234,207	1,629,226	9,797,978
2073	6,375,082	4,781,312	1,593,769	1,162,207	7.1454	8,304,434	2,464,871	1,848,653	616,218	449,358	3.8576	1,733,444	0	0	1.0000	0	2,209,988	1,611,565	10,037,877
2074	6,375,082	4,781,312	1,593,769	1,162,207	7.4155	8,618,346	2,464,871	1,848,653	616,218	449,358	3.9572	1,778,200	0	0	1.0000	0	2,209,988	1,611,565	10,396,546
2075	6,375,082	4,781,312	1,593,769	1,162,207	7.6958	8,944,113	2,464,871	1,848,653	616,218	449,358	4.0593	1,824,079	0	0	1.0000	0	2,209,988	1,611,565	10,768,192
2076	6,392,548	4,781,312	1,611,235	1,174,944	7.9867	9,383,921	2,471,624	1,848,653	622,971	454,283	4.1640	1,891,632	0	0	1.0000	0	2,234,207	1,629,226	11,275,554
2077	6,375,082	4,781,312	1,593,769	1,162,207	8.2886	9,633,069	2,464,871	1,848,653	616,218	449,358	4.2714	1,919,388	0	0	1.0000	0	2,209,988	1,611,565	11,552,457
2078	6,894,019	4,781,312	2,112,707	1,540,626	8.6019	13,252,311	4,021,684	1,848,653	2,173,031	1,584,615	4.3816	6,943,150	0	0	1.0000	0	4,285,738	3,125,241	20,195,462
2079	6,997,807	4,781,312	2,216,494	1,616,310	8.9270	14,428,798	4,333,046	1,848,653	2,484,393	1,811,667	4.4947	8,142,898	0	0	1.0000	0	4,700,888	3,427,977	22,571,697
2080	6,911,485	4,781,312	2,130,173	1,553,363	9.2645	14,391,128	4,028,437	1,848,653	2,179,784	1,589,540	4.6106	7,328,732	0	0	1.0000	0	4,309,957	3,142,902	21,719,860
2081	6,894,019	4,781,312	2,112,707	1,540,626	9.6147	14,812,657	4,021,684	1,848,653	2,173,031	1,584,615	4.7296	7,494,596	0	0	1.0000	0	4,285,738	3,125,241	22,307,254
2082	6,894,019	4,781,312	2,112,707	1,540,626	9.9781	15,372,521	4,021,684	1,848,653	2,173,031	1,584,615	4.8516	7,687,920	0	0	1.0000	0	4,285,738	3,125,241	23,060,441
2083	6,997,807	4,781,312	2,216,494	1,616,310	10.3553	16,737,374	4,333,046	1,848,653	2,484,393	1,811,667	4.9768	9,016,303	0	0	1.0000	0	4,700,888	3,427,977	25,753,677
2084	6,911,485	4,781,312	2,130,173	1,553,363	10.7467	16,693,522	4,028,437	1,848,653	2,179,784	1,589,540	5.1052	8,114,918	0	0	1.0000	0	4,309,957	3,142,902	24,808,440
2085	6,894,019	4,781,312	2,112,707	1,540,626	11.1529	17,182,449	4,021,684	1,848,653	2,173,031	1,584,615	5.2369	8,298,472	0	0	1.0000	0	4,285,738	3,125,241	25,480,920
2086	6,894,019	4,781,312	2,112,707	1,540,626	11.5745	17,831,976	4,021,684	1,848,653	2,173,031	1,584,615	5.3720	8,512,553	0	0	1.0000	0	4,285,738	3,125,241	26,344,530
2087	6,997,807	4,781,312	2,216,494	1,616,310	12.0120	19,415,114	4,333,046	1,848,653	2,484,393	1,811,667	5.5106	9,983,371	0	0	1.0000	0	4,700,888	3,427,977	29,398,485
2088	7,630,971	4,781,312	2,849,659	2,078,025	12.4661	25,904,873	6,186,895	1,848,653	4,338,242	3,163,528	5.6528	17,882,793	0	0	1.0000	0	7,187,901	5,241,554	43,787,665
2089	6,894,019	4,781,312	2,112,707	1,540,626	12.9373	19,931,542	4,021,684	1,848,653	2,173,031	1,584,615	5.7986	9,188,550	0	0	1.0000	0	4,285,738	3,125,241	29,120,092
2090	6,582,657	4,781,312	1,801,345	1,313,575	13.4263	17,636,447	9,395,159	1,848,653	7,546,506	5,503,056	5.9482	32,733,276	0	0	1.0000	0	9,347,851	6,816,630	50,369,723
2091	1,956,375	4,781,312	(2,824,937)	(2,059,998)	13.9338	(28,703,595)	13,550,559	1,848,653	11,701,906	8,533,252	6.1017	52,067,345	0	0	1.0000	0	8,876,969	6,473,255	23,363,750
	$865,579,591	$258,190,861	$607,388,730	$442,919,402		$1,041,699,140	$747,182,412	$99,827,263	$647,355,149	$472,063,675		$861,233,503	$0	$0		$0	$1,254,743,879	$914,983,077	$1,902,932,643

Xcel Energy
Nuclear Decommissioning Accrual
60-Year Decommissioning Period
DECON Method - No Recasking

Docket No. E002/M-20-___
Schedule E.2

Prairie Island Unit 1

Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2033	$23,781,625	$0	$23,781,625	$17,342,013	1.6199	$28,092,326	$10,730,370	$0	$10,730,370	$7,824,790	1.3926	$10,896,802	$1,250,000	$911,524	1.0000	$911,524	$35,761,995	$26,078,326	$39,900,652
2034	67,414,177	-	67,414,177	49,159,699	1.6811	82,642,369	37,794,295	-	37,794,295	27,560,318	1.4285	39,369,914	1,250,000	911,524	1.0000	911,524	106,458,472	77,631,540	122,923,807
2035	68,590,730	-	68,590,730	50,017,664	1.7446	87,260,816	77,836,646	-	77,836,646	56,759,961	1.4653	83,170,371	1,250,000	911,524	1.0000	911,524	147,677,376	107,689,149	171,342,711
2036	64,126,566	-	64,126,566	46,762,310	1.8106	84,667,839	79,805,408	-	79,805,408	58,195,619	1.5032	87,479,655	1,250,000	911,524	1.0000	911,524	145,181,973	105,869,453	173,059,018
2037	45,510,012	-	45,510,012	33,186,765	1.8790	62,357,932	66,379,691	-	66,379,691	48,405,332	1.5419	74,636,181	1,250,000	911,524	1.0000	911,524	113,139,703	82,503,621	137,905,637
2038	25,609,125	-	25,609,125	18,674,660	1.9501	36,417,455	43,408,012	-	43,408,012	31,653,947	1.5817	50,067,049	1,250,000	911,524	1.0000	911,524	70,267,137	51,240,132	87,396,028
2039	33,734,608	-	33,734,608	24,599,917	2.0238	49,785,312	14,198,587	-	14,198,587	10,353,879	1.6225	16,799,169	1,250,000	911,524	1.0000	911,524	49,183,194	35,865,320	67,496,004
2040	20,662,977	-	20,662,977	15,067,835	2.1003	31,646,974	9,470,300	-	9,470,300	6,905,922	1.6644	11,494,217	1,250,000	911,524	1.0000	911,524	31,383,276	22,885,281	44,052,715
2041	15,525,034	2,455,937	13,069,098	9,530,234	2.1797	20,773,052	11,497,122	1,626,430	9,870,693	7,197,897	1.7073	12,288,969	1,250,000	911,524	1.0000	911,524	24,189,791	17,639,655	33,973,545
2042	9,047,398	2,455,937	6,591,461	4,806,619	2.2620	10,872,572	6,564,040	1,626,430	4,937,611	3,600,600	1.7514	6,306,090	1,250,000	911,524	1.0000	911,524	12,779,072	9,318,742	18,090,185
2043	3,274,582	2,455,937	818,645	596,972	2.3475	1,401,391	2,167,718	1,626,430	541,289	394,718	1.7966	709,150	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,022,065
2044	3,283,554	2,455,937	827,617	603,514	2.4363	1,470,341	2,177,082	1,626,430	550,652	401,546	1.8429	740,009	1,250,000	911,524	1.0000	911,524	2,628,269	1,916,584	3,121,874
2045	3,274,582	2,455,937	818,645	596,972	2.5284	1,509,383	2,167,718	1,626,430	541,289	394,718	1.8905	746,214	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,167,122
2046	3,274,582	2,455,937	818,645	596,972	2.6239	1,566,394	2,167,718	1,626,430	541,289	394,718	1.9392	765,437	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,243,355
2047	3,274,582	2,455,937	818,645	596,972	2.7231	1,625,614	2,167,718	1,626,430	541,289	394,718	1.9893	785,213	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,322,350
2048	3,283,554	2,455,937	827,617	603,514	2.8261	1,705,591	2,177,082	1,626,430	550,652	401,546	2.0406	819,395	1,250,000	911,524	1.0000	911,524	2,628,269	1,916,584	3,436,509
2049	3,274,582	2,455,937	818,645	596,972	2.9329	1,750,858	2,167,718	1,626,430	541,289	394,718	2.0932	826,224	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,488,606
2050	3,274,582	2,455,937	818,645	596,972	3.0438	1,817,063	2,167,718	1,626,430	541,289	394,718	2.1472	847,539	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,576,125
2051	3,274,582	2,455,937	818,645	596,972	3.1588	1,885,714	2,167,718	1,626,430	541,289	394,718	2.2026	869,406	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,666,644
2052	3,283,554	2,455,937	827,617	603,514	3.2782	1,978,439	2,177,082	1,626,430	550,652	401,546	2.2595	907,294	1,250,000	911,524	1.0000	911,524	2,628,269	1,916,584	3,797,257
2053	3,378,370	2,455,937	922,433	672,656	3.4021	2,288,441	2,479,081	1,626,430	852,651	621,769	2.3178	1,441,137	1,250,000	911,524	1.0000	911,524	3,025,084	2,205,949	4,641,103
2054	3,482,157	2,455,937	1,026,220	748,339	3.5307	2,642,162	2,790,443	1,626,430	1,164,014	848,821	2.3776	2,018,157	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	5,571,842
2055	3,482,157	2,455,937	1,026,220	748,339	3.6642	2,742,065	2,790,443	1,626,430	1,164,014	848,821	2.4389	2,070,189	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	5,723,778
2056	3,543,022	2,455,937	1,087,086	792,723	3.8027	3,014,489	2,955,488	1,626,430	1,329,059	969,175	2.5018	2,424,681	1,250,000	911,524	1.0000	911,524	3,666,144	2,673,422	6,350,695
2057	3,430,263	2,455,937	974,327	710,497	3.9464	2,803,907	2,634,762	1,626,430	1,008,332	735,295	2.5664	1,887,062	1,250,000	911,524	1.0000	911,524	3,232,659	2,357,316	5,602,493
2058	3,585,945	2,455,937	1,130,008	824,023	4.0956	3,374,869	3,101,806	1,626,430	1,475,376	1,075,872	2.6326	2,832,342	1,250,000	911,524	1.0000	911,524	3,855,384	2,811,419	7,118,735
2059	3,430,263	2,455,937	974,327	710,497	4.2504	3,019,898	2,634,762	1,626,430	1,008,332	735,295	2.7005	1,985,665	1,250,000	911,524	1.0000	911,524	3,232,659	2,357,316	5,917,087
2060	3,387,341	2,455,937	931,404	679,198	4.4111	2,996,009	2,488,444	1,626,430	862,015	628,598	2.7702	1,741,341	1,250,000	911,524	1.0000	911,524	3,043,419	2,219,319	5,648,874
2061	3,482,157	2,455,937	1,026,220	748,339	4.5778	3,425,748	2,790,443	1,626,430	1,164,014	848,821	2.8416	2,412,010	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	6,749,281
2062	3,482,157	2,455,937	1,026,220	748,339	4.7509	3,555,286	2,790,443	1,626,430	1,164,014	848,821	2.9150	2,474,313	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	6,941,122
2063	3,430,263	2,455,937	974,327	710,497	4.9305	3,503,108	2,634,762	1,626,430	1,008,332	735,295	2.9902	2,198,680	1,250,000	911,524	1.0000	911,524	3,232,659	2,357,316	6,613,311
2064	3,491,129	2,455,937	1,035,192	754,882	5.1168	3,862,578	2,799,807	1,626,430	1,173,377	855,649	3.0673	2,624,532	1,250,000	911,524	1.0000	911,524	3,458,569	2,522,054	7,398,634
2065	3,482,157	2,455,937	1,026,220	748,339	5.3103	3,973,907	2,790,443	1,626,430	1,164,014	848,821	3.1465	2,670,815	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	7,556,245
2066	3,430,263	2,455,937	974,327	710,497	5.5110	3,915,552	2,634,762	1,626,430	1,008,332	735,295	3.2276	2,373,239	1,250,000	911,524	1.0000	911,524	3,232,659	2,357,316	7,200,314
2067	3,482,157	2,455,937	1,026,220	748,339	5.7193	4,279,977	2,790,443	1,626,430	1,164,014	848,821	3.3109	2,810,361	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	8,001,862
2068	3,491,129	2,455,937	1,035,192	754,882	5.9355	4,480,599	2,799,807	1,626,430	1,173,377	855,649	3.3963	2,906,041	1,250,000	911,524	1.0000	911,524	3,458,569	2,522,054	8,298,164
2069	3,430,263	2,455,937	974,327	710,497	6.1598	4,376,522	2,634,762	1,626,430	1,008,332	735,295	3.4840	2,561,768	1,250,000	911,524	1.0000	911,524	3,232,659	2,357,316	7,849,815
2070	3,482,157	2,455,937	1,026,220	748,339	6.3927	4,783,909	2,790,443	1,626,430	1,164,014	848,821	3.5738	3,033,516	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	8,728,949
2071	3,482,157	2,455,937	1,026,220	748,339	6.6343	4,964,708	2,790,443	1,626,430	1,164,014	848,821	3.6660	3,111,777	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	8,988,009
2072	3,491,129	2,455,937	1,035,192	754,882	6.8851	5,197,435	2,799,807	1,626,430	1,173,377	855,649	3.7606	3,217,754	1,250,000	911,524	1.0000	911,524	3,458,569	2,522,054	9,326,712
2073	3,482,157	2,455,937	1,026,220	748,339	7.1454	5,347,184	2,790,443	1,626,430	1,164,014	848,821	3.8576	3,274,412	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	9,533,120
2074	3,482,157	2,455,937	1,026,220	748,339	7.4155	5,549,311	2,790,443	1,626,430	1,164,014	848,821	3.9572	3,358,954	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	9,819,789
2075	3,841,900	2,455,937	1,385,963	1,010,671	7.6958	7,777,920	3,869,672	1,626,430	2,243,243	1,635,815	4.0593	6,640,265	1,250,000	911,524	1.0000	911,524	4,879,206	3,558,010	15,329,709
2076	3,491,129	2,455,937	1,035,192	754,882	7.9867	6,029,012	2,799,807	1,626,430	1,173,377	855,649	4.1640	3,562,923	1,250,000	911,524	1.0000	911,524	3,458,569	2,522,054	10,503,459
2077	3,482,157	2,455,937	1,026,220	748,339	8.2886	6,202,686	14,572,953	1,626,430	12,946,523	9,440,851	4.2714	40,325,650	1,250,000	911,524	1.0000	911,524	15,222,744	11,100,714	47,439,859
2078	885,735	2,455,937	(1,570,201)	(1,145,021)	8.6019	(9,849,354)	5,663,185	1,626,430	4,036,755	2,943,679	4.3816	12,898,022	0	0	1.0000	0	2,466,554	1,798,658	3,048,669
	$494,816,858	$93,325,595	$401,491,262	$292,775,057		$605,485,367	$466,797,843	$61,804,324	$404,993,520	$295,328,970		$519,379,902	$56,250,000	$41,018,569		$41,018,569	$862,734,782	$629,122,595	$1,165,883,838

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Prairie Island Unit 2

Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2034	$8,345,549	$0	$8,345,549	$6,085,733	1.6811	$10,230,726	$4,974,446	$0	$4,974,446	$3,627,461	1.4285	$5,181,828	$1,250,000	$911,524	1.0000	$911,524	$14,569,995	$10,624,717	$16,324,077
2035	49,894,469	-	49,894,469	36,383,994	1.7446	63,475,517	37,951,792	-	37,951,792	27,675,168	1.4653	40,552,423	1,250,000	911,524	1.0000	911,524	89,096,260	64,970,686	104,939,464
2036	67,020,055	-	67,020,055	48,872,297	1.8106	88,488,181	73,632,736	-	73,632,736	53,694,390	1.5032	80,713,407	1,250,000	911,524	1.0000	911,524	141,902,791	103,478,211	170,113,112
2037	75,245,310	-	75,245,310	54,870,310	1.8790	103,101,312	91,562,609	-	91,562,609	66,769,194	1.5419	102,951,421	1,250,000	911,524	1.0000	911,524	168,057,919	122,551,028	206,964,256
2038	82,427,075	-	82,427,075	60,107,389	1.9501	117,215,420	102,382,218	-	102,382,218	74,659,059	1.5817	118,088,233	1,250,000	911,524	1.0000	911,524	186,059,293	135,677,971	236,215,176
2039	39,073,086	-	39,073,086	28,492,837	2.0238	57,663,803	15,617,110	-	15,617,110	11,388,293	1.6225	18,477,506	1,250,000	911,524	1.0000	911,524	55,940,196	40,792,654	77,052,832
2040	24,821,306	-	24,821,306	18,100,168	2.1003	38,015,782	14,363,430	-	14,363,430	10,474,086	1.6644	17,433,069	1,250,000	911,524	1.0000	911,524	40,434,736	29,485,778	56,360,375
2041	18,294,168	-	18,294,168	13,340,455	2.1797	29,078,189	18,969,757	-	18,969,757	13,833,107	1.7073	23,617,263	1,250,000	911,524	1.0000	911,524	38,513,924	28,085,085	53,606,976
2042	10,352,305	2,462,665	7,889,639	5,753,275	2.2620	13,013,908	10,085,391	1,630,886	8,454,506	6,165,186	1.7514	10,797,707	1,250,000	911,524	1.0000	911,524	17,594,145	12,829,985	24,723,139
2043	3,274,582	2,462,665	811,917	592,065	2.3475	1,389,873	2,167,718	1,630,886	536,833	391,469	1.7966	703,313	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,004,709
2044	3,283,554	2,462,665	820,888	598,607	2.4363	1,458,387	2,177,082	1,630,886	546,196	398,297	1.8429	734,021	1,250,000	911,524	1.0000	911,524	2,617,085	1,908,428	3,103,932
2045	3,274,582	2,462,665	811,917	592,065	2.5284	1,496,977	2,167,718	1,630,886	536,833	391,469	1.8905	740,071	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,148,573
2046	3,274,582	2,462,665	811,917	592,065	2.6239	1,553,520	2,167,718	1,630,886	536,833	391,469	1.9392	759,136	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,224,179
2047	3,274,582	2,462,665	811,917	592,065	2.7231	1,612,253	2,167,718	1,630,886	536,833	391,469	1.9893	778,749	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,302,525
2048	3,283,554	2,462,665	820,888	598,607	2.8261	1,691,724	2,177,082	1,630,886	546,196	398,297	2.0406	812,764	1,250,000	911,524	1.0000	911,524	2,617,085	1,908,428	3,416,012
2049	3,274,582	2,462,665	811,917	592,065	2.9329	1,736,468	2,167,718	1,630,886	536,833	391,469	2.0932	819,422	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,467,414
2050	3,274,582	2,462,665	811,917	592,065	3.0438	1,802,128	2,167,718	1,630,886	536,833	391,469	2.1472	840,561	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,554,213
2051	3,274,582	2,462,665	811,917	592,065	3.1588	1,870,215	2,167,718	1,630,886	536,833	391,469	2.2026	862,249	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,643,988
2052	3,283,554	2,462,665	820,888	598,607	3.2782	1,962,354	2,177,082	1,630,886	546,196	398,297	2.2595	899,952	1,250,000	911,524	1.0000	911,524	2,617,085	1,908,428	3,773,830
2053	3,378,370	2,462,665	915,704	667,749	3.4021	2,271,749	2,479,081	1,630,886	848,195	618,520	2.3178	1,433,606	1,250,000	911,524	1.0000	911,524	3,013,900	2,197,793	4,616,878
2054	3,482,157	2,462,665	1,019,492	743,433	3.5307	2,624,838	2,790,443	1,630,886	1,159,558	845,572	2.3776	2,010,431	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	5,546,793
2055	3,482,157	2,462,665	1,019,492	743,433	3.6642	2,724,086	2,790,443	1,630,886	1,159,558	845,572	2.4389	2,062,264	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	5,697,874
2056	3,543,022	2,462,665	1,080,357	787,817	3.8027	2,995,831	2,955,488	1,630,886	1,324,603	965,925	2.5018	2,416,552	1,250,000	911,524	1.0000	911,524	3,654,960	2,665,266	6,323,907
2057	3,430,263	2,462,665	967,598	705,591	3.9464	2,784,544	2,634,762	1,630,886	1,003,876	732,046	2.5664	1,878,722	1,250,000	911,524	1.0000	911,524	3,221,475	2,349,160	5,574,790
2058	3,585,945	2,462,665	1,123,279	819,117	4.0956	3,354,774	3,101,806	1,630,886	1,470,920	1,072,623	2.6326	2,823,787	1,250,000	911,524	1.0000	911,524	3,844,200	2,803,263	7,090,085
2059	3,430,263	2,462,665	967,598	705,591	4.2504	2,999,043	2,634,762	1,630,886	1,003,876	732,046	2.7005	1,976,890	1,250,000	911,524	1.0000	911,524	3,221,475	2,349,160	5,887,457
2060	3,387,341	2,462,665	924,676	674,291	4.4111	2,974,365	2,488,444	1,630,886	857,559	625,348	2.7702	1,732,340	1,250,000	911,524	1.0000	911,524	3,032,235	2,211,163	5,618,229
2061	3,482,157	2,462,665	1,019,492	743,433	4.5778	3,403,286	2,790,443	1,630,886	1,159,558	845,572	2.8416	2,402,776	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	6,717,586
2062	3,482,157	2,462,665	1,019,492	743,433	4.7509	3,531,975	2,790,443	1,630,886	1,159,558	845,572	2.9150	2,464,841	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	6,908,339
2063	3,430,263	2,462,665	967,598	705,591	4.9305	3,478,916	2,634,762	1,630,886	1,003,876	732,046	2.9902	2,188,963	1,250,000	911,524	1.0000	911,524	3,221,475	2,349,160	6,579,403
2064	3,491,129	2,462,665	1,028,463	749,975	5.1168	3,837,472	2,799,807	1,630,886	1,168,921	852,400	3.0673	2,614,565	1,250,000	911,524	1.0000	911,524	3,447,385	2,513,898	7,363,561
2065	3,482,157	2,462,665	1,019,492	743,433	5.3103	3,947,851	2,790,443	1,630,886	1,159,558	845,572	3.1465	2,660,591	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	7,519,966
2066	3,430,263	2,462,665	967,598	705,591	5.5110	3,888,511	2,634,762	1,630,886	1,003,876	732,046	3.2276	2,362,751	1,250,000	911,524	1.0000	911,524	3,221,475	2,349,160	7,162,786
2067	3,482,157	2,462,665	1,019,492	743,433	5.7193	4,251,915	2,790,443	1,630,886	1,159,558	845,572	3.3109	2,799,603	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	7,963,042
2068	3,491,129	2,462,665	1,028,463	749,975	5.9355	4,451,476	2,799,807	1,630,886	1,168,921	852,400	3.3963	2,895,005	1,250,000	911,524	1.0000	911,524	3,447,385	2,513,898	8,258,005
2069	3,430,263	2,462,665	967,598	705,591	6.1598	4,346,299	2,634,762	1,630,886	1,003,876	732,046	3.4840	2,550,448	1,250,000	911,524	1.0000	911,524	3,221,475	2,349,160	7,808,270
2070	3,482,157	2,462,665	1,019,492	743,433	6.3927	4,752,543	2,790,443	1,630,886	1,159,558	845,572	3.5738	3,021,904	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	8,685,970
2071	3,482,157	2,462,665	1,019,492	743,433	6.6343	4,932,156	2,790,443	1,630,886	1,159,558	845,572	3.6660	3,099,865	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	8,943,545
2072	3,491,129	2,462,665	1,028,463	749,975	6.8851	5,163,652	2,799,807	1,630,886	1,168,921	852,400	3.7606	3,205,534	1,250,000	911,524	1.0000	911,524	3,447,385	2,513,898	9,280,710
2073	3,482,157	2,462,665	1,019,492	743,433	7.1454	5,312,124	2,790,443	1,630,886	1,159,558	845,572	3.8576	3,261,877	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	9,485,525
2074	3,482,157	2,462,665	1,019,492	743,433	7.4155	5,512,926	2,790,443	1,630,886	1,159,558	845,572	3.9572	3,346,096	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	9,770,545
2075	3,841,900	2,462,665	1,379,235	1,005,764	7.6958	7,740,160	3,869,672	1,630,886	2,238,787	1,632,566	4.0593	6,627,074	1,250,000	911,524	1.0000	911,524	4,868,021	3,549,854	15,278,758
2076	3,491,129	2,462,665	1,028,463	749,975	7.9867	5,989,825	2,799,807	1,630,886	1,168,921	852,400	4.1640	3,549,392	1,250,000	911,524	1.0000	911,524	3,447,385	2,513,898	10,450,741
2077	3,482,157	2,462,665	1,019,492	743,433	8.2886	6,162,017	14,572,953	1,630,886	12,942,067	9,437,601	4.2714	40,311,770	1,250,000	911,524	1.0000	911,524	15,211,559	11,092,558	47,385,311
2078	885,735	2,462,665	(1,576,930)	(1,149,927)	8.6019	(9,891,560)	5,663,185	1,630,886	4,032,299	2,940,429	4.3816	12,883,785	0	-	1.0000	-	2,455,369	1,790,502	2,992,225
	$496,287,928	$91,118,616	$405,169,311	$295,457,160		$630,397,510	$478,652,862	$60,342,765	$418,310,097	$305,039,670		$544,344,527	$55,000,000	$40,107,045		$40,107,045	$878,479,408	$640,603,875	$1,214,849,082
	$1,856,684,376	$442,635,072	$1,414,049,303	$1,031,151,619		$2,277,582,017	$1,692,633,117	$221,974,351	$1,470,658,766	$1,072,432,315		$1,924,957,932	$111,250,000	$81,125,614		$81,125,614	$2,995,958,070	$2,184,709,548	$4,283,665,563

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EXTERNAL FUND CALCULATION

Monticello

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$757,935,327	$14,464,384	$0	$6,696,113	$779,095,824
2021	779,095,824	29,767,276	-	8,507,110	817,370,210
2022	817,370,210	31,293,573	-	12,289,751	860,953,535
2023	860,953,535	32,949,740	-	12,289,751	906,193,025
2024	906,193,025	34,668,840	-	12,289,751	953,151,616
2025	953,151,616	36,453,267	-	12,289,751	1,001,894,634
2026	1,001,894,634	38,305,501	-	12,289,751	1,052,489,886
2027	1,052,489,886	40,228,121	-	12,289,751	1,105,007,758
2028	1,105,007,758	42,223,800	-	12,289,751	1,159,521,309
2029	1,159,521,309	44,295,315	-	12,289,751	1,216,106,375
2030	1,216,106,375	37,842,166	(32,782,380)	9,217,313	1,230,383,474
2031	1,230,383,474	38,141,888	(130,099,881)	-	1,138,425,481
2032	1,138,425,481	35,291,190	(226,582,865)	-	947,133,806
2033	947,133,806	29,361,148	(267,791,939)	-	708,703,015
2034	708,703,015	21,969,793	(255,961,587)	-	474,711,221
2035	474,711,221	14,716,048	(91,595,735)	-	397,831,534
2036	397,831,534	12,332,778	(65,231,306)	-	344,933,006
2037	344,933,006	10,692,923	(61,290,391)	-	294,335,538
2038	294,335,538	9,124,402	(3,064,988)	-	300,394,952
2039	300,394,952	9,312,244	(3,171,548)	-	306,535,647
2040	306,535,647	9,502,605	(3,316,884)	-	312,721,368
2041	312,721,368	9,694,362	(3,396,223)	-	319,019,507
2042	319,019,507	9,889,605	(3,514,505)	-	325,394,607
2043	325,394,607	10,087,233	(3,637,084)	-	331,844,756
2044	331,844,756	10,287,187	(3,804,186)	-	338,327,758
2045	338,327,758	10,488,160	(3,895,590)	-	344,920,328
2046	344,920,328	10,692,530	(4,031,634)	-	351,581,225
2047	351,581,225	10,899,018	(4,172,710)	-	358,307,533
2048	358,307,533	11,107,534	(9,059,513)	-	360,355,553
2049	360,355,553	11,171,022	(4,470,070)	-	367,056,506
2050	367,056,506	11,378,752	(15,824,236)	-	362,611,021
2051	362,611,021	11,240,942	(16,318,427)	-	357,533,536
2052	357,533,536	11,083,540	(22,161,321)	-	346,455,755
2053	346,455,755	10,740,128	(26,869,351)	-	330,326,533
2054	330,326,533	10,240,123	(19,299,327)	-	321,267,328
2055	321,267,328	9,959,287	(27,108,266)	-	304,118,350
2056	304,118,350	9,427,669	(30,974,628)	-	282,571,391
2057	282,571,391	8,759,713	(5,739,766)	-	285,591,338
2058	285,591,338	8,853,331	(5,942,915)	-	288,501,754
2059	288,501,754	8,943,554	(6,153,336)	-	291,291,973
2060	291,291,973	9,030,051	(6,441,247)	-	293,880,777
2061	293,880,777	9,110,304	(6,597,247)	-	296,393,834
2062	296,393,834	9,188,209	(6,831,408)	-	298,750,635
2063	298,750,635	9,261,270	(7,073,932)	-	300,937,973
2064	300,937,973	9,329,077	(7,405,372)	-	302,861,679
2065	302,861,679	9,388,712	(7,585,573)	-	304,664,818
2066	304,664,818	9,444,609	(7,855,271)	-	306,254,156
2067	306,254,156	9,493,879	(8,134,790)	-	307,613,245
2068	307,613,245	9,536,011	(8,516,757)	-	308,632,499
2069	308,632,499	9,567,607	(8,724,526)	-	309,475,581
2070	309,475,581	9,593,743	(9,035,556)	-	310,033,767
2071	310,033,767	9,611,047	(9,357,776)	-	310,287,038
2072	310,287,038	9,618,898	(9,797,978)	-	310,107,957
2073	310,107,957	9,613,347	(10,037,877)	-	309,683,427
2074	309,683,427	9,600,186	(10,396,546)	-	308,887,067
2075	308,887,067	9,575,499	(10,768,192)	-	307,694,375
2076	307,694,375	9,538,526	(11,275,554)	-	305,957,347
2077	305,957,347	9,484,678	(11,552,457)	-	303,889,568
2078	303,889,568	9,420,577	(20,195,462)	-	293,114,683
2079	293,114,683	9,086,555	(22,571,697)	-	279,629,541
2080	279,629,541	8,668,516	(21,719,860)	-	266,578,197
2081	266,578,197	8,263,924	(22,307,254)	-	252,534,867
2082	252,534,867	7,828,581	(23,060,441)	-	237,303,008
2083	237,303,008	7,356,393	(25,753,677)	-	218,905,724
2084	218,905,724	6,786,077	(24,808,440)	-	200,883,361
2085	200,883,361	6,227,384	(25,480,920)	-	181,629,825
2086	181,629,825	5,630,525	(26,344,530)	-	160,915,820
2087	160,915,820	4,988,390	(29,398,485)	-	136,505,725
2088	136,505,725	4,231,677	(43,787,665)	-	96,949,737
2089	96,949,737	3,005,442	(29,120,092)	-	70,835,087
2090	70,835,087	2,195,888	(50,369,723)	-	22,661,252
2091	22,661,252	702,499	(23,363,750)	-	0

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Prairie Island Unit 1

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	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$437,068,622	$8,763,473	$0	$24,632	$445,856,727
2021	445,856,727	18,127,469	-	12,399,703	476,383,899
2022	476,383,899	19,338,001	-	11,721,046	507,442,946
2023	507,442,946	20,583,469	-	11,721,046	539,747,461
2024	539,747,461	21,878,880	-	11,721,046	573,347,387
2025	573,347,387	23,226,237	-	11,721,046	608,294,670
2026	608,294,670	24,627,623	-	11,721,046	644,643,339
2027	644,643,339	26,085,205	-	11,721,046	682,449,590
2028	682,449,590	27,601,236	-	11,721,046	721,771,872
2029	721,771,872	29,178,059	-	11,721,046	762,670,976
2030	762,670,976	30,818,113	-	11,721,046	805,210,136
2031	805,210,136	32,523,933	-	11,721,046	849,455,115
2032	849,455,115	34,298,157	-	11,721,046	895,474,318
2033	895,474,318	25,183,224	(39,900,652)	7,853,101	888,609,991
2034	888,609,991	24,881,080	(122,923,807)	-	790,567,263
2035	790,567,263	22,135,883	(171,342,711)	-	641,360,436
2036	641,360,436	17,958,092	(173,059,018)	-	486,259,510
2037	486,259,510	13,615,266	(137,905,637)	-	361,969,139
2038	361,969,139	10,135,136	(87,396,028)	-	284,708,248
2039	284,708,248	7,971,831	(67,496,004)	-	225,184,074
2040	225,184,074	6,305,154	(44,052,715)	-	187,436,513
2041	187,436,513	5,248,222	(33,973,545)	-	158,711,191
2042	158,711,191	4,443,913	(18,090,185)	-	145,064,919
2043	145,064,919	4,061,818	(3,022,065)	-	146,104,671
2044	146,104,671	4,090,931	(3,121,874)	-	147,073,728
2045	147,073,728	4,118,064	(3,167,122)	-	148,024,671
2046	148,024,671	4,144,691	(3,243,355)	-	148,926,006
2047	148,926,006	4,169,928	(3,322,350)	-	149,773,584
2048	149,773,584	4,193,660	(3,436,509)	-	150,530,735
2049	150,530,735	4,214,861	(3,488,606)	-	151,256,990
2050	151,256,990	4,235,196	(3,576,125)	-	151,916,061
2051	151,916,061	4,253,650	(3,666,644)	-	152,503,066
2052	152,503,066	4,270,086	(3,797,257)	-	152,975,896
2053	152,975,896	4,283,325	(4,641,103)	-	152,618,118
2054	152,618,118	4,273,307	(5,571,842)	-	151,319,583
2055	151,319,583	4,236,948	(5,723,778)	-	149,832,754
2056	149,832,754	4,195,317	(6,350,695)	-	147,677,376
2057	147,677,376	4,134,967	(5,602,493)	-	146,209,850
2058	146,209,850	4,093,876	(7,118,735)	-	143,184,991
2059	143,184,991	4,009,180	(5,917,087)	-	141,277,084
2060	141,277,084	3,955,758	(5,648,874)	-	139,583,968
2061	139,583,968	3,908,351	(6,749,281)	-	136,743,038
2062	136,743,038	3,828,805	(6,941,122)	-	133,630,721
2063	133,630,721	3,741,660	(6,613,311)	-	130,759,070
2064	130,759,070	3,661,254	(7,398,634)	-	127,021,690
2065	127,021,690	3,556,607	(7,556,245)	-	123,022,052
2066	123,022,052	3,444,617	(7,200,314)	-	119,266,355
2067	119,266,355	3,339,458	(8,001,862)	-	114,603,951
2068	114,603,951	3,208,911	(8,298,164)	-	109,514,698
2069	109,514,698	3,066,412	(7,849,815)	-	104,731,295
2070	104,731,295	2,932,476	(8,728,949)	-	98,934,822
2071	98,934,822	2,770,175	(8,988,009)	-	92,716,988
2072	92,716,988	2,596,076	(9,326,712)	-	85,986,351
2073	85,986,351	2,407,618	(9,533,120)	-	78,860,849
2074	78,860,849	2,208,104	(9,819,789)	-	71,249,164
2075	71,249,164	1,994,977	(15,329,709)	-	57,914,432
2076	57,914,432	1,621,604	(10,503,459)	-	49,032,578
2077	49,032,578	1,372,912	(47,439,859)	-	2,965,631
2078	2,965,631	83,038	(3,048,669)	-	0

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	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$487,163,479	$9,697,485	$0	$294,670	$497,155,635
2021	497,155,635	19,916,375	-	6,511,608	523,583,618
2022	523,583,618	20,985,054	-	7,358,104	551,926,777
2023	551,926,777	22,113,112	-	7,358,104	581,397,993
2024	581,397,993	23,286,066	-	7,358,104	612,042,164
2025	612,042,164	24,505,704	-	7,358,104	643,905,972
2026	643,905,972	25,773,884	-	7,358,104	677,037,960
2027	677,037,960	27,092,537	-	7,358,104	711,488,602
2028	711,488,602	28,463,673	-	7,358,104	747,310,379
2029	747,310,379	29,889,379	-	7,358,104	784,557,862
2030	784,557,862	31,371,829	-	7,358,104	823,287,796
2031	823,287,796	32,913,281	-	7,358,104	863,559,180
2032	863,559,180	34,516,082	-	7,358,104	905,433,366
2033	905,433,366	36,182,674	-	7,358,104	948,974,145
2034	948,974,145	25,895,155	(16,324,077)	6,107,226	964,652,449
2035	964,652,449	26,238,547	(104,939,464)	-	885,951,532
2036	885,951,532	24,097,882	(170,113,112)	-	739,936,301
2037	739,936,301	20,126,267	(206,964,256)	-	553,098,312
2038	553,098,312	15,044,274	(236,215,176)	-	331,927,410
2039	331,927,410	9,028,426	(77,052,832)	-	263,903,004
2040	263,903,004	7,178,162	(56,360,375)	-	214,720,790
2041	214,720,790	5,840,405	(53,606,976)	-	166,954,219
2042	166,954,219	4,541,155	(24,723,139)	-	146,772,235
2043	146,772,235	3,992,205	(3,004,709)	-	147,759,731
2044	147,759,731	4,019,065	(3,103,932)	-	148,674,864
2045	148,674,864	4,043,956	(3,148,573)	-	149,570,248
2046	149,570,248	4,068,311	(3,224,179)	-	150,414,379
2047	150,414,379	4,091,271	(3,302,525)	-	151,203,125
2048	151,203,125	4,112,725	(3,416,012)	-	151,899,838
2049	151,899,838	4,131,676	(3,467,414)	-	152,564,100
2050	152,564,100	4,149,744	(3,554,213)	-	153,159,630
2051	153,159,630	4,165,942	(3,643,988)	-	153,681,584
2052	153,681,584	4,180,139	(3,773,830)	-	154,087,894
2053	154,087,894	4,191,191	(4,616,878)	-	153,662,206
2054	153,662,206	4,179,612	(5,546,793)	-	152,295,026
2055	152,295,026	4,142,425	(5,697,874)	-	150,739,576
2056	150,739,576	4,100,116	(6,323,907)	-	148,515,785
2057	148,515,785	4,039,629	(5,574,790)	-	146,980,625
2058	146,980,625	3,997,873	(7,090,085)	-	143,888,413
2059	143,888,413	3,913,765	(5,887,457)	-	141,914,721
2060	141,914,721	3,860,080	(5,618,229)	-	140,156,572
2061	140,156,572	3,812,259	(6,717,586)	-	137,251,245
2062	137,251,245	3,733,234	(6,908,339)	-	134,076,139
2063	134,076,139	3,646,871	(6,579,403)	-	131,143,607
2064	131,143,607	3,567,106	(7,363,561)	-	127,347,153
2065	127,347,153	3,463,843	(7,519,966)	-	123,291,030
2066	123,291,030	3,353,516	(7,162,786)	-	119,481,760
2067	119,481,760	3,249,904	(7,963,042)	-	114,768,622
2068	114,768,622	3,121,707	(8,258,005)	-	109,632,324
2069	109,632,324	2,981,999	(7,808,270)	-	104,806,053
2070	104,806,053	2,850,725	(8,685,970)	-	98,970,808
2071	98,970,808	2,692,006	(8,943,545)	-	92,719,269
2072	92,719,269	2,521,964	(9,280,710)	-	85,960,523
2073	85,960,523	2,338,126	(9,485,525)	-	78,813,124
2074	78,813,124	2,143,717	(9,770,545)	-	71,186,296
2075	71,186,296	1,936,267	(15,278,758)	-	57,843,805
2076	57,843,805	1,573,351	(10,450,741)	-	48,966,416
2077	48,966,416	1,331,887	(47,385,311)	-	2,912,991
2078	2,912,991	79,233	(2,992,225)	-	0

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2022 ACCRUAL COMPARISON

	Present	Proposed	Difference
Monticello	$8,507,110	$53,824,542	$45,317,432
Prairie Island Unit 1	12,399,703	29,514,299	17,114,596
Prairie Island Unit 2	6,511,608	23,764,067	17,252,459
TOTAL	$27,418,421	$107,102,909	$79,684,488

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2022 MN RETAIL SUMMARY

	Remaining Life (yrs)	Operational Earnings Rate	Post-Shutdown Earnings Rate	Market Value Balance 6/30/2020	Book Value 6/30/2020	Unrealized Gain/Loss 6/30/2020	Tax-Effect Adjustment	Tax-Adjusted Fund Balance 6/30/2020	2022-2024 Decommissioning Accrual
Monticello	9.67	3.84%	3.66%	$814,968,100	$610,109,002	$204,859,098	$57,032,773	$757,935,327	**$53,824,542**
Prairie Island Unit 1	13.25	4.02%	3.56%	471,960,960	346,629,286	125,331,674	34,892,338	437,068,622	**29,514,299**
Prairie Island Unit 2	14.42	3.99%	3.54%	526,255,835	385,837,890	140,417,945	39,092,356	487,163,479	**23,764,067**
TOTAL DECOMMISSIONING ACCRUAL				**$1,813,184,895**	**$1,342,576,178**	**$470,608,717**	**$131,017,467**	**$1,682,167,428**	**$107,102,909**

INPUT DATA

Escalation Rate (Labor)	3.78%
Escalation Rate (Non-Labor)	2.58%
Escalation Rate (PIIC)	0.00%
Jurisdictional Factor	72.9219%
Tax Rate for tax-effect adjustment	27.84%

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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Monticello																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2030	$22,675,886	$0	$22,675,886	$16,535,687	1.4492	$23,963,517	$9,374,135	$0	$9,374,135	$6,835,797	1.2901	$8,818,862	$0	$0	1.0000	$0	$32,050,021	$23,371,484	$32,782,380
2031	77,872,234	-	77,872,234	56,785,913	1.5040	85,406,013	48,073,591	-	48,073,591	35,056,176	1.3234	46,393,344	0	0	1.0000	0	125,945,826	91,842,089	131,799,357
2032	87,105,040	-	87,105,040	63,518,650	1.5609	99,146,261	136,816,869	-	136,816,869	99,769,461	1.3575	135,437,043	0	0	1.0000	0	223,921,909	163,288,111	234,583,304
2033	97,149,802	-	97,149,802	70,843,481	1.6199	114,759,356	156,137,852	-	156,137,852	113,858,688	1.3926	158,559,609	0	0	1.0000	0	253,287,654	184,702,170	273,318,965
2034	97,504,414	-	97,504,414	71,102,071	1.6811	119,529,692	130,971,769	-	130,971,769	95,507,102	1.4285	136,431,895	0	0	1.0000	0	228,476,182	166,609,173	255,961,587
2035	52,997,671	-	52,997,671	38,646,909	1.7446	67,423,397	22,622,163	-	22,622,163	16,496,511	1.4653	24,172,338	0	0	1.0000	0	75,619,834	55,143,420	91,595,735
2036	37,468,263	-	37,468,263	27,322,569	1.8106	49,470,244	18,557,761	-	18,557,761	13,532,672	1.5032	20,342,312	0	0	1.0000	0	56,026,024	40,855,241	69,812,556
2037	32,364,060	-	32,364,060	23,600,487	1.8790	44,345,316	19,952,696	-	19,952,696	14,549,885	1.5419	22,434,468	0	0	1.0000	0	52,316,756	38,150,372	66,779,784
2038	7,761,335	5,807,500	1,953,835	1,424,774	1.9501	2,778,451	2,505,528	1,838,642	666,886	486,306	1.5817	769,190	0	0	1.0000	0	2,620,721	1,911,080	3,547,641
2039	7,761,335	5,807,500	1,953,835	1,424,774	2.0238	2,883,457	2,505,528	1,838,642	666,886	486,306	1.6225	789,032	0	0	1.0000	0	2,620,721	1,911,080	3,672,488
2040	7,782,550	5,807,500	1,975,050	1,440,244	2.1003	3,024,944	2,512,245	1,838,642	673,603	491,204	1.6644	817,560	0	0	1.0000	0	2,648,652	1,931,448	3,842,504
2041	7,761,335	5,807,500	1,953,835	1,424,774	2.1797	3,105,579	2,505,528	1,838,642	666,886	486,306	1.7073	830,270	0	0	1.0000	0	2,620,721	1,911,080	3,935,849
2042	7,761,335	5,807,500	1,953,835	1,424,774	2.2620	3,222,838	2,505,528	1,838,642	666,886	486,306	1.7514	851,716	0	0	1.0000	0	2,620,721	1,911,080	4,074,554
2043	7,761,335	5,807,500	1,953,835	1,424,774	2.3475	3,344,656	2,505,528	1,838,642	666,886	486,306	1.7966	873,697	0	0	1.0000	0	2,620,721	1,911,080	4,218,354
2044	7,782,550	5,807,500	1,975,050	1,440,244	2.4363	3,508,866	2,512,245	1,838,642	673,603	491,204	1.8429	905,240	0	0	1.0000	0	2,648,652	1,931,448	4,414,106
2045	7,761,335	5,807,500	1,953,835	1,424,774	2.5284	3,602,398	2,505,528	1,838,642	666,886	486,306	1.8905	919,362	0	0	1.0000	0	2,620,721	1,911,080	4,521,759
2046	7,761,335	5,807,500	1,953,835	1,424,774	2.6239	3,738,464	2,505,528	1,838,642	666,886	486,306	1.9392	943,045	0	0	1.0000	0	2,620,721	1,911,080	4,681,508
2047	7,761,335	5,807,500	1,953,835	1,424,774	2.7231	3,879,801	2,505,528	1,838,642	666,886	486,306	1.9893	967,409	0	0	1.0000	0	2,620,721	1,911,080	4,847,210
2048	8,502,036	5,807,500	2,694,536	1,964,907	2.8261	5,553,023	4,670,703	1,838,642	2,832,061	2,065,192	2.0406	4,214,232	0	0	1.0000	0	5,526,596	4,030,099	9,767,254
2049	7,761,335	5,807,500	1,953,835	1,424,774	2.9329	4,178,719	2,505,528	1,838,642	666,886	486,306	2.0932	1,017,936	0	0	1.0000	0	2,620,721	1,911,080	5,196,654
2050	9,380,179	5,807,500	3,572,678	2,605,265	3.0438	7,929,906	7,362,059	1,838,642	5,523,416	4,027,780	2.1472	8,648,450	0	0	1.0000	0	9,096,095	6,633,045	16,578,355
2051	9,380,179	5,807,500	3,572,678	2,605,265	3.1588	8,229,511	7,362,059	1,838,642	5,523,416	4,027,780	2.2026	8,871,589	0	0	1.0000	0	9,096,095	6,633,045	17,101,100
2052	9,401,393	5,807,500	3,593,893	2,620,735	3.2782	8,591,294	7,368,775	1,838,642	5,530,133	4,032,678	2.2595	9,111,836	0	0	1.0000	0	9,124,026	6,653,413	17,703,130
2053	9,380,179	5,807,500	3,572,678	2,605,265	3.4021	8,863,372	7,362,059	1,838,642	5,523,416	4,027,780	2.3178	9,335,589	0	0	1.0000	0	9,096,095	6,633,045	18,198,961
2054	9,380,179	5,807,500	3,572,678	2,605,265	3.5307	9,198,409	7,362,059	1,838,642	5,523,416	4,027,780	2.3776	9,576,450	0	0	1.0000	0	9,096,095	6,633,045	18,774,859
2055	9,380,179	5,807,500	3,572,678	2,605,265	3.6642	9,546,212	7,362,059	1,838,642	5,523,416	4,027,780	2.4389	9,823,353	0	0	1.0000	0	9,096,095	6,633,045	19,369,565
2056	9,401,393	5,807,500	3,593,893	2,620,735	3.8027	9,965,870	7,368,775	1,838,642	5,530,133	4,032,678	2.5018	10,088,954	0	0	1.0000	0	9,124,026	6,653,413	20,054,823
2057	9,380,179	5,807,500	3,572,678	2,605,265	3.9464	10,281,418	7,362,059	1,838,642	5,523,416	4,027,780	2.5664	10,336,895	0	0	1.0000	0	9,096,095	6,633,045	20,618,313
2058	16,568,018	5,807,500	10,760,518	7,846,774	4.0956	32,137,249	28,925,578	1,838,642	27,086,936	19,752,308	2.6326	51,999,926	0	0	1.0000	0	37,847,454	27,599,082	84,137,175
2059	9,380,179	5,807,500	3,572,678	2,605,265	4.2504	11,073,418	7,362,059	1,838,642	5,523,416	4,027,780	2.7005	10,877,020	0	0	1.0000	0	9,096,095	6,633,045	21,950,439
2060	9,401,393	5,807,500	3,593,893	2,620,735	4.4111	11,560,325	7,368,775	1,838,642	5,530,133	4,032,678	2.7702	11,171,325	0	0	1.0000	0	9,124,026	6,653,413	22,731,650
2061	9,380,179	5,807,500	3,572,678	2,605,265	4.5778	11,926,382	7,362,059	1,838,642	5,523,416	4,027,780	2.8416	11,445,340	0	0	1.0000	0	9,096,095	6,633,045	23,371,722
2062	9,380,179	5,807,500	3,572,678	2,605,265	4.7509	12,377,354	7,362,059	1,838,642	5,523,416	4,027,780	2.9150	11,740,979	0	0	1.0000	0	9,096,095	6,633,045	24,118,333
2063	12,974,099	5,807,500	7,166,598	5,226,020	4.9305	25,766,890	18,143,818	1,838,642	16,305,176	11,890,044	2.9902	35,553,610	0	0	1.0000	0	23,471,774	17,116,064	61,320,500
2064	9,401,393	5,807,500	3,593,893	2,620,735	5.1168	13,409,778	7,368,775	1,838,642	5,530,133	4,032,678	3.0673	12,369,433	0	0	1.0000	0	9,124,026	6,653,413	25,779,211
2065	9,380,179	5,807,500	3,572,678	2,605,265	5.3103	13,834,739	7,362,059	1,838,642	5,523,416	4,027,780	3.1465	12,673,410	0	0	1.0000	0	9,096,095	6,633,045	26,508,149
2066	10,098,963	5,807,500	4,291,462	3,129,416	5.5110	17,246,211	9,518,411	1,838,642	7,679,768	5,600,233	3.2276	18,075,312	0	0	1.0000	0	11,971,231	8,729,649	35,321,523
2067	9,380,179	5,807,500	3,572,678	2,605,265	5.7193	14,900,292	7,362,059	1,838,642	5,523,416	4,027,780	3.3109	13,335,577	0	0	1.0000	0	9,096,095	6,633,045	28,235,870
2068	19,464,369	5,807,500	13,656,869	9,958,848	5.9355	59,110,743	37,557,702	1,838,642	35,719,060	26,047,017	3.3963	88,463,484	0	0	1.0000	0	49,375,929	36,005,865	147,574,227
2069	9,380,179	5,807,500	3,572,678	2,605,265	6.1598	16,047,911	7,362,059	1,838,642	5,523,416	4,027,780	3.4840	14,032,786	0	0	1.0000	0	9,096,095	6,633,045	30,080,698
2070	9,380,179	5,807,500	3,572,678	2,605,265	6.3927	16,654,678	7,362,059	1,838,642	5,523,416	4,027,780	3.5738	14,394,481	0	0	1.0000	0	9,096,095	6,633,045	31,049,158
2071	9,380,179	5,807,500	3,572,678	2,605,265	6.6343	17,284,110	7,362,059	1,838,642	5,523,416	4,027,780	3.6660	14,765,842	0	0	1.0000	0	9,096,095	6,633,045	32,049,952
2072	9,401,393	5,807,500	3,593,893	2,620,735	6.8851	18,044,024	7,368,775	1,838,642	5,530,133	4,032,678	3.7606	15,165,289	0	0	1.0000	0	9,124,026	6,653,413	33,209,313
2073	9,380,179	5,807,500	3,572,678	2,605,265	7.1454	18,615,661	7,362,059	1,838,642	5,523,416	4,027,780	3.8576	15,537,565	0	0	1.0000	0	9,096,095	6,633,045	34,153,225
2074	9,380,179	5,807,500	3,572,678	2,605,265	7.4155	19,319,343	7,362,059	1,838,642	5,523,416	4,027,780	3.9572	15,938,732	0	0	1.0000	0	9,096,095	6,633,045	35,258,074
2075	9,380,179	5,807,500	3,572,678	2,605,265	7.6958	20,049,598	7,362,059	1,838,642	5,523,416	4,027,780	4.0593	16,349,968	0	0	1.0000	0	9,096,095	6,633,045	36,399,566
2076	9,401,393	5,807,500	3,593,893	2,620,735	7.9867	20,931,025	7,368,775	1,838,642	5,530,133	4,032,678	4.1640	16,792,071	0	0	1.0000	0	9,124,026	6,653,413	37,723,097
2077	9,380,179	5,807,500	3,572,678	2,605,265	8.2886	21,594,000	7,362,059	1,838,642	5,523,416	4,027,780	4.2714	17,204,260	0	0	1.0000	0	9,096,095	6,633,045	38,798,260
2078	9,380,179	5,807,500	3,572,678	2,605,265	8.6019	22,410,229	7,362,059	1,838,642	5,523,416	4,027,780	4.3816	17,648,122	0	0	1.0000	0	9,096,095	6,633,045	40,058,351
2079	9,380,179	5,807,500	3,572,678	2,605,265	8.9270	23,257,201	7,362,059	1,838,642	5,523,416	4,027,780	4.4947	18,103,664	0	0	1.0000	0	9,096,095	6,633,045	41,360,864
2080	9,401,393	5,807,500	3,593,893	2,620,735	9.2645	24,279,801	7,368,775	1,838,642	5,530,133	4,032,678	4.6106	18,593,065	0	0	1.0000	0	9,124,026	6,653,413	42,872,866
2081	9,380,179	5,807,500	3,572,678	2,605,265	9.6147	25,048,841	7,362,059	1,838,642	5,523,416	4,027,780	4.7296	19,049,789	0	0	1.0000	0	9,096,095	6,633,045	44,098,631
2082	9,380,179	5,807,500	3,572,678	2,605,265	9.9781	25,995,595	7,362,059	1,838,642	5,523,416	4,027,780	4.8516	19,541,178	0	0	1.0000	0	9,096,095	6,633,045	45,536,773
2083	9,380,179	5,807,500	3,572,678	2,605,265	10.3553	26,978,301	7,362,059	1,838,642	5,523,416	4,027,780	4.9768	20,045,456	0	0	1.0000	0	9,096,095	6,633,045	47,023,757
2084	34,558,832	5,807,500	28,751,332	20,966,018	10.7467	225,315,502	82,841,092	1,838,642	81,002,450	59,068,526	5.1052	301,556,637	0	0	1.0000	0	109,753,782	80,034,543	526,872,139
2085	9,380,179	5,807,500	3,572,678	2,605,265	11.1529	29,056,260	7,362,059	1,838,642	5,523,416	4,027,780	5.2369	21,093,082	0	0	1.0000	0	9,096,095	6,633,045	50,149,342
2086	9,380,179	5,807,500	3,572,678	2,605,265	11.5745	30,154,640	7,362,059	1,838,642	5,523,416	4,027,780	5.3720	21,637,235	0	0	1.0000	0	9,096,095	6,633,045	51,791,875
2087	9,380,179	5,807,500	3,572,678	2,605,265	12.0120	31,294,443	7,362,059	1,838,642	5,523,416	4,027,780	5.5106	22,195,485	0	0	1.0000	0	9,096,095	6,633,045	53,489,929
2088	10,120,879	5,807,500	4,313,379	3,145,398	12.4661	39,210,846	9,527,233	1,838,642	7,688,591	5,606,667	5.6528	31,693,365	0	0	1.0000	0	12,001,970	8,752,065	70,904,210
2089	9,380,179	5,807,500	3,572,678	2,605,265	12.9373	33,705,095	7,362,059	1,838,642	5,523,416	4,027,780	5.7986	23,355,486	0	0	1.0000	0	9,096,095	6,633,045	57,060,581
2090	9,380,179	5,807,500	3,572,678	2,605,265	13.4263	34,979,070	7,362,059	1,838,642	5,523,416	4,027,780	5.9482	23,958,042	0	0	1.0000	0	9,096,095	6,633,045	58,937,112
2091	9,380,179	5,807,500	3,572,678	2,605,265	13.9338	36,301,242	7,362,059	1,838,642	5,523,416	4,027,780	6.1017	24,576,306	0	0	1.0000	0	9,096,095	6,633,045	60,877,548
2092	10,121,293	5,807,500	4,313,793	3,145,700	14.4605	45,488,393	9,528,475	1,838,642	7,689,833	5,607,572	6.2591	35,098,356	0	0	1.0000	0	12,003,626	8,753,272	80,586,749
2093	10,640,004	5,807,500	4,832,503	3,523,953	15.0071	52,884,320	11,141,534	1,838,642	9,302,891	6,783,845	6.4206	43,556,356	0	0	1.0000	0	14,135,395	10,307,798	96,440,676
2094	9,560,154	5,807,500	3,752,653	2,736,506	15.5744	42,619,442	7,901,984	1,838,642	6,063,341	4,421,504	6.5863	29,121,350	0	0	1.0000	0	9,815,995	7,158,010	71,740,792
2095	10,460,029	5,807,500	4,652,528	3,392,712	16.1631	54,836,746	10,601,609	1,838,642	8,762,966	6,390,122	6.7562	43,172,939	0	0	1.0000	0	13,415,495	9,782,834	98,009,685
2096	10,841,193	5,807,500	5,033,693	3,670,665	16.7741	61,572,096	11,688,175	1,838,642	9,849,533	7,182,467	6.9305	49,778,085	0	0	1.0000	0	14,883,226	10,853,131	111,350,181
2097	7,743,348	5,807,500	1,935,848	1,411,657	17.4081	24,574,267	2,451,567	1,838,642	612,925	446,956	7.1093	3,177,547	0	0	1.0000	0	2,548,773	1,858,613	27,751,814
2098	7,743,348	5,807,500	1,935,848	1,411,657	18.0662	25,503,279	2,451,567	1,838,642	612,925	446,956	7.2927	3,259,518	0	0	1.0000	0	2,548,773	1,858,613	28,762,797
2099	7,743,348	5,807,500	1,935,848	1,411,657	18.7491	26,467,299	2,451,567	1,838,642	612,925	446,956	7.4809	3,343,635	0	0	1.0000	0	2,548,773	1,858,613	29,810,935

Xcel Energy
Nuclear Decommissioning Accrual
100-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.3
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PHC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2100	7,743,348	5,807,500	1,935,848	1,411,657	19.4578	27,467,741	2,451,567	1,838,642	612,925	446,956	7.6739	3,429,898	0	0	1.0000	0	2,548,773	1,858,613	30,897,639
2101	7,743,348	5,807,500	1,935,848	1,411,657	20.1933	28,506,015	2,451,567	1,838,642	612,925	446,956	7.8719	3,518,395	0	0	1.0000	0	2,548,773	1,858,613	32,024,410
2102	7,743,348	5,807,500	1,935,848	1,411,657	20.9566	29,583,532	2,451,567	1,838,642	612,925	446,956	8.0750	3,609,172	0	0	1.0000	0	2,548,773	1,858,613	33,192,705
2103	7,743,348	5,807,500	1,935,848	1,411,657	21.7488	30,701,847	2,451,567	1,838,642	612,925	446,956	8.2833	3,702,273	0	0	1.0000	0	2,548,773	1,858,613	34,404,120
2104	7,764,563	5,807,500	1,957,063	1,427,127	22.5709	32,211,545	2,458,284	1,838,642	619,641	451,854	8.4970	3,839,405	0	0	1.0000	0	2,576,704	1,878,981	36,050,950
2105	7,743,348	5,807,500	1,935,848	1,411,657	23.4240	33,066,655	2,451,567	1,838,642	612,925	446,956	8.7162	3,895,761	0	0	1.0000	0	2,548,773	1,858,613	36,962,416
2106	7,743,348	5,807,500	1,935,848	1,411,657	24.3095	34,316,677	2,451,567	1,838,642	612,925	446,956	8.9411	3,996,281	0	0	1.0000	0	2,548,773	1,858,613	38,312,958
2107	7,743,348	5,807,500	1,935,848	1,411,657	25.2284	35,613,849	2,451,567	1,838,642	612,925	446,956	9.1718	4,099,394	0	0	1.0000	0	2,548,773	1,858,613	39,713,243
2108	14,952,403	5,807,500	9,144,902	6,668,636	26.1820	174,598,240	24,021,803	1,838,642	22,183,160	16,176,382	9.4084	152,193,873	0	0	1.0000	0	31,328,063	22,845,019	326,792,114
2109	7,743,348	5,807,500	1,935,848	1,411,657	27.1717	38,357,122	2,451,567	1,838,642	612,925	446,956	9.6512	4,313,665	0	0	1.0000	0	2,548,773	1,858,613	42,670,787
2110	7,743,348	5,807,500	1,935,848	1,411,657	28.1988	39,807,035	2,451,567	1,838,642	612,925	446,956	9.9002	4,424,957	0	0	1.0000	0	2,548,773	1,858,613	44,231,992
2111	7,743,348	5,807,500	1,935,848	1,411,657	29.2647	41,311,720	2,451,567	1,838,642	612,925	446,956	10.1556	4,539,110	0	0	1.0000	0	2,548,773	1,858,613	45,850,830
2112	7,764,563	5,807,500	1,957,063	1,427,127	30.3709	43,343,137	2,458,284	1,838,642	619,641	451,854	10.4176	4,707,236	0	0	1.0000	0	2,576,704	1,878,981	48,050,373
2113	11,337,268	5,807,500	5,529,768	4,032,412	31.5189	127,097,181	13,233,326	1,838,642	11,394,684	8,309,220	10.6864	88,795,651	0	0	1.0000	0	16,924,452	12,341,632	215,892,833
2114	7,743,348	5,807,500	1,935,848	1,411,657	32.7103	46,175,726	2,451,567	1,838,642	612,925	446,956	10.9621	4,899,580	0	0	1.0000	0	2,548,773	1,858,613	51,075,306
2115	7,743,348	5,807,500	1,935,848	1,411,657	33.9468	47,921,240	2,451,567	1,838,642	612,925	446,956	11.2449	5,025,979	0	0	1.0000	0	2,548,773	1,858,613	52,947,219
2116	8,483,347	5,807,500	2,675,847	1,951,278	35.2299	68,743,333	4,614,635	1,838,642	2,775,993	2,024,307	11.5350	23,350,381	0	0	1.0000	0	5,451,840	3,975,585	92,093,714
2117	7,743,348	5,807,500	1,935,848	1,411,657	36.5616	51,612,441	2,451,567	1,838,642	612,925	446,956	11.8326	5,288,655	0	0	1.0000	0	2,548,773	1,858,613	56,901,096
2118	18,325,261	5,807,500	12,517,761	9,128,189	37.9437	346,357,271	34,197,306	1,838,642	32,358,664	23,596,553	12.1379	286,412,596	0	0	1.0000	0	44,876,425	32,724,742	632,769,867
2119	8,366,073	5,807,500	2,558,573	1,865,760	39.3779	73,469,709	4,319,742	1,838,642	2,481,100	1,809,265	12.4511	22,527,340	0	0	1.0000	0	5,039,673	3,675,025	95,997,049
2120	8,283,500	5,807,500	2,476,000	1,805,546	40.8664	73,786,176	4,015,096	1,838,642	2,176,454	1,587,111	12.7723	20,271,064	0	0	1.0000	0	4,652,454	3,392,658	94,057,240
2121	8,262,286	5,807,500	2,454,785	1,790,076	42.4112	75,919,277	4,008,379	1,838,642	2,169,737	1,582,214	13.1018	20,729,846	0	0	1.0000	0	4,624,523	3,372,290	96,649,123
2122	8,262,286	5,807,500	2,454,785	1,790,076	44.0143	78,788,949	4,008,379	1,838,642	2,169,737	1,582,214	13.4399	21,264,792	0	0	1.0000	0	4,624,523	3,372,290	100,053,741
2123	8,366,073	5,807,500	2,558,573	1,865,760	45.6781	85,224,370	4,319,742	1,838,642	2,481,100	1,809,265	13.7866	24,943,613	0	0	1.0000	0	5,039,673	3,675,025	110,167,983
2124	8,283,500	5,807,500	2,476,000	1,805,546	47.4047	85,591,379	4,015,096	1,838,642	2,176,454	1,587,111	14.1423	22,445,406	0	0	1.0000	0	4,652,454	3,392,658	108,036,786
2125	8,262,286	5,807,500	2,454,785	1,790,076	49.1966	88,065,660	4,008,379	1,838,642	2,169,737	1,582,214	14.5072	22,953,489	0	0	1.0000	0	4,624,523	3,372,290	111,019,149
2126	8,262,286	5,807,500	2,454,785	1,790,076	51.0562	91,394,486	4,008,379	1,838,642	2,169,737	1,582,214	14.8815	23,545,711	0	0	1.0000	0	4,624,523	3,372,290	114,940,197
2127	8,366,073	5,807,500	2,558,573	1,865,760	52.9861	98,859,344	4,319,742	1,838,642	2,481,100	1,809,265	15.2654	27,619,154	0	0	1.0000	0	5,039,673	3,675,025	126,478,498
2128	9,002,986	5,807,500	3,195,486	2,330,209	54.9890	128,135,869	6,173,554	1,838,642	4,334,912	3,161,100	15.6593	49,500,613	0	0	1.0000	0	7,530,398	5,491,309	177,636,481
2129	8,262,286	5,807,500	2,454,785	1,790,076	57.0676	102,155,349	4,008,379	1,838,642	2,169,737	1,582,214	16.0633	25,415,571	0	0	1.0000	0	4,624,523	3,372,290	127,570,921
2130	7,898,442	5,807,500	2,090,941	1,524,754	59.2248	90,303,265	9,382,365	1,838,642	7,543,723	5,501,026	16.4777	90,644,258	0	0	1.0000	0	9,634,664	7,025,780	180,947,524
2131	1,934,862	5,807,500	(3,872,638)	(2,824,001)	61.4635	(173,573,015)	5,233,607	1,838,642	3,394,965	2,475,673	16.9028	41,845,801	0	0	1.0000	0	(477,674)	(348,329)	(131,727,214)
	$1,386,633,207	$545,905,026	$840,728,182	$613,074,964		$4,228,200,747	$1,259,238,069	$172,832,369	$1,086,405,700	$792,227,678		$2,881,471,706	$0	$0		$0	$1,927,133,882	$1,405,302,642	$7,109,672,452

Xcel Energy
Nuclear Decommissioning Accrual
100-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.3
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 1																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2033	$23,781,621	$0	$23,781,621	17,342,010	1.6199	$28,092,322	$10,730,367	$0	$10,730,367	$7,824,788	1.3926	$10,896,799	$1,250,000	$911,524	1.0000	$911,524	$35,761,989	26,078,322	$39,900,645
2034	67,414,165	-	67,414,165	49,159,690	1.6811	82,642,355	37,794,291	-	37,794,291	27,560,315	1.4285	39,369,910	1,250,000	911,524	1.0000	911,524	106,458,456	77,631,529	122,923,789
2035	68,590,728	-	68,590,728	50,017,662	1.7446	87,260,813	77,836,645	-	77,836,645	56,759,960	1.4653	83,170,370	1,250,000	911,524	1.0000	911,524	147,677,372	107,689,146	171,342,706
2036	64,616,422	-	64,616,422	47,119,523	1.8106	85,314,608	81,274,975	-	81,274,975	59,267,256	1.5032	89,090,539	1,250,000	911,524	1.0000	911,524	147,141,397	107,298,302	175,316,670
2037	46,367,050	-	46,367,050	33,811,734	1.8790	63,532,248	68,950,805	-	68,950,805	50,280,237	1.5419	77,527,098	1,250,000	911,524	1.0000	911,524	116,567,855	85,003,495	141,970,869
2038	26,102,517	-	26,102,517	19,034,451	1.9501	37,119,083	44,888,187	-	44,888,187	32,733,319	1.5817	51,774,290	1,250,000	911,524	1.0000	911,524	72,240,703	52,679,293	89,804,897
2039	33,734,614	-	33,734,614	24,599,921	2.0238	49,785,321	14,198,586	-	14,198,586	10,353,879	1.6225	16,799,168	1,250,000	911,524	1.0000	911,524	49,183,200	35,865,324	67,496,013
2040	20,721,562	-	20,721,562	15,110,557	2.1003	31,736,703	9,470,370	-	9,470,370	6,905,974	1.6644	11,494,303	1,250,000	911,524	1.0000	911,524	31,441,932	22,928,054	44,142,529
2041	15,615,259	2,964,152	12,651,106	9,225,427	2.1797	20,108,663	11,497,230	1,606,902	9,890,328	7,212,215	1.7073	12,313,415	1,250,000	911,524	1.0000	911,524	23,791,434	17,349,166	33,333,602
2042	9,448,219	2,964,152	6,484,066	4,728,304	2.2620	10,695,424	6,550,324	1,606,902	4,943,422	3,604,837	1.7514	6,313,512	1,250,000	911,524	1.0000	911,524	12,677,488	9,244,665	17,920,460
2043	3,952,203	2,964,152	988,051	720,506	2.3475	1,691,387	2,141,682	1,606,902	534,779	389,971	1.7966	700,622	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	3,303,533
2044	3,963,031	2,964,152	998,879	728,402	2.4363	1,774,605	2,150,974	1,606,902	544,072	396,747	1.8429	731,166	1,250,000	911,524	1.0000	911,524	2,792,951	2,036,673	3,417,294
2045	5,466,341	2,964,152	2,502,189	1,824,644	2.5284	4,613,429	6,684,095	1,606,902	5,077,193	3,702,386	1.8905	6,999,360	1,250,000	911,524	1.0000	911,524	8,829,382	6,438,553	12,524,313
2046	4,961,629	2,964,152	1,997,476	1,456,598	2.6239	3,821,967	5,169,957	1,606,902	3,563,055	2,598,247	1.9392	5,038,521	1,250,000	911,524	1.0000	911,524	6,810,531	4,966,369	9,772,012
2047	4,961,629	2,964,152	1,997,476	1,456,598	2.7231	3,966,461	5,169,957	1,606,902	3,563,055	2,598,247	1.9893	5,168,694	1,250,000	911,524	1.0000	911,524	6,810,531	4,966,369	10,046,679
2048	3,963,031	2,964,152	998,879	728,402	2.8261	2,058,536	2,150,974	1,606,902	544,072	396,747	2.0406	809,603	1,250,000	911,524	1.0000	911,524	2,792,951	2,036,673	3,779,662
2049	4,961,629	2,964,152	1,997,476	1,456,598	2.9329	4,272,055	5,169,957	1,606,902	3,563,055	2,598,247	2.0932	5,438,652	1,250,000	911,524	1.0000	911,524	6,810,531	4,966,369	10,622,231
2050	5,466,341	2,964,152	2,502,189	1,824,644	3.0438	5,553,851	6,684,095	1,606,902	5,077,193	3,702,386	2.1472	7,949,762	1,250,000	911,524	1.0000	911,524	8,829,382	6,438,553	14,415,137
2051	5,411,566	2,964,152	2,447,414	1,784,701	3.1588	5,637,512	6,519,770	1,606,902	4,912,868	3,582,556	2.2026	7,890,939	1,250,000	911,524	1.0000	911,524	8,610,281	6,278,781	14,439,975
2052	5,477,169	2,964,152	2,513,017	1,832,540	3.2782	6,007,432	6,693,388	1,606,902	5,086,485	3,709,162	2.2595	8,380,851	1,250,000	911,524	1.0000	911,524	8,849,502	6,453,225	15,299,806
2053	3,952,203	2,964,152	988,051	720,506	3.4021	2,451,232	2,141,682	1,606,902	534,779	389,971	2.3178	903,875	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	4,266,631
2054	3,952,203	2,964,152	988,051	720,506	3.5307	2,543,889	2,141,682	1,606,902	534,779	389,971	2.3776	927,195	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	4,382,608
2055	5,466,341	2,964,152	2,502,189	1,824,644	3.6642	6,685,860	6,684,095	1,606,902	5,077,193	3,702,386	2.4389	9,029,748	1,250,000	911,524	1.0000	911,524	8,829,382	6,438,553	16,627,132
2056	4,972,457	2,964,152	2,008,304	1,464,494	3.8027	5,569,030	5,179,250	1,606,902	3,572,347	2,605,024	2.5018	6,517,248	1,250,000	911,524	1.0000	911,524	6,830,652	4,981,041	12,997,802
2057	4,961,629	2,964,152	1,997,476	1,456,598	3.9464	5,748,317	5,169,957	1,606,902	3,563,055	2,598,247	2.5664	6,668,142	1,250,000	911,524	1.0000	911,524	6,810,531	4,966,369	13,327,983
2058	3,952,203	2,964,152	988,051	720,506	4.0956	2,950,903	2,141,682	1,606,902	534,779	389,971	2.6326	1,026,638	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	4,889,065
2059	4,906,854	2,964,152	1,942,701	1,416,655	4.2504	6,021,349	5,005,632	1,606,902	3,398,730	2,478,418	2.7005	6,692,968	1,250,000	911,524	1.0000	911,524	6,591,431	4,806,597	13,625,841
2060	4,972,457	2,964,152	2,008,304	1,464,494	4.4111	6,460,028	5,179,250	1,606,902	3,572,347	2,605,024	2.7702	7,216,436	1,250,000	911,524	1.0000	911,524	6,830,652	4,981,041	14,587,988
2061	4,961,629	2,964,152	1,997,476	1,456,598	4.5778	6,668,013	5,169,957	1,606,902	3,563,055	2,598,247	2.8416	7,383,180	1,250,000	911,524	1.0000	911,524	6,810,531	4,966,369	14,962,717
2062	3,952,203	2,964,152	988,051	720,506	4.7509	3,423,050	2,141,682	1,606,902	534,779	389,971	2.9150	1,136,766	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	5,471,340
2063	6,980,479	2,964,152	4,016,327	2,928,782	4.9305	14,440,359	11,226,509	1,606,902	9,619,607	7,014,800	2.9902	20,975,655	1,250,000	911,524	1.0000	911,524	14,885,934	10,855,106	36,327,538
2064	5,927,107	2,964,152	2,962,954	2,160,643	5.1168	11,055,576	8,043,200	1,606,902	6,436,298	4,693,471	3.0673	14,396,282	1,250,000	911,524	1.0000	911,524	10,649,252	7,765,637	26,363,383
2065	4,961,629	2,964,152	1,997,476	1,456,598	5.3103	7,734,971	5,169,957	1,606,902	3,563,055	2,598,247	3.1465	8,175,386	1,250,000	911,524	1.0000	911,524	6,810,531	4,966,369	16,821,880
2066	3,952,203	2,964,152	988,051	720,506	5.5110	3,970,706	2,141,682	1,606,902	534,779	389,971	3.2276	1,258,671	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	6,140,901
2067	3,952,203	2,964,152	988,051	720,506	5.7193	4,120,788	2,141,682	1,606,902	534,779	389,971	3.3109	1,291,156	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	6,323,467
2068	5,981,882	2,964,152	3,017,730	2,200,586	5.9355	13,061,577	8,207,526	1,606,902	6,600,623	4,813,300	3.3963	16,347,410	1,250,000	911,524	1.0000	911,524	10,868,353	7,925,409	30,320,511
2069	5,466,341	2,964,152	2,502,189	1,824,644	6.1598	11,239,440	6,684,095	1,606,902	5,077,193	3,702,386	3.4840	12,899,111	1,250,000	911,524	1.0000	911,524	8,829,382	6,438,553	25,050,076
2070	3,952,203	2,964,152	988,051	720,506	6.3927	4,605,976	2,141,682	1,606,902	534,779	389,971	3.5738	1,393,679	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	6,911,179
2071	3,952,203	2,964,152	988,051	720,506	6.6343	4,780,050	2,141,682	1,606,902	534,779	389,971	3.6660	1,429,634	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	7,121,208
2072	6,431,819	2,964,152	3,467,667	2,528,689	6.8851	17,410,275	9,557,338	1,606,902	7,950,436	5,797,609	3.7606	21,802,488	1,250,000	911,524	1.0000	911,524	12,668,103	9,237,821	40,124,286
2073	3,952,203	2,964,152	988,051	720,506	7.1454	5,148,301	2,141,682	1,606,902	534,779	389,971	3.8576	1,504,353	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	7,564,177
2074	3,952,203	2,964,152	988,051	720,506	7.4155	5,342,909	2,141,682	1,606,902	534,779	389,971	3.9572	1,543,194	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	7,797,627
2075	6,835,510	2,964,152	3,871,357	2,823,067	7.6958	21,725,761	10,791,600	1,606,902	9,184,698	6,697,656	4.0593	27,187,796	1,250,000	911,524	1.0000	911,524	14,306,055	10,432,247	49,825,080
2076	3,963,031	2,964,152	998,879	728,402	7.9867	5,817,525	2,150,974	1,606,902	544,072	396,747	4.1640	1,652,056	1,250,000	911,524	1.0000	911,524	2,792,951	2,036,673	8,381,104
2077	3,952,203	2,964,152	988,051	720,506	8.2886	5,971,983	2,141,682	1,606,902	534,779	389,971	4.2714	1,665,723	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	8,549,229
2078	6,475,767	2,964,152	3,511,614	2,560,736	8.6019	22,027,194	9,712,371	1,606,902	8,105,469	5,910,662	4.3816	25,898,156	1,250,000	911,524	1.0000	911,524	12,867,083	9,382,921	48,836,873
2079	3,952,203	2,964,152	988,051	720,506	8.9270	6,431,953	2,141,682	1,606,902	534,779	389,971	4.4947	1,752,803	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	9,096,281
2080	3,963,031	2,964,152	998,879	728,402	9.2645	6,748,276	2,150,974	1,606,902	544,072	396,747	4.6106	1,829,243	1,250,000	911,524	1.0000	911,524	2,792,951	2,036,673	9,489,043
2081	3,952,203	2,964,152	988,051	720,506	9.6147	6,927,445	2,141,682	1,606,902	534,779	389,971	4.7296	1,844,408	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	9,683,377
2082	6,366,216	2,964,152	3,402,064	2,480,850	9.9781	24,754,166	9,383,720	1,606,902	7,776,818	5,671,003	4.8516	27,513,440	1,250,000	911,524	1.0000	911,524	12,428,882	9,063,377	53,179,130
2083	3,952,203	2,964,152	988,051	720,506	10.3553	7,461,052	2,141,682	1,606,902	534,779	389,971	4.9768	1,940,809	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	10,313,384
2084	3,963,031	2,964,152	998,879	728,402	10.7467	7,827,913	2,150,974	1,606,902	544,072	396,747	5.1052	2,025,474	1,250,000	911,524	1.0000	911,524	2,792,951	2,036,673	10,764,911
2085	3,952,203	2,964,152	988,051	720,506	11.1529	8,035,727	2,141,682	1,606,902	534,779	389,971	5.2369	2,042,240	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	10,989,491
2086	3,952,203	2,964,152	988,051	720,506	11.5745	8,339,492	2,141,682	1,606,902	534,779	389,971	5.3720	2,094,925	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	11,345,941
2087	3,952,203	2,964,152	988,051	720,506	12.0120	8,654,713	2,141,682	1,606,902	534,779	389,971	5.5106	2,148,975	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	11,715,212
2088	19,159,622	2,964,152	16,195,469	11,810,044	12.4661	147,225,187	51,280,067	1,606,902	49,673,165	36,222,616	5.6528	204,759,202	1,250,000	911,524	1.0000	911,524	67,118,634	48,944,183	352,895,913
2089	3,952,203	2,964,152	988,051	720,506	12.9373	9,321,397	2,141,682	1,606,902	534,779	389,971	5.7986	2,261,287	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	12,494,208
2090	3,952,203	2,964,152	988,051	720,506	13.4263	9,673,724	2,141,682	1,606,902	534,779	389,971	5.9482	2,319,627	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	12,904,875
2091	3,952,203	2,964,152	988,051	720,506	13.9338	10,039,381	2,141,682	1,606,902	534,779	389,971	6.1017	2,379,487	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	13,330,392
2092	3,963,031	2,964,152	998,879	728,402	14.4605	10,533,051	2,150,974	1,606,902	544,072	396,747	6.2591	2,483,281	1,250,000	911,524	1.0000	911,524	2,792,951	2,036,673	13,927,855
2093	4,055,991	2,964,152	1,091,839	796,189	15.0071	11,948,494	2,453,044	1,606,902	846,142	617,023	6.4206	3,961,656	1,250,000	911,524	1.0000	911,524	3,187,980	2,324,736	16,821,673
2094	4,211,672	2,964,152	1,247,520	909,715	15.5744	14,168,267	2,920,088	1,606,902	1,313,185	957,600	6.5863	6,307,040	1,250,000	911,524	1.0000	911,524	3,810,705	2,778,839	21,386,831
2095	5,730,397	2,964,152	2,766,244	2,017,198	16.1631	32,604,173	7,476,262	1,606,902	5,869,360	4,280,048	6.7562	28,916,864	1,250,000	911,524	1.0000	911,524	9,885,604	7,208,770	62,432,561
2096	5,286,877	2,964,152	2,322,725	1,693,775	16.7741	28,411,550	6,122,511	1,606,902	4,515,608	3,292,867	6.9305	22,821,218	1,250,000	911,524	1.0000	911,524	8,088,333	5,898,166	52,144,291
2097	5,120,368	2,964,152	2,156,215	1,572,353	17.4081	27,371,683	5,646,175	1,606,902	4,039,272	2,945,514	7.1093	20,940,544	1,250,000	911,524	1.0000	911,524	7,445,488	5,429,391	49,223,750
2098	4,315,460	2,964,152	1,351,307	985,399	18.0662	17,802,415	3,231,450	1,606,902	1,624,548	1,184,651	7.2927	8,639,306	1,250,000	911,524	1.0000	911,524	4,225,855	3,081,574	27,353,245
2099	5,120,368	2,964,152	2,156,215	1,572,353	18.7491	29,480,208	5,646,175	1,606,902	4,039,272	2,945,514	7.4809	22,035,097	1,250,000	911,524	1.0000	911,524	7,445,488	5,429,391	52,426,829
2100	5,574,716	2,964,152	2,610,563	1,903,672	19.4578	37,041,275	7,009,218	1,606,902	5,402,316	3,939,471	7.6739	30,231,109	1,250,000	911,524	1.0000	911,524	9,262,879	6,754,667	68,183,908
2101	5,730,397	2,964,152	2,766,244	2,017,198	20.1933	40,733,885	7,476,262	1,606,902	5,869,360	4,280,048	7.8719	33,692,114	1,250,000	911,524	1.0000	911,524	9,885,604	7,208,770	75,337,522

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	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2102	5,730,397	2,964,152	2,766,244	2,017,198	20.9566	42,273,612	7,476,262	1,606,902	5,869,360	4,280,048	8.0750	34,561,392	1,250,000	911,524	1.0000	911,524	9,885,604	7,208,770	77,746,527
2103	4,107,885	2,964,152	1,143,732	834,031	21.7488	18,139,180	2,608,725	1,606,902	1,001,823	730,548	8.2833	6,051,351	1,250,000	911,524	1.0000	911,524	3,395,555	2,476,103	25,102,055
2104	4,170,606	2,964,152	1,206,454	879,769	22.5709	19,857,182	2,773,699	1,606,902	1,166,797	850,850	8.4970	7,229,674	1,250,000	911,524	1.0000	911,524	3,623,251	2,642,143	27,998,380
2105	5,678,503	2,964,152	2,714,351	1,979,356	23.4240	46,364,438	7,320,581	1,606,902	5,713,678	4,166,523	8.7162	36,316,246	1,250,000	911,524	1.0000	911,524	9,678,029	7,057,403	83,592,207
2106	5,120,368	2,964,152	2,156,215	1,572,353	24.3095	38,223,121	5,646,175	1,606,902	4,039,272	2,945,514	8.9411	26,336,136	1,250,000	911,524	1.0000	911,524	7,445,488	5,429,391	65,470,781
2107	5,172,262	2,964,152	2,208,109	1,610,195	25.2284	40,622,647	5,801,856	1,606,902	4,194,954	3,059,040	9.1718	28,056,902	1,250,000	911,524	1.0000	911,524	7,653,063	5,580,759	69,591,073
2108	4,170,606	2,964,152	1,206,454	879,769	26.1820	23,034,117	2,773,699	1,606,902	1,166,797	850,850	9.4084	8,005,139	1,250,000	911,524	1.0000	911,524	3,623,251	2,642,143	31,950,779
2109	5,120,368	2,964,152	2,156,215	1,572,353	27.1717	42,723,511	5,646,175	1,606,902	4,039,272	2,945,514	9.6512	28,427,746	1,250,000	911,524	1.0000	911,524	7,445,488	5,429,391	72,062,781
2110	5,172,262	2,964,152	2,208,109	1,610,195	28.1988	45,405,571	5,801,856	1,606,902	4,194,954	3,059,040	9.9002	30,285,106	1,250,000	911,524	1.0000	911,524	7,653,063	5,580,759	76,602,201
2111	5,172,262	2,964,152	2,208,109	1,610,195	29.2647	47,121,878	5,801,856	1,606,902	4,194,954	3,059,040	10.1556	31,066,385	1,250,000	911,524	1.0000	911,524	7,653,063	5,580,759	79,099,787
2112	4,170,606	2,964,152	1,206,454	879,769	30.3709	26,719,382	2,773,699	1,606,902	1,166,797	850,850	10.4176	8,863,817	1,250,000	911,524	1.0000	911,524	3,623,251	2,642,143	36,494,722
2113	7,197,228	2,964,152	4,233,075	3,086,839	31.5189	97,293,770	11,876,755	1,606,902	10,269,852	7,488,971	10.6864	80,030,144	1,250,000	911,524	1.0000	911,524	15,752,928	11,487,334	178,235,438
2114	6,184,745	2,964,152	3,220,592	2,348,517	32.7103	76,820,698	8,839,305	1,606,902	7,232,403	5,274,006	10.9621	57,814,177	1,250,000	911,524	1.0000	911,524	11,702,995	8,534,046	135,546,399
2115	5,532,005	2,964,152	2,567,852	1,872,527	33.9468	63,566,285	6,881,085	1,606,902	5,274,183	3,846,034	11.2449	43,248,269	1,250,000	911,524	1.0000	911,524	9,092,035	6,630,084	107,726,078
2116	4,170,606	2,964,152	1,206,454	879,769	35.2299	30,994,180	2,773,699	1,606,902	1,166,797	850,850	11.5350	9,814,557	1,250,000	911,524	1.0000	911,524	3,623,251	2,642,143	41,720,261
2117	4,133,787	2,964,152	1,169,635	852,920	36.5616	31,184,114	14,547,923	1,606,902	12,941,020	9,436,838	11.8326	111,662,329	1,250,000	911,524	1.0000	911,524	15,360,655	11,201,282	143,757,967
2118	1,123,816	2,964,152	(1,840,336)	(1,342,008)	37.9437	(50,920,761)	3,040,582	1,606,902	1,433,680	1,045,466	12.1379	12,689,767	0	0	1.0000	0	(406,657)	(296,542)	(38,230,994)
	$751,975,217	$231,203,890	$520,771,327	$379,756,347		$1,893,618,187	$775,973,803	$125,338,388	$650,635,414	$474,455,706		$1,650,179,805	$106,250,000	$77,479,519		$77,479,519	$1,277,656,742	$931,691,572	$3,621,277,511

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	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 2																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2034	$8,345,548	$0	$8,345,548	$6,085,732	1.6811	$10,230,725	$4,974,446	$0	$4,974,446	$3,627,460	1.4285	$5,181,827	$1,250,000	$911,524	1.0000	$911,524	$14,569,994	$10,624,716	$16,324,075
2035	49,894,465	-	49,894,465	36,383,992	1.7446	63,475,512	37,951,789	-	37,951,789	27,675,166	1.4653	40,552,420	1,250,000	911,524	1.0000	911,524	89,096,254	64,970,681	104,939,456
2036	67,674,097	-	67,674,097	49,349,237	1.8106	89,351,729	75,594,885	-	75,594,885	55,125,227	1.5032	82,864,241	1,250,000	911,524	1.0000	911,524	144,518,982	105,385,988	173,127,494
2037	76,073,328	-	76,073,328	55,474,116	1.8790	104,235,864	94,046,676	-	94,046,676	68,580,623	1.5419	105,744,462	1,250,000	911,524	1.0000	911,524	171,370,003	124,966,263	210,891,850
2038	82,785,291	-	82,785,291	60,368,607	1.9501	117,724,821	103,456,871	-	103,456,871	75,442,716	1.5817	119,327,744	1,250,000	911,524	1.0000	911,524	187,492,162	136,722,847	237,964,089
2039	39,073,080	-	39,073,080	28,492,832	2.0238	57,663,794	15,617,110	-	15,617,110	11,388,294	1.6225	18,477,506	1,250,000	911,524	1.0000	911,524	55,940,190	40,792,649	77,052,824
2040	24,879,886	-	24,879,886	18,142,885	2.1003	38,105,502	14,363,504	-	14,363,504	10,474,140	1.6644	17,433,158	1,250,000	911,524	1.0000	911,524	40,493,389	29,528,549	56,450,184
2041	18,384,389	-	18,384,389	13,406,246	2.1797	29,221,594	18,969,870	-	18,969,870	13,833,189	1.7073	23,617,404	1,250,000	911,524	1.0000	911,524	38,604,259	28,150,959	53,750,522
2042	10,753,124	2,972,273	7,780,851	5,673,944	2.2620	12,834,462	10,071,677	1,611,305	8,460,372	6,169,464	1.7514	10,805,200	1,250,000	911,524	1.0000	911,524	17,491,223	12,754,932	24,551,185
2043	3,952,203	2,972,273	979,930	714,584	2.3475	1,677,485	2,141,682	1,611,305	530,377	386,761	1.7966	694,854	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	3,283,863
2044	3,963,031	2,972,273	990,758	722,480	2.4363	1,760,177	2,150,974	1,611,305	539,669	393,537	1.8429	725,249	1,250,000	911,524	1.0000	911,524	2,780,427	2,027,540	3,396,950
2045	5,466,341	2,972,273	2,494,068	1,818,722	2.5284	4,598,456	6,684,095	1,611,305	5,072,791	3,699,175	1.8905	6,993,291	1,250,000	911,524	1.0000	911,524	8,816,859	6,429,421	12,503,271
2046	4,961,629	2,972,273	1,989,355	1,450,676	2.6239	3,806,428	5,169,957	1,611,305	3,558,653	2,595,037	1.9392	5,032,296	1,250,000	911,524	1.0000	911,524	6,798,008	4,957,237	9,750,248
2047	4,961,629	2,972,273	1,989,355	1,450,676	2.7231	3,950,335	5,169,957	1,611,305	3,558,653	2,595,037	1.9893	5,162,307	1,250,000	911,524	1.0000	911,524	6,798,008	4,957,237	10,024,166
2048	3,963,031	2,972,273	990,758	722,480	2.8261	2,041,800	2,150,974	1,611,305	539,669	393,537	2.0406	803,051	1,250,000	911,524	1.0000	911,524	2,780,427	2,027,540	3,756,375
2049	4,961,629	2,972,273	1,989,355	1,450,676	2.9329	4,254,687	5,169,957	1,611,305	3,558,653	2,595,037	2.0932	5,431,932	1,250,000	911,524	1.0000	911,524	6,798,008	4,957,237	10,598,142
2050	5,466,341	2,972,273	2,494,068	1,818,722	3.0438	5,535,825	6,684,095	1,611,305	5,072,791	3,699,175	2.1472	7,942,869	1,250,000	911,524	1.0000	911,524	8,816,859	6,429,421	14,390,218
2051	5,411,566	2,972,273	2,439,293	1,778,779	3.1588	5,618,806	6,519,770	1,611,305	4,908,465	3,579,346	2.2026	7,883,868	1,250,000	911,524	1.0000	911,524	8,597,758	6,269,648	14,414,197
2052	5,477,169	2,972,273	2,504,896	1,826,618	3.2782	5,988,018	6,693,388	1,611,305	5,082,083	3,705,951	2.2595	8,373,597	1,250,000	911,524	1.0000	911,524	8,836,979	6,444,093	15,273,139
2053	3,952,203	2,972,273	979,930	714,584	3.4021	2,431,085	2,141,682	1,611,305	530,377	386,761	2.3178	896,434	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	4,239,043
2054	3,952,203	2,972,273	979,930	714,584	3.5307	2,522,980	2,141,682	1,611,305	530,377	386,761	2.3776	919,563	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	4,354,067
2055	5,466,341	2,972,273	2,494,068	1,818,722	3.6642	6,664,160	6,684,095	1,611,305	5,072,791	3,699,175	2.4389	9,021,919	1,250,000	911,524	1.0000	911,524	8,816,859	6,429,421	16,597,603
2056	4,972,457	2,972,273	2,000,183	1,458,572	3.8027	5,546,511	5,179,250	1,611,305	3,567,945	2,601,813	2.5018	6,509,216	1,250,000	911,524	1.0000	911,524	6,818,128	4,971,909	12,967,251
2057	4,961,629	2,972,273	1,989,355	1,450,676	3.9464	5,724,947	5,169,957	1,611,305	3,558,653	2,595,037	2.5664	6,659,903	1,250,000	911,524	1.0000	911,524	6,798,008	4,957,237	13,296,374
2058	3,952,203	2,972,273	979,930	714,584	4.0956	2,926,649	2,141,682	1,611,305	530,377	386,761	2.6326	1,018,187	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	4,856,359
2059	4,906,854	2,972,273	1,934,580	1,410,733	4.2504	5,996,178	5,005,632	1,611,305	3,394,327	2,475,208	2.7005	6,684,299	1,250,000	911,524	1.0000	911,524	6,578,907	4,797,464	13,592,001
2060	4,972,457	2,972,273	2,000,183	1,458,572	4.4111	6,433,906	5,179,250	1,611,305	3,567,945	2,601,813	2.7702	7,207,543	1,250,000	911,524	1.0000	911,524	6,818,128	4,971,909	14,552,972
2061	4,961,629	2,972,273	1,989,355	1,450,676	4.5778	6,640,903	5,169,957	1,611,305	3,558,653	2,595,037	2.8416	7,374,057	1,250,000	911,524	1.0000	911,524	6,798,008	4,957,237	14,926,485
2062	3,952,203	2,972,273	979,930	714,584	4.7509	3,394,915	2,141,682	1,611,305	530,377	386,761	2.9150	1,127,408	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	5,433,847
2063	6,980,479	2,972,273	4,008,206	2,922,860	4.9305	14,411,161	11,226,509	1,611,305	9,615,204	7,011,590	2.9902	20,966,055	1,250,000	911,524	1.0000	911,524	14,873,410	10,845,973	36,288,740
2064	5,927,107	2,972,273	2,954,833	2,154,721	5.1168	11,025,275	8,043,200	1,611,305	6,431,895	4,690,260	3.0673	14,386,435	1,250,000	911,524	1.0000	911,524	10,636,729	7,756,505	26,323,234
2065	4,961,629	2,972,273	1,989,355	1,450,676	5.3103	7,703,523	5,169,957	1,611,305	3,558,653	2,595,037	3.1465	8,165,284	1,250,000	911,524	1.0000	911,524	6,798,008	4,957,237	16,780,331
2066	3,952,203	2,972,273	979,930	714,584	5.5110	3,938,070	2,141,682	1,611,305	530,377	386,761	3.2276	1,248,309	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	6,097,903
2067	3,952,203	2,972,273	979,930	714,584	5.7193	4,086,918	2,141,682	1,611,305	530,377	386,761	3.3109	1,280,526	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	6,278,968
2068	5,981,882	2,972,273	3,009,609	2,194,664	5.9355	13,026,427	8,207,526	1,611,305	6,596,221	4,810,089	3.3963	16,336,507	1,250,000	911,524	1.0000	911,524	10,855,829	7,916,277	30,274,458
2069	5,466,341	2,972,273	2,494,068	1,818,722	6.1598	11,202,962	6,684,095	1,611,305	5,072,791	3,699,175	3.4840	12,887,927	1,250,000	911,524	1.0000	911,524	8,816,859	6,429,421	25,002,413
2070	3,952,203	2,972,273	979,930	714,584	6.3927	4,568,119	2,141,682	1,611,305	530,377	386,761	3.5738	1,382,206	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	6,861,848
2071	3,952,203	2,972,273	979,930	714,584	6.6343	4,740,762	2,141,682	1,611,305	530,377	386,761	3.6660	1,417,865	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	7,070,151
2072	6,431,819	2,972,273	3,459,546	2,522,767	6.8851	17,369,501	9,557,338	1,611,305	7,946,033	5,794,398	3.7606	21,790,415	1,250,000	911,524	1.0000	911,524	12,655,579	9,228,689	40,071,440
2073	3,952,203	2,972,273	979,930	714,584	7.1454	5,105,986	2,141,682	1,611,305	530,377	386,761	3.8576	1,491,969	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	7,509,478
2074	3,952,203	2,972,273	979,930	714,584	7.4155	5,298,995	2,141,682	1,611,305	530,377	386,761	3.9572	1,530,490	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	7,741,009
2075	6,835,510	2,972,273	3,863,236	2,817,145	7.6958	21,680,187	10,791,600	1,611,305	9,180,295	6,694,446	4.0593	27,174,764	1,250,000	911,524	1.0000	911,524	14,293,532	10,423,115	49,766,474
2076	3,963,031	2,972,273	990,758	722,480	7.9867	5,770,228	2,150,974	1,611,305	539,669	393,537	4.1640	1,638,688	1,250,000	911,524	1.0000	911,524	2,780,427	2,027,540	8,320,439
2077	3,952,203	2,972,273	979,930	714,584	8.2886	5,922,898	2,141,682	1,611,305	530,377	386,761	4.2714	1,652,010	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	8,486,432
2078	6,475,767	2,972,273	3,503,493	2,554,814	8.6019	21,976,253	9,712,371	1,611,305	8,101,066	5,907,452	4.3816	25,884,090	1,250,000	911,524	1.0000	911,524	12,854,560	9,373,789	48,771,867
2079	3,952,203	2,972,273	979,930	714,584	8.9270	6,379,088	2,141,682	1,611,305	530,377	386,761	4.4947	1,738,374	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	9,028,986
2080	3,963,031	2,972,273	990,758	722,480	9.2645	6,693,412	2,150,974	1,611,305	539,669	393,537	4.6106	1,814,441	1,250,000	911,524	1.0000	911,524	2,780,427	2,027,540	9,419,377
2081	3,952,203	2,972,273	979,930	714,584	9.6147	6,870,507	2,141,682	1,611,305	530,377	386,761	4.7296	1,829,224	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	9,611,255
2082	6,366,216	2,972,273	3,393,943	2,474,928	9.9781	24,695,076	9,383,720	1,611,305	7,772,416	5,667,793	4.8516	27,497,865	1,250,000	911,524	1.0000	911,524	12,416,359	9,054,245	53,104,465
2083	3,952,203	2,972,273	979,930	714,584	10.3553	7,399,728	2,141,682	1,611,305	530,377	386,761	4.9768	1,924,831	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	10,236,083
2084	3,963,031	2,972,273	990,758	722,480	10.7467	7,764,271	2,150,974	1,611,305	539,669	393,537	5.1052	2,009,085	1,250,000	911,524	1.0000	911,524	2,780,427	2,027,540	10,684,880
2085	3,952,203	2,972,273	979,930	714,584	11.1529	7,969,680	2,141,682	1,611,305	530,377	386,761	5.2369	2,025,428	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	10,906,631
2086	3,952,203	2,972,273	979,930	714,584	11.5745	8,270,948	2,141,682	1,611,305	530,377	386,761	5.3720	2,077,679	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	11,260,151
2087	3,952,203	2,972,273	979,930	714,584	12.0120	8,583,579	2,141,682	1,611,305	530,377	386,761	5.5106	2,131,284	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	11,626,386
2088	19,159,622	2,972,273	16,187,348	11,804,122	12.4661	147,151,363	51,280,067	1,611,305	49,668,763	36,219,405	5.6528	204,741,054	1,250,000	911,524	1.0000	911,524	67,106,111	48,935,051	352,803,942
2089	3,952,203	2,972,273	979,930	714,584	12.9373	9,244,783	2,141,682	1,611,305	530,377	386,761	5.7986	2,242,671	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	12,398,978
2090	3,952,203	2,972,273	979,930	714,584	13.4263	9,594,214	2,141,682	1,611,305	530,377	386,761	5.9482	2,300,531	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	12,806,269
2091	3,952,203	2,972,273	979,930	714,584	13.9338	9,956,865	2,141,682	1,611,305	530,377	386,761	6.1017	2,359,898	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	13,228,288
2092	3,963,031	2,972,273	990,758	722,480	14.4605	10,447,416	2,150,974	1,611,305	539,669	393,537	6.2591	2,463,187	1,250,000	911,524	1.0000	911,524	2,780,427	2,027,540	13,822,127
2093	4,055,991	2,972,273	1,083,718	790,267	15.0071	11,859,623	2,453,044	1,611,305	841,739	613,812	6.4206	3,941,043	1,250,000	911,524	1.0000	911,524	3,175,457	2,315,603	16,712,189
2094	4,211,672	2,972,273	1,239,399	903,793	15.5744	14,076,036	2,920,088	1,611,305	1,308,783	954,389	6.5863	6,285,895	1,250,000	911,524	1.0000	911,524	3,798,182	2,769,706	21,273,455
2095	5,730,397	2,972,273	2,758,124	2,011,276	16.1631	32,508,456	7,476,262	1,611,305	5,864,957	4,276,838	6.7562	28,895,174	1,250,000	911,524	1.0000	911,524	9,873,081	7,199,638	62,315,154
2096	5,286,877	2,972,273	2,314,604	1,687,853	16.7741	28,312,214	6,122,511	1,611,305	4,511,206	3,289,657	6.9305	22,798,968	1,250,000	911,524	1.0000	911,524	8,075,810	5,889,034	52,022,706
2097	5,120,368	2,972,273	2,148,094	1,566,431	17.4081	27,268,592	5,646,175	1,611,305	4,034,870	2,942,304	7.1093	20,917,720	1,250,000	911,524	1.0000	911,524	7,432,964	5,420,259	49,097,836
2098	4,315,460	2,972,273	1,343,186	979,477	18.0662	17,695,427	3,231,450	1,611,305	1,620,146	1,181,441	7.2927	8,615,894	1,250,000	911,524	1.0000	911,524	4,213,332	3,072,442	27,222,845
2099	5,120,368	2,972,273	2,148,094	1,566,431	18.7491	29,369,177	5,646,175	1,611,305	4,034,870	2,942,304	7.4809	22,011,080	1,250,000	911,524	1.0000	911,524	7,432,964	5,420,259	52,291,781
2100	5,574,716	2,972,273	2,602,442	1,897,750	19.4578	36,926,047	7,009,218	1,611,305	5,397,913	3,936,261	7.6739	30,206,473	1,250,000	911,524	1.0000	911,524	9,250,356	6,745,535	68,044,043
2101	5,730,397	2,972,273	2,758,124	2,011,276	20.1933	40,614,301	7,476,262	1,611,305	5,864,957	4,276,838	7.8719	33,666,842	1,250,000	911,524	1.0000	911,524	9,873,081	7,199,638	75,192,667
2102	5,730,397	2,972,273	2,758,124	2,011,276	20.9566	42,149,508	7,476,262	1,611,305	5,864,957	4,276,838	8.0750	34,535,468	1,250,000	911,524	1.0000	911,524	9,873,081	7,199,638	77,596,500
2103	4,107,885	2,972,273	1,135,611	828,109	21.7488	18,010,385	2,608,725	1,611,305	997,421	727,338	8.2833	6,024,759	1,250,000	911,524	1.0000	911,524	3,383,032	2,466,971	24,946,667

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	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2104	4,170,606	2,972,273	1,198,333	873,847	22.5709	19,723,518	2,773,699	1,611,305	1,162,394	847,640	8.4970	7,202,396	1,250,000	911,524	1.0000	911,524	3,610,727	2,633,011	27,837,437
2105	5,678,503	2,972,273	2,706,230	1,973,434	23.4240	46,225,722	7,320,581	1,611,305	5,709,276	4,163,312	8.7162	36,288,263	1,250,000	911,524	1.0000	911,524	9,665,506	7,048,270	83,425,509
2106	5,120,368	2,972,273	2,148,094	1,566,431	24.3095	38,079,161	5,646,175	1,611,305	4,034,870	2,942,304	8.9411	26,307,432	1,250,000	911,524	1.0000	911,524	7,432,964	5,420,259	65,298,117
2107	5,172,262	2,972,273	2,199,988	1,604,273	25.2284	40,473,246	5,801,856	1,611,305	4,190,551	3,055,829	9.1718	28,027,457	1,250,000	911,524	1.0000	911,524	7,640,539	5,571,626	69,412,227
2108	4,170,606	2,972,273	1,198,333	873,847	26.1820	22,879,068	2,773,699	1,611,305	1,162,394	847,640	9.4084	7,974,934	1,250,000	911,524	1.0000	911,524	3,610,727	2,633,011	31,765,526
2109	5,120,368	2,972,273	2,148,094	1,566,431	27.1717	42,562,601	5,646,175	1,611,305	4,034,870	2,942,304	9.6512	28,396,762	1,250,000	911,524	1.0000	911,524	7,432,964	5,420,259	71,870,887
2110	5,172,262	2,972,273	2,199,988	1,604,273	28.1988	45,238,579	5,801,856	1,611,305	4,190,551	3,055,829	9.9002	30,253,323	1,250,000	911,524	1.0000	911,524	7,640,539	5,571,626	76,403,426
2111	5,172,262	2,972,273	2,199,988	1,604,273	29.2647	46,948,574	5,801,856	1,611,305	4,190,551	3,055,829	10.1556	31,033,782	1,250,000	911,524	1.0000	911,524	7,640,539	5,571,626	78,893,880
2112	4,170,606	2,972,273	1,198,333	873,847	30.3709	26,539,526	2,773,699	1,611,305	1,162,394	847,640	10.4176	8,830,373	1,250,000	911,524	1.0000	911,524	3,610,727	2,633,011	36,281,423
2113	7,197,228	2,972,273	4,224,954	3,080,917	31.5189	97,107,116	11,876,755	1,611,305	10,265,450	7,485,761	10.6864	79,995,837	1,250,000	911,524	1.0000	911,524	15,740,404	11,478,202	178,014,477
2114	6,184,745	2,972,273	3,212,471	2,342,595	32.7103	76,626,989	8,839,305	1,611,305	7,228,000	5,270,795	10.9621	57,778,985	1,250,000	911,524	1.0000	911,524	11,690,472	8,524,914	135,317,498
2115	5,532,005	2,972,273	2,559,731	1,866,605	33.9468	63,365,253	6,881,085	1,611,305	5,269,780	3,842,824	11.2449	43,212,169	1,250,000	911,524	1.0000	911,524	9,079,511	6,620,952	107,488,946
2116	4,170,606	2,972,273	1,198,333	873,847	35.2299	30,785,550	2,773,699	1,611,305	1,162,394	847,640	11.5350	9,777,525	1,250,000	911,524	1.0000	911,524	3,610,727	2,633,011	41,474,599
2117	4,133,787	2,972,273	1,161,514	846,998	36.5616	30,967,597	14,547,923	1,611,305	12,936,618	9,433,628	11.8326	111,624,342	1,250,000	911,524	1.0000	911,524	15,348,132	11,192,149	143,503,463
2118	1,123,816	2,972,273	(1,848,457)	(1,347,930)	37.9437	(51,145,463)	3,040,582	1,611,305	1,429,277	1,042,256	12.1379	12,650,800	-	-	1.0000	-	(419,180)	(305,674)	(38,494,662)
	$753,446,268	$228,865,051	$524,581,217	$382,534,590		$1,914,373,255	$787,828,851	$124,070,476	$663,758,374	$484,025,218		$1,674,108,595	$105,000,000	$76,567,995		$76,567,995	$1,293,339,591	$943,127,803	$3,665,049,845
	$2,892,054,693	$1,005,973,967	$1,886,080,726	$1,375,365,901		$8,036,192,189	$2,823,040,722	$422,241,234	$2,400,799,489	$1,750,708,602		$6,205,760,106	$211,250,000	$154,047,514		$154,047,514	$4,498,130,215	$3,280,122,017	$14,395,999,809

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EXTERNAL FUND CALCULATION

Monticello

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$757,935,327	$14,616,641	$0	$6,696,113	$779,248,081
2021	779,248,081	30,086,463	-	8,507,110	817,841,653
2022	817,841,653	32,438,551	-	53,824,542	904,104,746
2023	904,104,746	35,751,053	-	53,824,542	993,680,342
2024	993,680,342	39,190,756	-	53,824,542	1,086,695,640
2025	1,086,695,640	42,762,544	-	53,824,542	1,183,282,726
2026	1,183,282,726	46,471,488	-	53,824,542	1,283,578,756
2027	1,283,578,756	50,322,855	-	53,824,542	1,387,726,154
2028	1,387,726,154	54,322,116	-	53,824,542	1,495,872,812
2029	1,495,872,812	58,474,947	-	53,824,542	1,608,172,301
2030	1,608,172,301	59,597,848	(32,782,380)	40,368,407	1,675,356,176
2031	1,675,356,176	61,318,036	(131,799,357)	-	1,604,874,855
2032	1,604,874,855	58,738,420	(234,583,304)	-	1,429,029,971
2033	1,429,029,971	52,302,497	(273,318,965)	-	1,208,013,503
2034	1,208,013,503	44,213,294	(255,961,587)	-	996,265,210
2035	996,265,210	36,463,307	(91,595,735)	-	941,132,782
2036	941,132,782	34,445,460	(69,812,556)	-	905,765,685
2037	905,765,685	33,151,024	(66,779,784)	-	872,136,926
2038	872,136,926	31,920,211	(3,547,641)	-	900,509,496
2039	900,509,496	32,958,648	(3,672,488)	-	929,795,655
2040	929,795,655	34,030,521	(3,842,504)	-	959,983,672
2041	959,983,672	35,135,402	(3,935,849)	-	991,183,226
2042	991,183,226	36,277,306	(4,074,554)	-	1,023,385,977
2043	1,023,385,977	37,455,927	(4,218,354)	-	1,056,623,550
2044	1,056,623,550	38,672,422	(4,414,106)	-	1,090,881,867
2045	1,090,881,867	39,926,276	(4,521,759)	-	1,126,286,384
2046	1,126,286,384	41,222,082	(4,681,508)	-	1,162,826,957
2047	1,162,826,957	42,559,467	(4,847,210)	-	1,200,539,214
2048	1,200,539,214	43,939,735	(9,767,254)	-	1,234,711,696
2049	1,234,711,696	45,190,448	(5,196,654)	-	1,274,705,489
2050	1,274,705,489	46,654,221	(16,578,355)	-	1,304,781,355
2051	1,304,781,355	47,754,998	(17,101,100)	-	1,335,435,253
2052	1,335,435,253	48,876,930	(17,703,130)	-	1,366,609,053
2053	1,366,609,053	50,017,891	(18,198,961)	-	1,398,427,983
2054	1,398,427,983	51,182,464	(18,774,859)	-	1,430,835,588
2055	1,430,835,588	52,368,583	(19,369,565)	-	1,463,834,606
2056	1,463,834,606	53,576,347	(20,054,823)	-	1,497,356,129
2057	1,497,356,129	54,803,234	(20,618,313)	-	1,531,541,050
2058	1,531,541,050	56,054,402	(84,137,175)	-	1,503,458,278
2059	1,503,458,278	55,026,573	(21,950,439)	-	1,536,534,412
2060	1,536,534,412	56,237,159	(22,731,650)	-	1,570,039,922

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EXTERNAL FUND CALCULATION

External Levelized	2061	1,570,039,922	57,463,461	(23,371,722)	-	1,604,131,661
	2062	1,604,131,661	58,711,219	(24,118,333)	-	1,638,724,547
	2063	1,638,724,547	59,977,318	(61,320,500)	-	1,637,381,366
	2064	1,637,381,366	59,928,158	(25,779,211)	-	1,671,530,313
	2065	1,671,530,313	61,178,009	(26,508,149)	-	1,706,200,173
	2066	1,706,200,173	62,446,926	(35,321,523)	-	1,733,325,576
	2067	1,733,325,576	63,439,716	(28,235,870)	-	1,768,529,423
	2068	1,768,529,423	64,728,177	(147,574,227)	-	1,685,683,372
	2069	1,685,683,372	61,696,011	(30,080,698)	-	1,717,298,686
	2070	1,717,298,686	62,853,132	(31,049,158)	-	1,749,102,660
	2071	1,749,102,660	64,017,157	(32,049,952)	-	1,781,069,865
	2072	1,781,069,865	65,187,157	(33,209,313)	-	1,813,047,710
	2073	1,813,047,710	66,357,546	(34,153,225)	-	1,845,252,031
	2074	1,845,252,031	67,536,224	(35,258,074)	-	1,877,530,181
	2075	1,877,530,181	68,717,605	(36,399,566)	-	1,909,848,219
	2076	1,909,848,219	69,900,445	(37,723,097)	-	1,942,025,567
	2077	1,942,025,567	71,078,136	(38,798,260)	-	1,974,305,443
	2078	1,974,305,443	72,259,579	(40,058,351)	-	2,006,506,671
	2079	2,006,506,671	73,438,144	(41,360,864)	-	2,038,583,951
	2080	2,038,583,951	74,612,173	(42,872,866)	-	2,070,323,258
	2081	2,070,323,258	75,773,831	(44,098,631)	-	2,101,998,458
	2082	2,101,998,458	76,933,144	(45,536,773)	-	2,133,394,829
	2083	2,133,394,829	78,082,251	(47,023,757)	-	2,164,453,323
	2084	2,164,453,323	79,218,992	(526,872,139)	-	1,716,800,175
	2085	1,716,800,175	62,834,886	(50,149,342)	-	1,729,485,719
	2086	1,729,485,719	63,299,177	(51,791,875)	-	1,740,993,022
	2087	1,740,993,022	63,720,345	(53,489,929)	-	1,751,223,438
	2088	1,751,223,438	64,094,778	(70,904,210)	-	1,744,414,005
	2089	1,744,414,005	63,845,553	(57,060,581)	-	1,751,198,976
	2090	1,751,198,976	64,093,883	(58,937,112)	-	1,756,355,747
	2091	1,756,355,747	64,282,620	(60,877,548)	-	1,759,760,820
	2092	1,759,760,820	64,407,246	(80,586,749)	-	1,743,581,317
	2093	1,743,581,317	63,815,076	(96,440,676)	-	1,710,955,717
	2094	1,710,955,717	62,620,979	(71,740,792)	-	1,701,835,904
	2095	1,701,835,904	62,287,194	(98,009,685)	-	1,666,113,413
	2096	1,666,113,413	60,979,751	(111,350,181)	-	1,615,742,983
	2097	1,615,742,983	59,136,193	(27,751,814)	-	1,647,127,362
	2098	1,647,127,362	60,284,861	(28,762,797)	-	1,678,649,426
	2099	1,678,649,426	61,438,569	(29,810,935)	-	1,710,277,061
	2100	1,710,277,061	62,596,140	(30,897,639)	-	1,741,975,562
	2101	1,741,975,562	63,756,306	(32,024,410)	-	1,773,707,458
	2102	1,773,707,458	64,917,693	(33,192,705)	-	1,805,432,446
	2103	1,805,432,446	66,078,828	(34,404,120)	-	1,837,107,153
	2104	1,837,107,153	67,238,122	(36,050,950)	-	1,868,294,325
	2105	1,868,294,325	68,379,572	(36,962,416)	-	1,899,711,481
	2106	1,899,711,481	69,529,440	(38,312,958)	-	1,930,927,963
	2107	1,930,927,963	70,671,963	(39,713,243)	-	1,961,886,684

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2108	1,961,886,684	71,805,053	(326,792,114)	-	1,706,899,623
2109	1,706,899,623	62,472,526	(42,670,787)	-	1,726,701,362
2110	1,726,701,362	63,197,270	(44,231,992)	-	1,745,666,640
2111	1,745,666,640	63,891,399	(45,850,830)	-	1,763,707,209
2112	1,763,707,209	64,551,684	(48,050,373)	-	1,780,208,519
2113	1,780,208,519	65,155,632	(215,892,833)	-	1,629,471,318
2114	1,629,471,318	59,638,650	(51,075,306)	-	1,638,034,663
2115	1,638,034,663	59,952,069	(52,947,219)	-	1,645,039,512
2116	1,645,039,512	60,208,446	(92,093,714)	-	1,613,154,244
2117	1,613,154,244	59,041,445	(56,901,096)	-	1,615,294,593
2118	1,615,294,593	59,119,782	(632,769,867)	-	1,041,644,509
2119	1,041,644,509	38,124,189	(95,997,049)	-	983,771,649
2120	983,771,649	36,006,042	(94,057,240)	-	925,720,451
2121	925,720,451	33,881,369	(96,649,123)	-	862,952,696
2122	862,952,696	31,584,069	(100,053,741)	-	794,483,024
2123	794,483,024	29,078,079	(110,167,983)	-	713,393,120
2124	713,393,120	26,110,188	(108,036,786)	-	631,466,522
2125	631,466,522	23,111,675	(111,019,149)	-	543,559,048
2126	543,559,048	19,894,261	(114,940,197)	-	448,513,112
2127	448,513,112	16,415,580	(126,478,498)	-	338,450,194
2128	338,450,194	12,387,277	(177,636,481)	-	173,200,990
2129	173,200,990	6,339,156	(127,570,921)	-	51,969,225
2130	51,969,225	1,902,074	(180,947,524)	-	(127,076,225)
2131	(127,076,225)	(4,650,990)	131,727,214	-	(0)

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Prairie Island Unit 1

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$437,068,622	$8,785,327	$0	$24,632	$445,878,581
2021	445,878,581	18,173,553	-	12,399,703	476,451,837
2022	476,451,837	19,746,601	-	29,514,299	525,712,738
2023	525,712,738	21,726,889	-	29,514,299	576,953,926
2024	576,953,926	23,786,785	-	29,514,299	630,255,011
2025	630,255,011	25,929,489	-	29,514,299	685,698,799
2026	685,698,799	28,158,329	-	29,514,299	743,371,428
2027	743,371,428	30,476,769	-	29,514,299	803,362,496
2028	803,362,496	32,888,410	-	29,514,299	865,765,205
2029	865,765,205	35,396,999	-	29,514,299	930,676,503
2030	930,676,503	38,006,433	-	29,514,299	998,197,235
2031	998,197,235	40,720,766	-	29,514,299	1,068,432,301
2032	1,068,432,301	43,544,216	-	29,514,299	1,141,490,816
2033	1,141,490,816	40,989,061	(39,900,645)	19,774,581	1,162,353,812
2034	1,162,353,812	41,379,796	(122,923,789)	-	1,080,809,819
2035	1,080,809,819	38,476,830	(171,342,706)	-	947,943,943
2036	947,943,943	33,746,804	(175,316,670)	-	806,374,077
2037	806,374,077	28,706,917	(141,970,869)	-	693,110,124
2038	693,110,124	24,674,720	(89,804,897)	-	627,979,948
2039	627,979,948	22,356,086	(67,496,013)	-	582,840,021
2040	582,840,021	20,749,105	(44,142,529)	-	559,446,597
2041	559,446,597	19,916,299	(33,333,602)	-	546,029,294
2042	546,029,294	19,438,643	(17,920,460)	-	547,547,477
2043	547,547,477	19,492,690	(3,303,533)	-	563,736,634
2044	563,736,634	20,069,024	(3,417,294)	-	580,388,364
2045	580,388,364	20,661,826	(12,524,313)	-	588,525,877
2046	588,525,877	20,951,521	(9,772,012)	-	599,705,386
2047	599,705,386	21,349,512	(10,046,679)	-	611,008,219
2048	611,008,219	21,751,893	(3,779,662)	-	628,980,450
2049	628,980,450	22,391,704	(10,622,231)	-	640,749,923
2050	640,749,923	22,810,697	(14,415,137)	-	649,145,484
2051	649,145,484	23,109,579	(14,439,975)	-	657,815,088
2052	657,815,088	23,418,217	(15,299,806)	-	665,933,499
2053	665,933,499	23,707,233	(4,266,631)	-	685,374,101
2054	685,374,101	24,399,318	(4,382,608)	-	705,390,810
2055	705,390,810	25,111,913	(16,627,132)	-	713,875,592
2056	713,875,592	25,413,971	(12,997,802)	-	726,291,761
2057	726,291,761	25,855,987	(13,327,983)	-	738,819,765
2058	738,819,765	26,301,984	(4,889,065)	-	760,232,684
2059	760,232,684	27,064,284	(13,625,841)	-	773,671,126
2060	773,671,126	27,542,692	(14,587,988)	-	786,625,830

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External Levelized	2061	786,625,830	28,003,880	(14,962,717)	-	799,666,993
	2062	799,666,993	28,468,145	(5,471,340)	-	822,663,798
	2063	822,663,798	29,286,831	(36,327,538)	-	815,623,092
	2064	815,623,092	29,036,182	(26,363,383)	-	818,295,891
	2065	818,295,891	29,131,334	(16,821,880)	-	830,605,345
	2066	830,605,345	29,569,550	(6,140,901)	-	854,033,994
	2067	854,033,994	30,403,610	(6,323,467)	-	878,114,137
	2068	878,114,137	31,260,863	(30,320,511)	-	879,054,490
	2069	879,054,490	31,294,340	(25,050,076)	-	885,298,754
	2070	885,298,754	31,516,636	(6,911,179)	-	909,904,211
	2071	909,904,211	32,392,590	(7,121,208)	-	935,175,592
	2072	935,175,592	33,292,251	(40,124,286)	-	928,343,557
	2073	928,343,557	33,049,031	(7,564,177)	-	953,828,411
	2074	953,828,411	33,956,291	(7,797,627)	-	979,987,075
	2075	979,987,075	34,887,540	(49,825,080)	-	965,049,535
	2076	965,049,535	34,355,763	(8,381,104)	-	991,024,194
	2077	991,024,194	35,280,461	(8,549,229)	-	1,017,755,426
	2078	1,017,755,426	36,232,093	(48,836,873)	-	1,005,150,646
	2079	1,005,150,646	35,783,363	(9,096,281)	-	1,031,837,728
	2080	1,031,837,728	36,733,423	(9,489,043)	-	1,059,082,108
	2081	1,059,082,108	37,703,323	(9,683,377)	-	1,087,102,055
	2082	1,087,102,055	38,700,833	(53,179,130)	-	1,072,623,758
	2083	1,072,623,758	38,185,406	(10,313,384)	-	1,100,495,780
	2084	1,100,495,780	39,177,650	(10,764,911)	-	1,128,908,519
	2085	1,128,908,519	40,189,143	(10,989,491)	-	1,158,108,171
	2086	1,158,108,171	41,228,651	(11,345,941)	-	1,187,990,881
	2087	1,187,990,881	42,292,475	(11,715,212)	-	1,218,568,144
	2088	1,218,568,144	43,381,026	(352,895,913)	-	909,053,257
	2089	909,053,257	32,362,296	(12,494,208)	-	928,921,346
	2090	928,921,346	33,069,600	(12,904,875)	-	949,086,071
	2091	949,086,071	33,787,464	(13,330,392)	-	969,543,143
	2092	969,543,143	34,515,736	(13,927,855)	-	990,131,024
	2093	990,131,024	35,248,664	(16,821,673)	-	1,008,558,015
	2094	1,008,558,015	35,904,665	(21,386,831)	-	1,023,075,850
	2095	1,023,075,850	36,421,500	(62,432,561)	-	997,064,789
	2096	997,064,789	35,495,506	(52,144,291)	-	980,416,004
	2097	980,416,004	34,902,810	(49,223,750)	-	966,095,064
	2098	966,095,064	34,392,984	(27,353,245)	-	973,134,804
	2099	973,134,804	34,643,599	(52,426,829)	-	955,351,574
	2100	955,351,574	34,010,516	(68,183,908)	-	921,178,183
	2101	921,178,183	32,793,943	(75,337,522)	-	878,634,604
	2102	878,634,604	31,279,392	(77,746,527)	-	832,167,468
	2103	832,167,468	29,625,162	(25,102,055)	-	836,690,575
	2104	836,690,575	29,786,184	(27,998,380)	-	838,478,379
	2105	838,478,379	29,849,830	(83,592,207)	-	784,736,002
	2106	784,736,002	27,936,602	(65,470,781)	-	747,201,823
	2107	747,201,823	26,600,385	(69,591,073)	-	704,211,135

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2108	704,211,135	25,069,916	(31,950,779)	-	697,330,272
2109	697,330,272	24,824,958	(72,062,781)	-	650,092,449
2110	650,092,449	23,143,291	(76,602,201)	-	596,633,539
2111	596,633,539	21,240,154	(79,099,787)	-	538,773,905
2112	538,773,905	19,180,351	(36,494,722)	-	521,459,534
2113	521,459,534	18,563,959	(178,235,438)	-	361,788,055
2114	361,788,055	12,879,655	(135,546,399)	-	239,121,311
2115	239,121,311	8,512,719	(107,726,078)	-	139,907,951
2116	139,907,951	4,980,723	(41,720,261)	-	103,168,414
2117	103,168,414	3,672,796	(143,757,967)	-	(36,916,758)
2118	(36,916,758)	(1,314,237)	38,230,994	-	0

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Prairie Island Unit 2

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$487,163,479	$9,721,851	$0	$294,670	$497,180,001
2021	497,180,001	19,967,389	-	6,511,608	523,658,997
2022	523,658,997	21,368,087	-	23,764,067	568,791,151
2023	568,791,151	23,168,860	-	23,764,067	615,724,078
2024	615,724,078	25,041,484	-	23,764,067	664,529,629
2025	664,529,629	26,988,825	-	23,764,067	715,282,522
2026	715,282,522	29,013,866	-	23,764,067	768,060,454
2027	768,060,454	31,119,705	-	23,764,067	822,944,227
2028	822,944,227	33,309,568	-	23,764,067	880,017,861
2029	880,017,861	35,586,806	-	23,764,067	939,368,734
2030	939,368,734	37,954,906	-	23,764,067	1,001,087,707
2031	1,001,087,707	40,417,493	-	23,764,067	1,065,269,267
2032	1,065,269,267	42,978,337	-	23,764,067	1,132,011,670
2033	1,132,011,670	45,641,359	-	23,764,067	1,201,417,096
2034	1,201,417,096	42,879,283	(16,324,075)	19,724,176	1,247,696,480
2035	1,247,696,480	44,168,455	(104,939,456)	-	1,186,925,479
2036	1,186,925,479	42,017,162	(173,127,494)	-	1,055,815,147
2037	1,055,815,147	37,375,856	(210,891,850)	-	882,299,153
2038	882,299,153	31,233,390	(237,964,089)	-	675,568,454
2039	675,568,454	23,915,123	(77,052,824)	-	622,430,754
2040	622,430,754	22,034,049	(56,450,184)	-	588,014,619
2041	588,014,619	20,815,717	(53,750,522)	-	555,079,814
2042	555,079,814	19,649,825	(24,551,185)	-	550,178,454
2043	550,178,454	19,476,317	(3,283,863)	-	566,370,908
2044	566,370,908	20,049,530	(3,396,950)	-	583,023,489
2045	583,023,489	20,639,031	(12,503,271)	-	591,159,249
2046	591,159,249	20,927,037	(9,750,248)	-	602,336,039
2047	602,336,039	21,322,696	(10,024,166)	-	613,634,569
2048	613,634,569	21,722,664	(3,756,375)	-	631,600,858
2049	631,600,858	22,358,670	(10,598,142)	-	643,361,386
2050	643,361,386	22,774,993	(14,390,218)	-	651,746,161
2051	651,746,161	23,071,814	(14,414,197)	-	660,403,777
2052	660,403,777	23,378,294	(15,273,139)	-	668,508,932
2053	668,508,932	23,665,216	(4,239,043)	-	687,935,105
2054	687,935,105	24,352,903	(4,354,067)	-	707,933,941
2055	707,933,941	25,060,862	(16,597,603)	-	716,397,200
2056	716,397,200	25,360,461	(12,967,251)	-	728,790,411
2057	728,790,411	25,799,181	(13,296,374)	-	741,293,218
2058	741,293,218	26,241,780	(4,856,359)	-	762,678,639
2059	762,678,639	26,998,824	(13,592,001)	-	776,085,462
2060	776,085,462	27,473,425	(14,552,972)	-	789,005,915

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External Levelized	2061	789,005,915	27,930,809	(14,926,485)	-	802,010,240
	2062	802,010,240	28,391,162	(5,433,847)	-	824,967,555
	2063	824,967,555	29,203,851	(36,288,740)	-	817,882,667
	2064	817,882,667	28,953,046	(26,323,234)	-	820,512,479
	2065	820,512,479	29,046,142	(16,780,331)	-	832,778,290
	2066	832,778,290	29,480,351	(6,097,903)	-	856,160,738
	2067	856,160,738	30,308,090	(6,278,968)	-	880,189,860
	2068	880,189,860	31,158,721	(30,274,458)	-	881,074,123
	2069	881,074,123	31,190,024	(25,002,413)	-	887,261,734
	2070	887,261,734	31,409,065	(6,861,848)	-	911,808,951
	2071	911,808,951	32,278,037	(7,070,151)	-	937,016,837
	2072	937,016,837	33,170,396	(40,071,440)	-	930,115,794
	2073	930,115,794	32,926,099	(7,509,478)	-	955,532,415
	2074	955,532,415	33,825,847	(7,741,009)	-	981,617,253
	2075	981,617,253	34,749,251	(49,766,474)	-	966,600,030
	2076	966,600,030	34,217,641	(8,320,439)	-	992,497,232
	2077	992,497,232	35,134,402	(8,486,432)	-	1,019,145,202
	2078	1,019,145,202	36,077,740	(48,771,867)	-	1,006,451,076
	2079	1,006,451,076	35,628,368	(9,028,986)	-	1,033,050,458
	2080	1,033,050,458	36,569,986	(9,419,377)	-	1,060,201,067
	2081	1,060,201,067	37,531,118	(9,611,255)	-	1,088,120,930
	2082	1,088,120,930	38,519,481	(53,104,465)	-	1,073,535,946
	2083	1,073,535,946	38,003,172	(10,236,083)	-	1,101,303,035
	2084	1,101,303,035	38,986,127	(10,684,880)	-	1,129,604,283
	2085	1,129,604,283	39,987,992	(10,906,631)	-	1,158,685,644
	2086	1,158,685,644	41,017,472	(11,260,151)	-	1,188,442,964
	2087	1,188,442,964	42,070,881	(11,626,386)	-	1,218,887,459
	2088	1,218,887,459	43,148,616	(352,803,942)	-	909,232,133
	2089	909,232,133	32,186,818	(12,398,978)	-	929,019,973
	2090	929,019,973	32,887,307	(12,806,269)	-	949,101,011
	2091	949,101,011	33,598,176	(13,228,288)	-	969,470,899
	2092	969,470,899	34,319,270	(13,822,127)	-	989,968,043
	2093	989,968,043	35,044,869	(16,712,189)	-	1,008,300,722
	2094	1,008,300,722	35,693,846	(21,273,455)	-	1,022,721,112
	2095	1,022,721,112	36,204,327	(62,315,154)	-	996,610,286
	2096	996,610,286	35,280,004	(52,022,706)	-	979,867,584
	2097	979,867,584	34,687,312	(49,097,836)	-	965,457,060
	2098	965,457,060	34,177,180	(27,222,845)	-	972,411,395
	2099	972,411,395	34,423,363	(52,291,781)	-	954,542,977
	2100	954,542,977	33,790,821	(68,044,043)	-	920,289,755
	2101	920,289,755	32,578,257	(75,192,667)	-	877,675,346
	2102	877,675,346	31,069,707	(77,596,500)	-	831,148,554
	2103	831,148,554	29,422,659	(24,946,667)	-	835,624,545
	2104	835,624,545	29,581,109	(27,837,437)	-	837,368,217
	2105	837,368,217	29,642,835	(83,425,509)	-	783,585,543
	2106	783,585,543	27,738,928	(65,298,117)	-	746,026,354
	2107	746,026,354	26,409,333	(69,412,227)	-	703,023,460

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2108	703,023,460	24,887,030	(31,765,526)	-	696,144,965
2109	696,144,965	24,643,532	(71,870,887)	-	648,917,609
2110	648,917,609	22,971,683	(76,403,426)	-	595,485,867
2111	595,485,867	21,080,200	(78,893,880)	-	537,672,187
2112	537,672,187	19,033,595	(36,281,423)	-	520,424,360
2113	520,424,360	18,423,022	(178,014,477)	-	360,832,905
2114	360,832,905	12,773,485	(135,317,498)	-	238,288,892
2115	238,288,892	8,435,427	(107,488,946)	-	139,235,373
2116	139,235,373	4,928,932	(41,474,599)	-	102,689,706
2117	102,689,706	3,635,216	(143,503,463)	-	(37,178,542)
2118	(37,178,542)	(1,316,120)	38,494,662	-	0

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

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Proposed

2022 ACCRUAL COMPARISON

	Present	Proposed	Difference
Monticello	$8,507,110	$98,957,412	$90,450,302
Prairie Island Unit 1	12,399,703	44,412,832	32,013,129
Prairie Island Unit 2	6,511,608	37,671,093	31,159,485
TOTAL	$27,418,421	$181,041,337	$153,622,916

Xcel Energy
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200-Year Decommissioning Period
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Proposed

2022 MN RETAIL SUMMARY

	Remaining Life (yrs)	Operational Earnings Rate	Post-Shutdown Earnings Rate	Market Value Balance 6/30/2020	Book Value 6/30/2020	Unrealized Gain/Loss 6/30/2020	Tax-Effect Adjustment	Tax-Adjusted Fund Balance 6/30/2020	2022-2024 Decommissioning Accrual
Monticello	9.67	3.88%	3.90%	$814,968,100	$610,109,002	$204,859,098	$57,032,773	$757,935,327	**$98,957,412**
Prairie Island Unit 1	13.25	4.03%	3.85%	471,960,960	346,629,286	125,331,674	34,892,338	437,068,622	**44,412,832**
Prairie Island Unit 2	14.42	4.00%	3.84%	526,255,835	385,837,890	140,417,945	39,092,356	487,163,479	**37,671,093**
TOTAL DECOMMISSIONING ACCRUAL				**$1,813,184,895**	**$1,342,576,178**	**$470,608,717**	**$131,017,467**	**$1,682,167,428**	**$181,041,337**

INPUT DATA

Escalation Rate (Labor)	3.78%
Escalation Rate (Non-Labor)	2.58%
Escalation Rate (PIIC)	0.00%
Jurisdictional Factor	72.9219%
Tax Rate for tax-effect adjustment	27.84%

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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Monticello																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2030	$22,675,886	$0	$22,675,886	$16,535,687	1.4492	$23,963,517	$9,374,135	$0	$9,374,135	$6,835,797	1.2901	$8,818,862	$0	$0	1.0000	$0	$32,050,021	$23,371,484	$32,782,380
2031	77,872,234	-	77,872,234	56,785,913	1.5040	85,406,013	48,073,591	-	48,073,591	35,056,176	1.3234	46,393,344	0	0	1.0000	0	125,945,826	91,842,089	131,799,357
2032	87,239,449	-	87,239,449	63,616,664	1.5609	99,299,250	136,816,869	-	136,816,869	99,769,461	1.3575	135,437,043	0	0	1.0000	0	224,056,318	163,386,124	234,736,293
2033	97,169,774	-	97,169,774	70,858,045	1.6199	114,782,948	156,137,852	-	156,137,852	113,858,688	1.3926	158,559,609	0	0	1.0000	0	253,307,626	184,716,734	273,342,557
2034	97,349,933	-	97,349,933	70,989,421	1.6811	119,340,316	130,971,769	-	130,971,769	95,507,102	1.4285	136,431,895	0	0	1.0000	0	228,321,702	166,496,523	255,772,211
2035	52,997,671	-	52,997,671	38,646,909	1.7446	67,423,397	22,622,163	-	22,622,163	16,496,511	1.4653	24,172,338	0	0	1.0000	0	75,619,834	55,143,420	91,595,735
2036	37,468,263	-	37,468,263	27,322,569	1.8106	49,470,244	18,557,761	-	18,557,761	13,532,672	1.5032	20,342,312	0	0	1.0000	0	56,026,024	40,855,241	69,812,556
2037	32,364,059	-	32,364,059	23,600,487	1.8790	44,345,315	19,951,990	-	19,951,990	14,549,370	1.5419	22,433,674	0	0	1.0000	0	52,316,049	38,149,857	66,778,988
2038	7,761,328	5,807,500	1,953,828	1,424,768	1.9501	2,778,441	2,496,318	1,831,752	664,566	484,614	1.5817	766,515	0	0	1.0000	0	2,618,394	1,909,383	3,544,955
2039	7,761,328	5,807,500	1,953,828	1,424,768	2.0238	2,883,446	2,496,318	1,831,752	664,566	484,614	1.6225	786,287	0	0	1.0000	0	2,618,394	1,909,383	3,669,733
2040	7,782,543	5,807,500	1,975,042	1,440,238	2.1003	3,024,933	2,503,009	1,831,752	671,258	489,494	1.6644	814,714	0	0	1.0000	0	2,646,300	1,929,732	3,839,647
2041	7,761,328	5,807,500	1,953,828	1,424,768	2.1797	3,105,568	2,496,318	1,831,752	664,566	484,614	1.7073	827,382	0	0	1.0000	0	2,618,394	1,909,383	3,932,950
2042	7,761,328	5,807,500	1,953,828	1,424,768	2.2620	3,222,826	2,496,318	1,831,752	664,566	484,614	1.7514	848,754	0	0	1.0000	0	2,618,394	1,909,383	4,071,580
2043	7,761,328	5,807,500	1,953,828	1,424,768	2.3475	3,344,644	2,496,318	1,831,752	664,566	484,614	1.7966	870,658	0	0	1.0000	0	2,618,394	1,909,383	4,215,302
2044	7,782,543	5,807,500	1,975,042	1,440,238	2.4363	3,508,853	2,503,009	1,831,752	671,258	489,494	1.8429	902,088	0	0	1.0000	0	2,646,300	1,929,732	4,410,941
2045	7,761,328	5,807,500	1,953,828	1,424,768	2.5284	3,602,384	2,496,318	1,831,752	664,566	484,614	1.8905	916,163	0	0	1.0000	0	2,618,394	1,909,383	4,518,548
2046	7,761,328	5,807,500	1,953,828	1,424,768	2.6239	3,738,450	2,496,318	1,831,752	664,566	484,614	1.9392	939,764	0	0	1.0000	0	2,618,394	1,909,383	4,678,214
2047	7,761,328	5,807,500	1,953,828	1,424,768	2.7231	3,879,787	2,496,318	1,831,752	664,566	484,614	1.9893	964,043	0	0	1.0000	0	2,618,394	1,909,383	4,843,830
2048	8,502,029	5,807,500	2,694,528	1,964,901	2.8261	5,553,008	4,661,467	1,831,752	2,829,716	2,063,482	2.0406	4,210,742	0	0	1.0000	0	5,524,244	4,028,384	9,763,750
2049	7,761,328	5,807,500	1,953,828	1,424,768	2.9329	4,178,703	2,496,318	1,831,752	664,566	484,614	2.0932	1,014,395	0	0	1.0000	0	2,618,394	1,909,383	5,193,098
2050	9,380,171	5,807,500	3,572,671	2,605,260	3.0438	7,929,890	7,352,848	1,831,752	5,521,097	4,026,089	2.1472	8,644,817	0	0	1.0000	0	9,093,768	6,631,348	16,574,707
2051	9,380,171	5,807,500	3,572,671	2,605,260	3.1588	8,229,495	7,352,848	1,831,752	5,521,097	4,026,089	2.2026	8,867,863	0	0	1.0000	0	9,093,768	6,631,348	17,097,357
2052	9,401,386	5,807,500	3,593,886	2,620,730	3.2782	8,591,277	7,359,540	1,831,752	5,527,788	4,030,968	2.2595	9,107,972	0	0	1.0000	0	9,121,674	6,651,698	17,699,249
2053	9,380,171	5,807,500	3,572,671	2,605,260	3.4021	8,863,354	7,352,848	1,831,752	5,521,097	4,026,089	2.3178	9,331,668	0	0	1.0000	0	9,093,768	6,631,348	18,195,022
2054	9,380,171	5,807,500	3,572,671	2,605,260	3.5307	9,198,391	7,352,848	1,831,752	5,521,097	4,026,089	2.3776	9,572,428	0	0	1.0000	0	9,093,768	6,631,348	18,770,819
2055	9,380,171	5,807,500	3,572,671	2,605,260	3.6642	9,546,193	7,352,848	1,831,752	5,521,097	4,026,089	2.4389	9,819,227	0	0	1.0000	0	9,093,768	6,631,348	19,365,420
2056	9,401,386	5,807,500	3,593,886	2,620,730	3.8027	9,965,850	7,359,540	1,831,752	5,527,788	4,030,968	2.5018	10,084,676	0	0	1.0000	0	9,121,674	6,651,698	20,050,525
2057	9,380,171	5,807,500	3,572,671	2,605,260	3.9464	10,281,397	7,352,848	1,831,752	5,521,097	4,026,089	2.5664	10,332,554	0	0	1.0000	0	9,093,768	6,631,348	20,613,951
2058	16,568,011	5,807,500	10,760,511	7,846,769	4.0956	32,137,227	28,916,367	1,831,752	27,084,616	19,750,616	2.6326	51,995,473	0	0	1.0000	0	37,845,127	27,597,385	84,132,700
2059	9,380,171	5,807,500	3,572,671	2,605,260	4.2504	11,073,396	7,352,848	1,831,752	5,521,097	4,026,089	2.7005	10,872,452	0	0	1.0000	0	9,093,768	6,631,348	21,945,848
2060	9,401,386	5,807,500	3,593,886	2,620,730	4.4111	11,560,302	7,359,540	1,831,752	5,527,788	4,030,968	2.7702	11,166,588	0	0	1.0000	0	9,121,674	6,651,698	22,726,889
2061	9,380,171	5,807,500	3,572,671	2,605,260	4.5778	11,926,358	7,352,848	1,831,752	5,521,097	4,026,089	2.8416	11,440,533	0	0	1.0000	0	9,093,768	6,631,348	23,366,891
2062	9,380,171	5,807,500	3,572,671	2,605,260	4.7509	12,377,329	7,352,848	1,831,752	5,521,097	4,026,089	2.9150	11,736,048	0	0	1.0000	0	9,093,768	6,631,348	24,113,377
2063	12,974,091	5,807,500	7,166,591	5,226,014	4.9305	25,766,864	18,134,608	1,831,752	16,302,856	11,888,352	2.9902	35,548,552	0	0	1.0000	0	23,469,447	17,114,367	61,315,416
2064	9,401,386	5,807,500	3,593,886	2,620,730	5.1168	13,409,751	7,359,540	1,831,752	5,527,788	4,030,968	3.0673	12,364,188	0	0	1.0000	0	9,121,674	6,651,698	25,773,939
2065	9,380,171	5,807,500	3,572,671	2,605,260	5.3103	13,834,711	7,352,848	1,831,752	5,521,097	4,026,089	3.1465	12,668,088	0	0	1.0000	0	9,093,768	6,631,348	26,502,798
2066	10,098,955	5,807,500	4,291,455	3,129,411	5.5110	17,246,182	9,509,200	1,831,752	7,677,448	5,598,541	3.2276	18,069,852	0	0	1.0000	0	11,968,904	8,727,952	35,316,034
2067	9,380,171	5,807,500	3,572,671	2,605,260	5.7193	14,900,262	7,352,848	1,831,752	5,521,097	4,026,089	3.3109	13,329,976	0	0	1.0000	0	9,093,768	6,631,348	28,230,239
2068	19,464,362	5,807,500	13,656,862	9,958,843	5.9355	59,110,712	37,548,466	1,831,752	35,716,715	26,045,307	3.3963	88,457,676	0	0	1.0000	0	49,373,576	36,004,150	147,568,388
2069	9,380,171	5,807,500	3,572,671	2,605,260	6.1598	16,047,879	7,352,848	1,831,752	5,521,097	4,026,089	3.4840	14,026,892	0	0	1.0000	0	9,093,768	6,631,348	30,074,771
2070	9,380,171	5,807,500	3,572,671	2,605,260	6.3927	16,654,644	7,352,848	1,831,752	5,521,097	4,026,089	3.5738	14,388,435	0	0	1.0000	0	9,093,768	6,631,348	31,043,079
2071	9,380,171	5,807,500	3,572,671	2,605,260	6.6343	17,284,075	7,352,848	1,831,752	5,521,097	4,026,089	3.6660	14,759,641	0	0	1.0000	0	9,093,768	6,631,348	32,043,715
2072	9,401,386	5,807,500	3,593,886	2,620,730	6.8851	18,043,987	7,359,540	1,831,752	5,527,788	4,030,968	3.7606	15,158,858	0	0	1.0000	0	9,121,674	6,651,698	33,202,846
2073	9,380,171	5,807,500	3,572,671	2,605,260	7.1454	18,615,623	7,352,848	1,831,752	5,521,097	4,026,089	3.8576	15,531,039	0	0	1.0000	0	9,093,768	6,631,348	34,146,662
2074	9,380,171	5,807,500	3,572,671	2,605,260	7.4155	19,319,304	7,352,848	1,831,752	5,521,097	4,026,089	3.9572	15,932,037	0	0	1.0000	0	9,093,768	6,631,348	35,251,341
2075	9,380,171	5,807,500	3,572,671	2,605,260	7.6958	20,049,558	7,352,848	1,831,752	5,521,097	4,026,089	4.0593	16,343,101	0	0	1.0000	0	9,093,768	6,631,348	36,392,659
2076	9,401,386	5,807,500	3,593,886	2,620,730	7.9867	20,930,983	7,359,540	1,831,752	5,527,788	4,030,968	4.1640	16,784,951	0	0	1.0000	0	9,121,674	6,651,698	37,715,934
2077	9,380,171	5,807,500	3,572,671	2,605,260	8.2886	21,593,956	7,352,848	1,831,752	5,521,097	4,026,089	4.2714	17,197,034	0	0	1.0000	0	9,093,768	6,631,348	38,790,991
2078	9,380,171	5,807,500	3,572,671	2,605,260	8.6019	22,410,184	7,352,848	1,831,752	5,521,097	4,026,089	4.3816	17,640,709	0	0	1.0000	0	9,093,768	6,631,348	40,050,893
2079	9,380,171	5,807,500	3,572,671	2,605,260	8.9270	23,257,154	7,352,848	1,831,752	5,521,097	4,026,089	4.4947	18,096,060	0	0	1.0000	0	9,093,768	6,631,348	41,353,214
2080	9,401,386	5,807,500	3,593,886	2,620,730	9.2645	24,279,752	7,359,540	1,831,752	5,527,788	4,030,968	4.6106	18,585,181	0	0	1.0000	0	9,121,674	6,651,698	42,864,933
2081	9,380,171	5,807,500	3,572,671	2,605,260	9.6147	25,048,791	7,352,848	1,831,752	5,521,097	4,026,089	4.7296	19,041,788	0	0	1.0000	0	9,093,768	6,631,348	44,090,579
2082	9,380,171	5,807,500	3,572,671	2,605,260	9.9781	25,995,542	7,352,848	1,831,752	5,521,097	4,026,089	4.8516	19,532,971	0	0	1.0000	0	9,093,768	6,631,348	45,528,513
2083	9,380,171	5,807,500	3,572,671	2,605,260	10.3553	26,978,246	7,352,848	1,831,752	5,521,097	4,026,089	4.9768	20,037,037	0	0	1.0000	0	9,093,768	6,631,348	47,015,284
2084	34,558,825	5,807,500	28,751,325	20,966,012	10.7467	225,315,446	82,831,857	1,831,752	81,000,105	59,066,816	5.1052	301,547,907	0	0	1.0000	0	109,751,430	80,032,828	526,863,353
2085	9,380,171	5,807,500	3,572,671	2,605,260	11.1529	29,056,202	7,352,848	1,831,752	5,521,097	4,026,089	5.2369	21,084,223	0	0	1.0000	0	9,093,768	6,631,348	50,140,425
2086	9,380,171	5,807,500	3,572,671	2,605,260	11.5745	30,154,579	7,352,848	1,831,752	5,521,097	4,026,089	5.3720	21,628,148	0	0	1.0000	0	9,093,768	6,631,348	51,782,727
2087	9,380,171	5,807,500	3,572,671	2,605,260	12.0120	31,294,380	7,352,848	1,831,752	5,521,097	4,026,089	5.5106	22,186,163	0	0	1.0000	0	9,093,768	6,631,348	53,480,544
2088	10,120,872	5,807,500	4,313,372	3,145,393	12.4661	39,210,780	9,517,997	1,831,752	7,686,246	5,604,957	5.6528	31,683,698	0	0	1.0000	0	11,999,618	8,750,349	70,894,478
2089	9,380,171	5,807,500	3,572,671	2,605,260	12.9373	33,705,027	7,352,848	1,831,752	5,521,097	4,026,089	5.7986	23,345,677	0	0	1.0000	0	9,093,768	6,631,348	57,050,704
2090	9,380,171	5,807,500	3,572,671	2,605,260	13.4263	34,978,999	7,352,848	1,831,752	5,521,097	4,026,089	5.9482	23,947,980	0	0	1.0000	0	9,093,768	6,631,348	58,926,979
2091	9,380,171	5,807,500	3,572,671	2,605,260	13.9338	36,301,168	7,352,848	1,831,752	5,521,097	4,026,089	6.1017	24,565,984	0	0	1.0000	0	9,093,768	6,631,348	60,867,153
2092	9,401,386	5,807,500	3,593,886	2,620,730	14.4605	37,897,064	7,359,540	1,831,752	5,527,788	4,030,968	6.2591	25,230,232	0	0	1.0000	0	9,121,674	6,651,698	63,127,296
2093	9,380,171	5,807,500	3,572,671	2,605,260	15.0071	39,097,394	7,352,848	1,831,752	5,521,097	4,026,089	6.4206	25,849,904	0	0	1.0000	0	9,093,768	6,631,348	64,947,298
2094	9,380,171	5,807,500	3,572,671	2,605,260	15.5744	40,575,358	7,352,848	1,831,752	5,521,097	4,026,089	6.5863	26,517,027	0	0	1.0000	0	9,093,768	6,631,348	67,092,384
2095	9,380,171	5,807,500	3,572,671	2,605,260	16.1631	42,109,074	7,352,848	1,831,752	5,521,097	4,026,089	6.7562	27,201,059	0	0	1.0000	0	9,093,768	6,631,348	69,310,133
2096	9,401,386	5,807,500	3,593,886	2,620,730	16.7741	43,960,385	7,359,540	1,831,752	5,527,788	4,030,968	6.9305	27,936,624	0	0	1.0000	0	9,121,674	6,651,698	71,897,009
2097	9,380,171	5,807,500	3,572,671	2,605,260	17.4081	45,352,622	7,352,848	1,831,752	5,521,097	4,026,089	7.1093	28,622,671	0	0	1.0000	0	9,093,768	6,631,348	73,975,294
2098	9,380,171	5,807,500	3,572,671	2,605,260	18.0662	47,067,144	7,352,848	1,831,752	5,521,097	4,026,089	7.2927	29,361,056	0	0	1.0000	0	9,093,768	6,631,348	76,428,200
2099	9,380,171	5,807,500	3,572,671	2,605,260	18.7491	48,846,276	7,352,848	1,831,752	5,521,097	4,026,089	7.4809	30,118,766	0	0	1.0000	0	9,093,768	6,631,348	78,965,041
2100	9,380,171	5,807,500	3,572,671	2,605,260	19.4578	50,692,623	7,352,848	1,831,752	5,521,097	4,026,089	7.6739	30,895,801	0	0	1.0000	0	9,093,768	6,631,348	81,588,424
2101	9,380,171	5,807,500	3,572,671	2,605,260	20.1933	52,608,792	7,352,848	1,831,752	5,521,097	4,026,089	7.8719	31,692,966	0	0	1.0000	0	9,093,768	6,631,348	84,301,758
2102	9,380,171	5,807,500	3,572,671	2,605,260	20.9566	54,597,387	7,352,848	1,831,752	5,521,097	4,026,089	8.0750	32,510,665	0	0	1.0000	0	9,093,768	6,631,348	87,108,052
2103	9,380,171	5,807,500	3,572,671	2,605,260	21.7488	56,661,274	7,352,848	1,831,752	5,521,097	4,026,089	8.2833	33,349,299	0	0	1.0000	0	9,093,768	6,631,348	90,010,573
2104	9,401,386	5,807,500	3,593,886	2,620,730	22.5709	59,152,232	7,359,540	1,831,752	5,527,788	4,030,968	8.4970	34,251,135	0	0	1.0000	0	9,121,674	6,651,698	93,403,367

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2105	9,380,171	5,807,500	3,572,671	2,605,260	23.4240	61,025,605	7,352,848	1,831,752	5,521,097	4,026,089	8.7162	35,092,193	0	0	1.0000	0	9,093,768	6,631,348	96,117,797
2106	9,380,171	5,807,500	3,572,671	2,605,260	24.3095	63,332,562	7,352,848	1,831,752	5,521,097	4,026,089	8.9411	35,997,660	0	0	1.0000	0	9,093,768	6,631,348	99,330,222
2107	9,380,171	5,807,500	3,572,671	2,605,260	25.2284	65,726,535	7,352,848	1,831,752	5,521,097	4,026,089	9.1718	36,926,479	0	0	1.0000	0	9,093,768	6,631,348	102,653,014
2108	16,589,226	5,807,500	10,781,726	7,862,239	26.1820	205,849,146	28,923,059	1,831,752	27,091,307	19,755,496	9.4084	185,867,608	0	0	1.0000	0	37,873,033	27,617,735	391,716,754
2109	9,380,171	5,807,500	3,572,671	2,605,260	27.1717	70,789,337	7,352,848	1,831,752	5,521,097	4,026,089	9.6512	38,856,585	0	0	1.0000	0	9,093,768	6,631,348	109,645,922
2110	9,380,171	5,807,500	3,572,671	2,605,260	28.1988	73,465,199	7,352,848	1,831,752	5,521,097	4,026,089	9.9002	39,859,082	0	0	1.0000	0	9,093,768	6,631,348	113,324,281
2111	9,380,171	5,807,500	3,572,671	2,605,260	29.2647	76,242,145	7,352,848	1,831,752	5,521,097	4,026,089	10.1556	40,887,345	0	0	1.0000	0	9,093,768	6,631,348	117,129,490
2112	9,401,386	5,807,500	3,593,886	2,620,730	30.3709	79,593,925	7,359,540	1,831,752	5,527,788	4,030,968	10.4176	41,993,012	0	0	1.0000	0	9,121,674	6,651,698	121,586,937
2113	12,974,091	5,807,500	7,166,591	5,226,014	31.5189	164,718,226	18,134,608	1,831,752	16,302,856	11,888,352	10.6864	127,043,690	0	0	1.0000	0	23,469,447	17,114,367	291,761,915
2114	9,380,171	5,807,500	3,572,671	2,605,260	32.7103	85,218,828	7,352,848	1,831,752	5,521,097	4,026,089	10.9621	44,134,385	0	0	1.0000	0	9,093,768	6,631,348	129,353,213
2115	9,380,171	5,807,500	3,572,671	2,605,260	33.9468	88,440,232	7,352,848	1,831,752	5,521,097	4,026,089	11.2449	45,272,963	0	0	1.0000	0	9,093,768	6,631,348	133,713,195
2116	10,120,170	5,807,500	4,312,670	3,144,881	35.2299	110,793,836	9,515,891	1,831,752	7,684,140	5,603,421	11.5350	64,635,459	0	0	1.0000	0	11,996,810	8,748,302	175,429,295
2117	9,380,171	5,807,500	3,572,671	2,605,260	36.5616	95,252,465	7,352,848	1,831,752	5,521,097	4,026,089	11.8326	47,639,095	0	0	1.0000	0	9,093,768	6,631,348	142,891,560
2118	19,443,147	5,807,500	13,635,647	9,943,373	37.9437	377,288,354	37,541,775	1,831,752	35,710,023	26,040,428	12.1379	316,076,106	0	0	1.0000	0	49,345,670	35,983,800	693,364,459
2119	9,380,171	5,807,500	3,572,671	2,605,260	39.3779	102,589,658	7,352,848	1,831,752	5,521,097	4,026,089	12.4511	50,129,231	0	0	1.0000	0	9,093,768	6,631,348	152,718,889
2120	9,401,386	5,807,500	3,593,886	2,620,730	40.8664	107,099,795	7,359,540	1,831,752	5,527,788	4,030,968	12.7723	51,484,733	0	0	1.0000	0	9,121,674	6,651,698	158,584,528
2121	9,380,171	5,807,500	3,572,671	2,605,260	42.4112	110,492,193	7,352,848	1,831,752	5,521,097	4,026,089	13.1018	52,749,007	0	0	1.0000	0	9,093,768	6,631,348	163,241,199
2122	9,380,171	5,807,500	3,572,671	2,605,260	44.0143	114,668,685	7,352,848	1,831,752	5,521,097	4,026,089	13.4399	54,110,227	0	0	1.0000	0	9,093,768	6,631,348	168,778,912
2123	9,380,171	5,807,500	3,572,671	2,605,260	45.6781	119,003,316	7,352,848	1,831,752	5,521,097	4,026,089	13.7866	55,506,072	0	0	1.0000	0	9,093,768	6,631,348	174,509,388
2124	9,401,386	5,807,500	3,593,886	2,620,730	47.4047	124,234,914	7,359,540	1,831,752	5,527,788	4,030,968	14.1423	57,007,159	0	0	1.0000	0	9,121,674	6,651,698	181,242,072
2125	9,380,171	5,807,500	3,572,671	2,605,260	49.1966	128,169,922	7,352,848	1,831,752	5,521,097	4,026,089	14.5072	58,407,271	0	0	1.0000	0	9,093,768	6,631,348	186,577,194
2126	9,380,171	5,807,500	3,572,671	2,605,260	51.0562	133,014,664	7,352,848	1,831,752	5,521,097	4,026,089	14.8815	59,914,236	0	0	1.0000	0	9,093,768	6,631,348	192,928,900
2127	9,380,171	5,807,500	3,572,671	2,605,260	52.9861	138,042,554	7,352,848	1,831,752	5,521,097	4,026,089	15.2654	61,459,852	0	0	1.0000	0	9,093,768	6,631,348	199,502,406
2128	10,120,872	5,807,500	4,313,372	3,145,393	54.9890	172,962,000	9,517,997	1,831,752	7,686,246	5,604,957	15.6593	87,769,695	0	0	1.0000	0	11,999,618	8,750,349	260,731,695
2129	9,380,171	5,807,500	3,572,671	2,605,260	57.0676	148,675,922	7,352,848	1,831,752	5,521,097	4,026,089	16.0633	64,672,268	0	0	1.0000	0	9,093,768	6,631,348	213,348,190
2130	9,380,171	5,807,500	3,572,671	2,605,260	59.2248	154,295,988	7,352,848	1,831,752	5,521,097	4,026,089	16.4777	66,340,679	0	0	1.0000	0	9,093,768	6,631,348	220,636,667
2131	9,380,171	5,807,500	3,572,671	2,605,260	61.4635	160,128,383	7,352,848	1,831,752	5,521,097	4,026,089	16.9028	68,052,169	0	0	1.0000	0	9,093,768	6,631,348	228,180,552
2132	9,401,386	5,807,500	3,593,886	2,620,730	63.7868	167,167,972	7,359,540	1,831,752	5,527,788	4,030,968	17.3389	69,892,551	0	0	1.0000	0	9,121,674	6,651,698	237,060,524
2133	9,380,171	5,807,500	3,572,671	2,605,260	66.1979	172,462,725	7,352,848	1,831,752	5,521,097	4,026,089	17.7863	71,609,218	0	0	1.0000	0	9,093,768	6,631,348	244,071,943
2134	34,537,610	5,807,500	28,730,110	20,950,542	68.7002	1,439,306,446	82,825,165	1,831,752	80,993,414	59,061,936	18.2451	1,077,590,931	0	0	1.0000	0	109,723,524	80,012,478	2,516,897,377
2135	9,380,171	5,807,500	3,572,671	2,605,260	71.2971	185,747,466	7,352,848	1,831,752	5,521,097	4,026,089	18.7159	75,351,870	0	0	1.0000	0	9,093,768	6,631,348	261,099,336
2136	9,401,386	5,807,500	3,593,886	2,620,730	73.9921	193,913,307	7,359,540	1,831,752	5,527,788	4,030,968	19.1987	77,389,345	0	0	1.0000	0	9,121,674	6,651,698	271,302,652
2137	9,380,171	5,807,500	3,572,671	2,605,260	76.7890	200,055,292	7,352,848	1,831,752	5,521,097	4,026,089	19.6941	79,290,190	0	0	1.0000	0	9,093,768	6,631,348	279,345,482
2138	9,380,171	5,807,500	3,572,671	2,605,260	79.6916	207,617,319	7,352,848	1,831,752	5,521,097	4,026,089	20.2022	81,335,845	0	0	1.0000	0	9,093,768	6,631,348	288,953,164
2139	9,380,171	5,807,500	3,572,671	2,605,260	82.7040	215,465,403	7,352,848	1,831,752	5,521,097	4,026,089	20.7234	83,434,243	0	0	1.0000	0	9,093,768	6,631,348	298,899,646
2140	9,401,386	5,807,500	3,593,886	2,620,730	85.8302	224,937,769	7,359,540	1,831,752	5,527,788	4,030,968	21.2580	85,690,318	0	0	1.0000	0	9,121,674	6,651,698	310,628,087
2141	9,380,171	5,807,500	3,572,671	2,605,260	89.0745	232,062,211	7,352,848	1,831,752	5,521,097	4,026,089	21.8065	87,794,899	0	0	1.0000	0	9,093,768	6,631,348	319,857,110
2142	9,380,171	5,807,500	3,572,671	2,605,260	92.4416	240,834,381	7,352,848	1,831,752	5,521,097	4,026,089	22.3691	90,059,977	0	0	1.0000	0	9,093,768	6,631,348	330,894,358
2143	9,380,171	5,807,500	3,572,671	2,605,260	95.9359	249,937,940	7,352,848	1,831,752	5,521,097	4,026,089	22.9462	92,383,432	0	0	1.0000	0	9,093,768	6,631,348	342,321,372
2144	9,401,386	5,807,500	3,593,886	2,620,730	99.5622	260,925,632	7,359,540	1,831,752	5,527,788	4,030,968	23.5382	94,881,731	0	0	1.0000	0	9,121,674	6,651,698	355,807,363
2145	9,380,171	5,807,500	3,572,671	2,605,260	103.3257	269,190,289	7,352,848	1,831,752	5,521,097	4,026,089	24.1455	97,211,920	0	0	1.0000	0	9,093,768	6,631,348	366,402,209
2146	9,380,171	5,807,500	3,572,671	2,605,260	107.2314	279,365,652	7,352,848	1,831,752	5,521,097	4,026,089	24.7685	99,720,173	0	0	1.0000	0	9,093,768	6,631,348	379,085,825
2147	9,380,171	5,807,500	3,572,671	2,605,260	111.2847	289,925,551	7,352,848	1,831,752	5,521,097	4,026,089	25.4075	102,292,844	0	0	1.0000	0	9,093,768	6,631,348	392,218,395
2148	9,401,386	5,807,500	3,593,886	2,620,730	115.4913	302,671,500	7,359,540	1,831,752	5,527,788	4,030,968	26.0630	105,059,119	0	0	1.0000	0	9,121,674	6,651,698	407,730,619
2149	9,380,171	5,807,500	3,572,671	2,605,260	119.8569	312,258,359	7,352,848	1,831,752	5,521,097	4,026,089	26.7355	107,639,490	0	0	1.0000	0	9,093,768	6,631,348	419,897,848
2150	9,380,171	5,807,500	3,572,671	2,605,260	124.3875	324,061,749	7,352,848	1,831,752	5,521,097	4,026,089	27.4252	110,416,283	0	0	1.0000	0	9,093,768	6,631,348	434,478,032
2151	9,380,171	5,807,500	3,572,671	2,605,260	129.0893	336,311,159	7,352,848	1,831,752	5,521,097	4,026,089	28.1328	113,265,143	0	0	1.0000	0	9,093,768	6,631,348	449,576,302
2152	9,401,386	5,807,500	3,593,886	2,620,730	133.9689	351,096,299	7,359,540	1,831,752	5,527,788	4,030,968	28.8586	116,328,093	0	0	1.0000	0	9,121,674	6,651,698	467,424,392
2153	9,380,171	5,807,500	3,572,671	2,605,260	139.0329	362,216,820	7,352,848	1,831,752	5,521,097	4,026,089	29.6032	119,185,104	0	0	1.0000	0	9,093,768	6,631,348	481,401,924
2154	9,380,171	5,807,500	3,572,671	2,605,260	144.2884	375,908,763	7,352,848	1,831,752	5,521,097	4,026,089	30.3669	122,259,827	0	0	1.0000	0	9,093,768	6,631,348	498,168,590
2155	9,380,171	5,807,500	3,572,671	2,605,260	149.7425	390,118,110	7,352,848	1,831,752	5,521,097	4,026,089	31.1504	125,414,268	0	0	1.0000	0	9,093,768	6,631,348	515,532,378
2156	9,401,386	5,807,500	3,593,886	2,620,730	155.4027	407,268,499	7,359,540	1,831,752	5,527,788	4,030,968	31.9541	128,805,955	0	0	1.0000	0	9,121,674	6,651,698	536,074,453
2157	9,380,171	5,807,500	3,572,671	2,605,260	161.2769	420,168,218	7,352,848	1,831,752	5,521,097	4,026,089	32.7785	131,969,142	0	0	1.0000	0	9,093,768	6,631,348	552,137,361
2158	16,568,011	5,807,500	10,760,511	7,846,769	167.3732	1,313,338,847	28,916,367	1,831,752	27,084,616	19,750,616	33.6242	664,098,676	0	0	1.0000	0	37,845,127	27,597,385	1,977,437,523
2159	9,380,171	5,807,500	3,572,671	2,605,260	173.6999	452,533,360	7,352,848	1,831,752	5,521,097	4,026,089	34.4917	138,866,637	0	0	1.0000	0	9,093,768	6,631,348	591,399,998
2160	9,401,386	5,807,500	3,593,886	2,620,730	180.2658	472,427,968	7,359,540	1,831,752	5,527,788	4,030,968	35.3816	142,622,097	0	0	1.0000	0	9,121,674	6,651,698	615,050,065
2161	9,380,171	5,807,500	3,572,671	2,605,260	187.0798	487,391,475	7,352,848	1,831,752	5,521,097	4,026,089	36.2944	146,124,467	0	0	1.0000	0	9,093,768	6,631,348	633,515,942
2162	9,380,171	5,807,500	3,572,671	2,605,260	194.1514	505,814,830	7,352,848	1,831,752	5,521,097	4,026,089	37.2308	149,894,496	0	0	1.0000	0	9,093,768	6,631,348	655,709,327
2163	12,974,091	5,807,500	7,166,591	5,226,014	201.4904	1,052,991,734	18,134,608	1,831,752	16,302,856	11,888,352	38.1914	454,032,824	0	0	1.0000	0	23,469,447	17,114,367	1,507,024,558
2164	9,401,386	5,807,500	3,593,886	2,620,730	209.1067	548,012,176	7,359,540	1,831,752	5,527,788	4,030,968	39.1767	157,920,024	0	0	1.0000	0	9,121,674	6,651,698	705,932,200
2165	9,380,171	5,807,500	3,572,671	2,605,260	217.0109	565,369,766	7,352,848	1,831,752	5,521,097	4,026,089	40.1875	161,798,432	0	0	1.0000	0	9,093,768	6,631,348	727,168,198
2166	10,098,955	5,807,500	4,291,455	3,129,411	225.2140	704,787,100	9,509,200	1,831,752	7,677,448	5,598,541	41.2243	230,795,946	0	0	1.0000	0	11,968,904	8,727,952	935,583,046
2167	9,380,171	5,807,500	3,572,671	2,605,260	233.7270	608,919,549	7,352,848	1,831,752	5,521,097	4,026,089	42.2879	170,254,829	0	0	1.0000	0	9,093,768	6,631,348	779,174,377
2168	20,183,848	5,807,500	14,376,347	10,483,506	242.5619	2,542,899,067	39,706,924	1,831,752	37,875,173	27,619,296	43.3789	1,198,094,660	0	0	1.0000	0	52,251,520	38,102,801	3,740,993,727
2169	9,380,171	5,807,500	3,572,671	2,605,260	251.7308	655,824,124	7,352,848	1,831,752	5,521,097	4,026,089	44.4981	179,153,289	0	0	1.0000	0	9,093,768	6,631,348	834,977,414
2170	9,380,171	5,807,500	3,572,671	2,605,260	261.2462	680,614,213	7,352,848	1,831,752	5,521,097	4,026,089	45.6462	183,775,642	0	0	1.0000	0	9,093,768	6,631,348	864,389,855
2171	9,380,171	5,807,500	3,572,671	2,605,260	271.1213	706,341,414	7,352,848	1,831,752	5,521,097	4,026,089	46.8238	188,516,763	0	0	1.0000	0	9,093,768	6,631,348	894,858,177
2172	9,401,386	5,807,500	3,593,886	2,620,730	281.3697	737,393,979	7,359,540	1,831,752	5,527,788	4,030,968	48.0319	193,615,052	0	0	1.0000	0	9,121,674	6,651,698	931,009,031
2173	9,380,171	5,807,500	3,572,671	2,605,260	292.0054	760,749,919	7,352,848	1,831,752	5,521,097	4,026,089	49.2711	198,369,810	0	0	1.0000	0	9,093,768	6,631,348	959,119,729
2174	9,380,171	5,807,500	3,572,671	2,605,260	303.0433	789,506,516	7,352,848	1,831,752	5,521,097	4,026,089	50.5423	203,487,774	0	0	1.0000	0	9,093,768	6,631,348	992,994,290
2175	9,380,171	5,807,500	3,572,671	2,605,260	314.4983	819,349,767	7,352,848	1,831,752	5,521,097	4,026,089	51.8463	208,737,793	0	0	1.0000	0	9,093,768	6,631,348	1,028,087,560
2176	9,401,386	5,807,500	3,593,886	2,620,730	326.3863	855,370,328	7,359,540	1,831,752	5,527,788	4,030,968	53.1839	214,382,599	0	0	1.0000	0	9,121,674	6,651,698	1,069,752,927
2177	9,380,171	5,807,500	3,572,671	2,605,260	338.7237	882,463,226	7,352,848	1,831,752	5,521,097	4,026,089	54.5561	219,647,688	0	0	1.0000	0	9,093,768	6,631,348	1,102,110,914
2178	9,380,171	5,807,500	3,572,671	2,605,260	351.5275	915,820,451	7,352,848	1,831,752	5,521,097	4,026,089	55.9636	225,314,407	0	0	1.0000	0	9,093,768	6,631,348	1,141,134,859
2179	9,380,171	5,807,500	3,572,671	2,605,260	364.8152	950,438,362	7,352,848	1,831,752	5,521,097	4,026,089	57.4075	231,127,676	0	0	1.0000	0	9,093,768	6,631,348	1,181,566,038
2180	9,401,386	5,807,500	3,593,886	2,620,730	378.6052	992,221,959	7,359,540	1,831,752	5,527,788	4,030,968	58.8886	237,378,062	0	0	1.0000	0	9,121,674	6,651,698	1,229,600,021
2181	9,380,171	5,807,500	3,572,671	2,605,260	392.9165	1,023,649,548	7,352,848	1,831,752	5,521,097	4,026,089	60.4079	243,207,552	0	0	1.0000	0	9,093,768	6,631,348	1,266,857,100

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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2182	9,380,171	5,807,500	3,572,671	2,605,260	407.7688	1,062,343,647	7,352,848	1,831,752	5,521,097	4,026,089	61.9664	249,482,211	0	0	1.0000	0	9,093,768	6,631,348	1,311,825,859
2183	9,380,171	5,807,500	3,572,671	2,605,260	423.1824	1,102,500,079	7,352,848	1,831,752	5,521,097	4,026,089	63.5652	255,919,122	0	0	1.0000	0	9,093,768	6,631,348	1,358,419,201
2184	34,558,825	5,807,500	28,751,325	20,966,012	439.1787	9,207,826,074	82,831,857	1,831,752	81,000,105	59,066,816	65.2052	3,851,463,525	0	0	1.0000	0	109,751,430	80,032,828	13,059,289,599
2185	9,380,171	5,807,500	3,572,671	2,605,260	455.7797	1,187,424,513	7,352,848	1,831,752	5,521,097	4,026,089	66.8874	269,294,593	0	0	1.0000	0	9,093,768	6,631,348	1,456,719,106
2186	9,380,171	5,807,500	3,572,671	2,605,260	473.0081	1,232,308,971	7,352,848	1,831,752	5,521,097	4,026,089	68.6131	276,242,414	0	0	1.0000	0	9,093,768	6,631,348	1,508,551,385
2187	9,380,171	5,807,500	3,572,671	2,605,260	490.8878	1,278,890,234	7,352,848	1,831,752	5,521,097	4,026,089	70.3834	283,369,798	0	0	1.0000	0	9,093,768	6,631,348	1,562,260,032
2188	9,401,386	5,807,500	3,593,886	2,620,730	509.4434	1,335,113,539	7,359,540	1,831,752	5,527,788	4,030,968	72.1993	291,033,068	0	0	1.0000	0	9,121,674	6,651,698	1,626,146,607
2189	9,380,171	5,807,500	3,572,671	2,605,260	528.7004	1,377,401,879	7,352,848	1,831,752	5,521,097	4,026,089	74.0620	298,180,168	0	0	1.0000	0	9,093,768	6,631,348	1,675,582,047
2190	9,380,171	5,807,500	3,572,671	2,605,260	548.6852	1,429,467,474	7,352,848	1,831,752	5,521,097	4,026,089	75.9728	305,873,218	0	0	1.0000	0	9,093,768	6,631,348	1,735,340,692
2191	9,380,171	5,807,500	3,572,671	2,605,260	569.4255	1,483,501,343	7,352,848	1,831,752	5,521,097	4,026,089	77.9329	313,764,754	0	0	1.0000	0	9,093,768	6,631,348	1,797,266,097
2192	10,121,286	5,807,500	4,313,786	3,145,695	590.9498	1,858,947,615	9,519,240	1,831,752	7,687,488	5,605,862	79.9436	448,152,812	0	0	1.0000	0	12,001,274	8,751,557	2,307,100,427
2193	10,639,996	5,807,500	4,832,496	3,523,948	613.2877	2,161,194,019	11,132,323	1,831,752	9,300,572	6,782,153	82.0061	556,177,958	0	0	1.0000	0	14,133,068	10,306,102	2,717,371,977
2194	9,560,146	5,807,500	3,752,646	2,736,501	636.4700	1,741,700,761	7,892,773	1,831,752	6,061,022	4,419,812	84.1219	371,802,990	0	0	1.0000	0	9,813,668	7,156,313	2,113,503,752
2195	10,460,021	5,807,500	4,652,521	3,392,707	660.5286	2,240,979,939	10,592,398	1,831,752	8,760,647	6,388,430	86.2922	551,271,673	0	0	1.0000	0	13,413,168	9,781,137	2,792,251,612
2196	10,841,186	5,807,500	5,033,686	3,670,659	685.4966	2,516,224,533	11,678,940	1,831,752	9,847,188	7,180,757	88.5185	635,629,799	0	0	1.0000	0	14,880,874	10,851,416	3,151,854,332
2197	7,743,341	5,807,500	1,935,841	1,411,652	711.4083	1,004,260,817	2,442,356	1,831,752	610,605	445,265	90.8023	40,431,056	0	0	1.0000	0	2,546,446	1,856,916	1,044,691,873
2198	7,743,341	5,807,500	1,935,841	1,411,652	738.2996	1,042,221,969	2,442,356	1,831,752	610,605	445,265	93.1450	41,474,177	0	0	1.0000	0	2,546,446	1,856,916	1,083,696,147
2199	7,743,341	5,807,500	1,935,841	1,411,652	766.2073	1,081,617,925	2,442,356	1,831,752	610,605	445,265	95.5482	42,544,238	0	0	1.0000	0	2,546,446	1,856,916	1,124,162,162
2200	7,743,341	5,807,500	1,935,841	1,411,652	795.1699	1,122,503,032	2,442,356	1,831,752	610,605	445,265	98.0133	43,641,859	0	0	1.0000	0	2,546,446	1,856,916	1,166,144,891
2201	7,743,341	5,807,500	1,935,841	1,411,652	825.2273	1,164,933,615	2,442,356	1,831,752	610,605	445,265	100.5421	44,767,845	0	0	1.0000	0	2,546,446	1,856,916	1,209,701,460
2202	7,743,341	5,807,500	1,935,841	1,411,652	856.4209	1,208,968,117	2,442,356	1,831,752	610,605	445,265	103.1360	45,922,817	0	0	1.0000	0	2,546,446	1,856,916	1,254,890,934
2203	7,743,341	5,807,500	1,935,841	1,411,652	888.7937	1,254,667,239	2,442,356	1,831,752	610,605	445,265	105.7969	47,107,622	0	0	1.0000	0	2,546,446	1,856,916	1,301,774,860
2204	7,764,555	5,807,500	1,957,055	1,427,122	922.3901	1,316,363,137	2,449,048	1,831,752	617,296	450,144	108.5265	48,852,570	0	0	1.0000	0	2,574,352	1,877,266	1,365,215,706
2205	7,743,341	5,807,500	1,935,841	1,411,652	957.2564	1,351,312,733	2,442,356	1,831,752	610,605	445,265	111.3265	49,569,757	0	0	1.0000	0	2,546,446	1,856,916	1,400,882,490
2206	7,743,341	5,807,500	1,935,841	1,411,652	993.4407	1,402,392,366	2,442,356	1,831,752	610,605	445,265	114.1987	50,848,646	0	0	1.0000	0	2,546,446	1,856,916	1,453,241,012
2207	7,743,341	5,807,500	1,935,841	1,411,652	1,030.9927	1,455,402,715	2,442,356	1,831,752	610,605	445,265	117.1450	52,160,530	0	0	1.0000	0	2,546,446	1,856,916	1,507,563,244
2208	15,671,881	5,807,500	9,864,381	7,193,294	1,069.9643	7,696,567,840	26,171,025	1,831,752	24,339,273	17,748,661	120.1674	2,132,810,391	0	0	1.0000	0	34,203,654	24,941,955	9,829,378,232
2209	7,743,341	5,807,500	1,935,841	1,411,652	1,110.4089	1,567,510,738	2,442,356	1,831,752	610,605	445,265	123.2677	54,886,751	0	0	1.0000	0	2,546,446	1,856,916	1,622,397,489
2210	7,743,341	5,807,500	1,935,841	1,411,652	1,152.3824	1,626,762,705	2,442,356	1,831,752	610,605	445,265	126.4480	56,302,827	0	0	1.0000	0	2,546,446	1,856,916	1,683,065,532
2211	7,743,341	5,807,500	1,935,841	1,411,652	1,195.9424	1,688,254,258	2,442,356	1,831,752	610,605	445,265	129.7104	57,755,458	0	0	1.0000	0	2,546,446	1,856,916	1,746,009,716
2212	7,764,555	5,807,500	1,957,055	1,427,122	1,241.1491	1,771,271,095	2,449,048	1,831,752	617,296	450,144	133.0569	59,894,786	0	0	1.0000	0	2,574,352	1,877,266	1,831,165,881
2213	11,337,261	5,807,500	5,529,761	4,032,406	1,288.0645	5,193,999,613	13,224,116	1,831,752	11,392,364	8,307,529	136.4898	1,133,892,919	0	0	1.0000	0	16,922,125	12,339,935	6,327,892,531
2214	7,743,341	5,807,500	1,935,841	1,411,652	1,336.7533	1,887,030,221	2,442,356	1,831,752	610,605	445,265	140.0112	62,342,040	0	0	1.0000	0	2,546,446	1,856,916	1,949,372,261
2215	7,743,341	5,807,500	1,935,841	1,411,652	1,387.2826	1,958,359,999	2,442,356	1,831,752	610,605	445,265	143.6235	63,950,470	0	0	1.0000	0	2,546,446	1,856,916	2,022,310,469
2216	8,483,339	5,807,500	2,675,839	1,951,273	1,439.7219	2,809,290,264	4,605,400	1,831,752	2,773,648	2,022,597	147.3290	297,987,185	0	0	1.0000	0	5,449,487	3,973,870	3,107,277,449
2217	7,743,341	5,807,500	1,935,841	1,411,652	1,494.1434	2,109,210,241	2,442,356	1,831,752	610,605	445,265	151.1301	67,292,894	0	0	1.0000	0	2,546,446	1,856,916	2,176,503,134
2218	18,325,254	5,807,500	12,517,754	9,128,184	1,550.6220	14,154,362,794	34,188,096	1,831,752	32,356,344	23,594,861	155.0292	3,657,892,419	0	0	1.0000	0	44,874,098	32,723,045	17,812,255,213
2219	8,366,066	5,807,500	2,558,566	1,865,755	1,609.2355	3,002,438,723	4,310,531	1,831,752	2,478,780	1,807,573	159.0290	287,456,586	0	0	1.0000	0	5,037,346	3,673,328	3,289,895,309
2220	8,283,493	5,807,500	2,475,993	1,805,541	1,670.0646	3,015,370,127	4,005,860	1,831,752	2,174,109	1,585,401	163.1319	258,629,544	0	0	1.0000	0	4,650,102	3,390,942	3,273,999,672
2221	8,262,278	5,807,500	2,454,778	1,790,071	1,733.1930	3,102,538,351	3,999,169	1,831,752	2,167,417	1,580,522	167.3407	264,485,645	0	0	1.0000	0	4,622,196	3,370,593	3,367,023,996
2222	8,262,278	5,807,500	2,454,778	1,790,071	1,798.7077	3,219,814,309	3,999,169	1,831,752	2,167,417	1,580,522	171.6581	271,309,390	0	0	1.0000	0	4,622,196	3,370,593	3,491,123,699
2223	8,366,066	5,807,500	2,558,566	1,865,755	1,866.6989	3,482,802,275	4,310,531	1,831,752	2,478,780	1,807,573	176.0869	318,289,992	0	0	1.0000	0	5,037,346	3,673,328	3,801,092,267
2224	8,283,493	5,807,500	2,475,993	1,805,541	1,937.2601	3,497,802,561	4,005,860	1,831,752	2,174,109	1,585,401	180.6299	286,370,898	0	0	1.0000	0	4,650,102	3,390,942	3,784,173,459
2225	8,262,278	5,807,500	2,454,778	1,790,071	2,010.4885	3,598,916,956	3,999,169	1,831,752	2,167,417	1,580,522	185.2902	292,855,223	0	0	1.0000	0	4,622,196	3,370,593	3,891,772,179
2226	8,262,278	5,807,500	2,454,778	1,790,071	2,086.4850	3,734,956,079	3,999,169	1,831,752	2,167,417	1,580,522	190.0707	300,410,908	0	0	1.0000	0	4,622,196	3,370,593	4,035,366,987
2227	8,366,066	5,807,500	2,558,566	1,865,755	2,165.3541	4,040,019,623	4,310,531	1,831,752	2,478,780	1,807,573	194.9745	352,430,715	0	0	1.0000	0	5,037,346	3,673,328	4,392,450,338
2228	8,283,493	5,807,500	2,475,993	1,805,541	2,247.2045	4,057,419,886	4,005,860	1,831,752	2,174,109	1,585,401	200.0048	317,087,892	0	0	1.0000	0	4,650,102	3,390,942	4,374,507,778
2229	8,262,278	5,807,500	2,454,778	1,790,071	2,332.1489	4,174,711,877	3,999,169	1,831,752	2,167,417	1,580,522	205.1650	324,267,780	0	0	1.0000	0	4,622,196	3,370,593	4,498,979,657
2230	7,898,435	5,807,500	2,090,935	1,524,749	2,420.3041	3,690,356,757	9,373,508	1,831,752	7,541,756	5,499,592	210.4582	1,157,434,251	0	0	1.0000	0	9,632,691	7,024,341	4,847,791,008
2231	1,934,862	5,807,500	(3,872,638)	(2,824,001)	2,511.7916	(7,093,302,984)	5,233,607	1,831,752	3,401,855	2,480,697	215.8880	535,552,815	0	0	1.0000	0	(470,783)	(343,304)	(6,557,750,169)
	$2,420,039,607	$1,126,655,030	$1,293,384,577	$943,160,608		$156,711,216,362	$2,278,468,669	$355,359,814	$1,923,108,855	$1,402,367,516		$35,878,386,295	$0	$0		$0	$3,216,493,432	$2,345,528,124	$192,589,602,657

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment					
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 1																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2033	$23,781,621	$0	$23,781,621	$17,342,010	1.6199	$28,092,322	$10,730,367	$0	$10,730,367	$7,824,788	1.3926	$10,896,799	$1,250,000	$911,524	1.0000	$911,524	$35,761,989	$26,078,322	$39,900,645
2034	67,414,165	-	67,414,165	49,159,690	1.6811	82,642,355	37,794,291	-	37,794,291	27,560,315	1.4285	39,369,910	1,250,000	911,524	1.0000	911,524	106,458,456	77,631,529	122,923,789
2035	68,590,728	-	68,590,728	50,017,662	1.7446	87,260,813	77,836,645	-	77,836,645	56,759,960	1.4653	83,170,370	1,250,000	911,524	1.0000	911,524	147,677,372	107,689,146	171,342,706
2036	64,616,422	-	64,616,422	47,119,523	1.8106	85,314,608	81,274,975	-	81,274,975	59,267,256	1.5032	89,090,539	1,250,000	911,524	1.0000	911,524	147,141,397	107,298,302	175,316,670
2037	46,367,050	-	46,367,050	33,811,734	1.8790	63,532,248	68,950,805	-	68,950,805	50,280,237	1.5419	77,527,098	1,250,000	911,524	1.0000	911,524	116,567,855	85,003,495	141,970,869
2038	26,102,517	-	26,102,517	19,034,451	1.9501	37,119,083	44,888,187	-	44,888,187	32,733,319	1.5817	51,774,290	1,250,000	911,524	1.0000	911,524	72,240,703	52,679,293	89,804,897
2039	33,734,614	-	33,734,614	24,599,921	2.0238	49,785,321	14,198,586	-	14,198,586	10,353,879	1.6225	16,799,168	1,250,000	911,524	1.0000	911,524	49,183,200	35,865,324	67,496,013
2040	20,721,562	-	20,721,562	15,110,557	2.1003	31,736,703	9,470,370	-	9,470,370	6,905,974	1.6644	11,494,303	1,250,000	911,524	1.0000	911,524	31,441,932	22,928,054	44,142,529
2041	15,615,259	2,964,152	12,651,106	9,225,427	2.1797	20,108,663	11,497,230	1,596,286	9,900,945	7,219,957	1.7073	12,326,633	1,250,000	911,524	1.0000	911,524	23,802,051	17,356,908	33,346,820
2042	9,448,219	2,964,152	6,484,067	4,728,305	2.2620	10,695,425	6,542,839	1,596,286	4,946,554	3,607,121	1.7514	6,317,511	1,250,000	911,524	1.0000	911,524	12,680,620	9,246,949	17,924,460
2043	3,952,204	2,964,152	988,052	720,506	2.3475	1,691,388	2,127,526	1,596,286	531,240	387,390	1.7966	695,985	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	3,298,897
2044	3,963,032	2,964,152	998,879	728,402	2.4363	1,774,606	2,136,779	1,596,286	540,493	394,138	1.8429	726,357	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	3,412,486
2045	5,466,342	2,964,152	2,502,189	1,824,644	2.5284	4,613,430	6,669,939	1,596,286	5,073,654	3,699,805	1.8905	6,994,481	1,250,000	911,524	1.0000	911,524	8,825,843	6,435,973	12,519,435
2046	4,961,629	2,964,152	1,997,477	1,456,598	2.6239	3,821,968	5,155,801	1,596,286	3,559,516	2,595,667	1.9392	5,033,517	1,250,000	911,524	1.0000	911,524	6,806,993	4,963,788	9,767,008
2047	4,961,629	2,964,152	1,997,477	1,456,598	2.7231	3,966,462	5,155,801	1,596,286	3,559,516	2,595,667	1.9893	5,163,560	1,250,000	911,524	1.0000	911,524	6,806,993	4,963,788	10,041,546
2048	3,963,032	2,964,152	998,879	728,402	2.8261	2,058,537	2,136,779	1,596,286	540,493	394,138	2.0406	804,278	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	3,774,339
2049	4,961,629	2,964,152	1,997,477	1,456,598	2.9329	4,272,056	5,155,801	1,596,286	3,559,516	2,595,667	2.0932	5,433,249	1,250,000	911,524	1.0000	911,524	6,806,993	4,963,788	10,616,830
2050	5,466,342	2,964,152	2,502,189	1,824,644	3.0438	5,553,852	6,669,939	1,596,286	5,073,654	3,699,805	2.1472	7,944,221	1,250,000	911,524	1.0000	911,524	8,825,843	6,435,973	14,409,596
2051	5,411,567	2,964,152	2,447,414	1,784,701	3.1588	5,637,514	6,505,614	1,596,286	4,909,328	3,579,976	2.2026	7,885,254	1,250,000	911,524	1.0000	911,524	8,606,743	6,276,200	14,434,291
2052	5,477,170	2,964,152	2,513,017	1,832,540	3.2782	6,007,433	6,679,193	1,596,286	5,082,907	3,706,553	2.2595	8,374,956	1,250,000	911,524	1.0000	911,524	8,845,925	6,450,616	15,293,912
2053	3,952,204	2,964,152	988,052	720,506	3.4021	2,451,233	2,127,526	1,596,286	531,240	387,390	2.3178	897,893	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	4,260,650
2054	3,952,204	2,964,152	988,052	720,506	3.5307	2,543,890	2,127,526	1,596,286	531,240	387,390	2.3776	921,059	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	4,376,473
2055	5,466,342	2,964,152	2,502,189	1,824,644	3.6642	6,685,861	6,669,939	1,596,286	5,073,654	3,699,805	2.4389	9,023,454	1,250,000	911,524	1.0000	911,524	8,825,843	6,435,973	16,620,838
2056	4,972,457	2,964,152	2,008,305	1,464,494	3.8027	5,569,031	5,165,055	1,596,286	3,568,769	2,602,414	2.5018	6,510,720	1,250,000	911,524	1.0000	911,524	6,827,074	4,978,432	12,991,276
2057	4,961,629	2,964,152	1,997,477	1,456,598	3.9464	5,748,319	5,155,801	1,596,286	3,559,516	2,595,667	2.5664	6,661,519	1,250,000	911,524	1.0000	911,524	6,806,993	4,963,788	13,321,361
2058	3,952,204	2,964,152	988,052	720,506	4.0956	2,950,904	2,127,526	1,596,286	531,240	387,390	2.6326	1,019,844	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	4,882,272
2059	4,906,854	2,964,152	1,942,702	1,416,655	4.2504	6,021,350	4,991,476	1,596,286	3,395,190	2,475,837	2.7005	6,685,999	1,250,000	911,524	1.0000	911,524	6,587,892	4,804,016	13,618,873
2060	4,972,457	2,964,152	2,008,305	1,464,494	4.4111	6,460,029	5,165,055	1,596,286	3,568,769	2,602,414	2.7702	7,209,208	1,250,000	911,524	1.0000	911,524	6,827,074	4,978,432	14,580,762
2061	4,961,629	2,964,152	1,997,477	1,456,598	4.5778	6,668,015	5,155,801	1,596,286	3,559,516	2,595,667	2.8416	7,375,846	1,250,000	911,524	1.0000	911,524	6,806,993	4,963,788	14,955,385
2062	3,952,204	2,964,152	988,052	720,506	4.7509	3,423,052	2,127,526	1,596,286	531,240	387,390	2.9150	1,129,243	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	5,463,818
2063	6,980,480	2,964,152	4,016,327	2,928,782	4.9305	14,440,361	11,212,353	1,596,286	9,616,068	7,012,219	2.9902	20,967,938	1,250,000	911,524	1.0000	911,524	14,882,395	10,852,525	36,319,822
2064	5,927,107	2,964,152	2,962,955	2,160,643	5.1168	11,055,578	8,029,005	1,596,286	6,432,720	4,690,862	3.0673	14,388,279	1,250,000	911,524	1.0000	911,524	10,645,675	7,763,028	26,355,381
2065	4,961,629	2,964,152	1,997,477	1,456,598	5.3103	7,734,973	5,155,801	1,596,286	3,559,516	2,595,667	3.1465	8,167,265	1,250,000	911,524	1.0000	911,524	6,806,993	4,963,788	16,813,761
2066	3,952,204	2,964,152	988,052	720,506	5.5110	3,970,708	2,127,526	1,596,286	531,240	387,390	3.2276	1,250,341	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	6,132,573
2067	3,952,204	2,964,152	988,052	720,506	5.7193	4,120,790	2,127,526	1,596,286	531,240	387,390	3.3109	1,282,611	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	6,314,924
2068	5,981,882	2,964,152	3,017,730	2,200,586	5.9355	13,061,579	8,193,331	1,596,286	6,597,045	4,810,691	3.3963	16,338,549	1,250,000	911,524	1.0000	911,524	10,864,775	7,922,801	30,311,651
2069	5,466,342	2,964,152	2,502,189	1,824,644	6.1598	11,239,443	6,669,939	1,596,286	5,073,654	3,699,805	3.4840	12,890,120	1,250,000	911,524	1.0000	911,524	8,825,843	6,435,973	25,041,086
2070	3,952,204	2,964,152	988,052	720,506	6.3927	4,605,978	2,127,526	1,596,286	531,240	387,390	3.5738	1,384,455	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	6,901,958
2071	3,952,204	2,964,152	988,052	720,506	6.6343	4,780,053	2,127,526	1,596,286	531,240	387,390	3.6660	1,420,173	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	7,111,749
2072	6,431,820	2,964,152	3,467,668	2,528,689	6.8851	17,410,277	9,543,143	1,596,286	7,946,858	5,795,000	3.7606	21,792,676	1,250,000	911,524	1.0000	911,524	12,664,525	9,235,212	40,114,477
2073	3,952,204	2,964,152	988,052	720,506	7.1454	5,148,303	2,127,526	1,596,286	531,240	387,390	3.8576	1,494,397	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	7,554,224
2074	3,952,204	2,964,152	988,052	720,506	7.4155	5,342,912	2,127,526	1,596,286	531,240	387,390	3.9572	1,532,981	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	7,787,417
2075	6,835,510	2,964,152	3,871,358	2,823,068	7.6958	21,725,764	10,777,444	1,596,286	9,181,159	6,695,075	4.0593	27,177,319	1,250,000	911,524	1.0000	911,524	14,302,516	10,429,667	49,814,607
2076	3,963,032	2,964,152	998,879	728,402	7.9867	5,817,528	2,136,779	1,596,286	540,493	394,138	4.1640	1,641,191	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	8,370,242
2077	3,952,204	2,964,152	988,052	720,506	8.2886	5,971,986	2,127,526	1,596,286	531,240	387,390	4.2714	1,654,699	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	8,538,208
2078	6,475,767	2,964,152	3,511,615	2,560,736	8.6019	22,027,197	9,698,215	1,596,286	8,101,930	5,908,081	4.3816	25,886,848	1,250,000	911,524	1.0000	911,524	12,863,544	9,380,341	48,825,568
2079	3,952,204	2,964,152	988,052	720,506	8.9270	6,431,957	2,127,526	1,596,286	531,240	387,390	4.4947	1,741,203	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	9,084,684
2080	3,963,032	2,964,152	998,879	728,402	9.2645	6,748,279	2,136,779	1,596,286	540,493	394,138	4.6106	1,817,213	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	9,477,016
2081	3,952,204	2,964,152	988,052	720,506	9.6147	6,927,449	2,127,526	1,596,286	531,240	387,390	4.7296	1,832,201	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	9,671,174
2082	6,366,217	2,964,152	3,402,064	2,480,850	9.9781	24,754,170	9,369,564	1,596,286	7,773,279	5,668,423	4.8516	27,500,919	1,250,000	911,524	1.0000	911,524	12,425,343	9,060,796	53,166,613
2083	3,952,204	2,964,152	988,052	720,506	10.3553	7,461,055	2,127,526	1,596,286	531,240	387,390	4.9768	1,927,964	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	10,300,543
2084	3,963,032	2,964,152	998,879	728,402	10.7467	7,827,917	2,136,779	1,596,286	540,493	394,138	5.1052	2,012,154	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	10,751,594
2085	3,952,204	2,964,152	988,052	720,506	11.1529	8,035,731	2,127,526	1,596,286	531,240	387,390	5.2369	2,028,724	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	10,975,979
2086	3,952,204	2,964,152	988,052	720,506	11.5745	8,339,496	2,127,526	1,596,286	531,240	387,390	5.3720	2,081,061	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	11,332,081
2087	3,952,204	2,964,152	988,052	720,506	12.0120	8,654,718	2,127,526	1,596,286	531,240	387,390	5.5106	2,134,753	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	11,700,994
2088	19,159,622	2,964,152	16,195,470	11,810,044	12.4661	147,225,192	51,265,873	1,596,286	49,669,587	36,220,007	5.6528	204,744,453	1,250,000	911,524	1.0000	911,524	67,115,057	48,941,575	352,881,169
2089	3,952,204	2,964,152	988,052	720,506	12.9373	9,321,402	2,127,526	1,596,286	531,240	387,390	5.7986	2,246,321	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	12,479,247
2090	3,952,204	2,964,152	988,052	720,506	13.4263	9,673,729	2,127,526	1,596,286	531,240	387,390	5.9482	2,304,275	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	12,889,528
2091	3,952,204	2,964,152	988,052	720,506	13.9338	10,039,386	2,127,526	1,596,286	531,240	387,390	6.1017	2,363,739	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	13,314,649
2092	3,963,032	2,964,152	998,879	728,402	14.4605	10,533,056	2,136,779	1,596,286	540,493	394,138	6.2591	2,466,950	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	13,911,529
2093	3,952,204	2,964,152	988,052	720,506	15.0071	10,812,705	2,127,526	1,596,286	531,240	387,390	6.4206	2,487,278	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	14,211,507
2094	3,952,204	2,964,152	988,052	720,506	15.5744	11,221,448	2,127,526	1,596,286	531,240	387,390	6.5863	2,551,469	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	14,684,440
2095	5,470,929	2,964,152	2,506,776	1,827,989	16.1631	29,545,967	6,683,700	1,596,286	5,087,414	3,709,839	6.7562	25,064,414	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	55,521,905
2096	4,975,515	2,964,152	2,011,363	1,466,724	16.7741	24,602,972	5,174,228	1,596,286	3,577,943	2,609,104	6.9305	18,082,395	1,250,000	911,524	1.0000	911,524	6,839,306	4,987,352	43,596,891
2097	4,964,687	2,964,152	2,000,535	1,458,828	17.4081	25,395,422	5,164,975	1,596,286	3,568,689	2,602,356	7.1093	18,500,930	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	44,807,876
2098	3,952,204	2,964,152	988,052	720,506	18.0662	13,016,805	2,127,526	1,596,286	531,240	387,390	7.2927	2,825,121	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	16,753,450
2099	4,964,687	2,964,152	2,000,535	1,458,828	18.7491	27,351,710	5,164,975	1,596,286	3,568,689	2,602,356	7.4809	19,467,966	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	47,731,200
2100	5,470,929	2,964,152	2,506,776	1,827,989	19.4578	35,568,641	6,683,700	1,596,286	5,087,414	3,709,839	7.6739	28,468,934	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	64,949,099
2101	5,470,929	2,964,152	2,506,776	1,827,989	20.1933	36,913,127	6,683,700	1,596,286	5,087,414	3,709,839	7.8719	29,203,482	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	67,028,133
2102	5,470,929	2,964,152	2,506,776	1,827,989	20.9566	38,308,431	6,683,700	1,596,286	5,087,414	3,709,839	8.0750	29,956,950	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	69,176,905
2103	3,952,204	2,964,152	988,052	720,506	21.7488	15,670,140	2,127,526	1,596,286	531,240	387,390	8.2833	3,208,870	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	19,790,534
2104	3,963,032	2,964,152	998,879	728,402	22.5709	16,440,687	2,136,779	1,596,286	540,493	394,138	8.4970	3,348,992	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	20,701,202
2105	5,470,929	2,964,152	2,506,776	1,827,989	23.4240	42,818,811	6,683,700	1,596,286	5,087,414	3,709,839	8.7162	32,335,699	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	76,066,033
2106	4,964,687	2,964,152	2,000,535	1,458,828	24.3095	35,463,376	5,164,975	1,596,286	3,568,689	2,602,356	8.9411	23,267,926	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	59,642,826
2107	4,964,687	2,964,152	2,000,535	1,458,828	25.2284	36,803,893	5,164,975	1,596,286	3,568,689	2,602,356	9.1718	23,868,290	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	61,583,707

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.4
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2108	3,963,032	2,964,152	998,879	728,402	26.1820	19,071,019	2,136,779	1,596,286	540,493	394,138	9.4084	3,708,209	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	23,690,752
2109	4,964,687	2,964,152	2,000,535	1,458,828	27.1717	39,638,834	5,164,975	1,596,286	3,568,689	2,602,356	9.6512	25,115,859	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	65,666,217
2110	4,964,687	2,964,152	2,000,535	1,458,828	28.1988	41,137,196	5,164,975	1,596,286	3,568,689	2,602,356	9.9002	25,763,846	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	67,812,566
2111	4,964,687	2,964,152	2,000,535	1,458,828	29.2647	42,692,160	5,164,975	1,596,286	3,568,689	2,602,356	10.1556	26,428,488	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	70,032,172
2112	3,963,032	2,964,152	998,879	728,402	30.3709	22,122,222	2,136,779	1,596,286	540,493	394,138	10.4176	4,105,973	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	27,139,719
2113	6,989,653	2,964,152	4,025,501	2,935,472	31.5189	92,522,840	11,239,874	1,596,286	9,643,588	7,032,288	10.6864	75,149,839	1,250,000	911,524	1.0000	911,524	14,919,089	10,879,283	168,584,203
2114	5,977,170	2,964,152	3,013,018	2,197,150	32.7103	71,869,430	8,202,424	1,596,286	6,606,139	4,817,322	10.9621	52,807,964	1,250,000	911,524	1.0000	911,524	10,869,157	7,925,995	125,588,918
2115	5,324,430	2,964,152	2,360,278	1,721,159	33.9468	58,427,851	6,244,204	1,596,286	4,647,918	3,389,350	11.2449	38,112,906	1,250,000	911,524	1.0000	911,524	8,258,196	6,022,033	97,452,280
2116	3,963,032	2,964,152	998,879	728,402	35.2299	25,661,526	2,136,779	1,596,286	540,493	394,138	11.5350	4,546,383	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	31,119,433
2117	3,952,204	2,964,152	988,052	720,506	36.5616	26,342,851	2,127,526	1,596,286	531,240	387,390	11.8326	4,583,834	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	31,838,209
2118	5,977,170	2,964,152	3,013,018	2,197,150	37.9437	83,367,993	8,202,424	1,596,286	6,606,139	4,817,322	12.1379	58,472,171	1,250,000	911,524	1.0000	911,524	10,869,157	7,925,995	142,751,689
2119	5,470,929	2,964,152	2,506,776	1,827,989	39.3779	71,982,362	6,683,700	1,596,286	5,087,414	3,709,839	12.4511	46,191,576	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	119,085,462
2120	3,963,032	2,964,152	998,879	728,402	40.8664	29,767,164	2,136,779	1,596,286	540,493	394,138	12.7723	5,034,050	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	35,712,738
2121	3,952,204	2,964,152	988,052	720,506	42.4112	30,557,522	2,127,526	1,596,286	531,240	387,390	13.1018	5,075,510	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	36,544,556
2122	6,483,412	2,964,152	3,519,259	2,566,311	44.0143	112,954,372	9,721,149	1,596,286	8,124,863	5,924,805	13.4399	79,628,784	1,250,000	911,524	1.0000	911,524	12,894,123	9,402,639	193,494,680
2123	3,952,204	2,964,152	988,052	720,506	45.6781	32,911,343	2,127,526	1,596,286	531,240	387,390	13.7866	5,340,795	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	39,163,662
2124	3,963,032	2,964,152	998,879	728,402	47.4047	34,529,674	2,136,779	1,596,286	540,493	394,138	14.1423	5,574,020	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	41,015,217
2125	6,483,412	2,964,152	3,519,259	2,566,311	49.1966	126,253,765	9,721,149	1,596,286	8,124,863	5,924,805	14.5072	85,952,328	1,250,000	911,524	1.0000	911,524	12,894,123	9,402,639	213,117,617
2126	3,952,204	2,964,152	988,052	720,506	51.0562	36,786,296	2,127,526	1,596,286	531,240	387,390	14.8815	5,764,949	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	43,462,769
2127	3,952,204	2,964,152	988,052	720,506	52.9861	38,176,801	2,127,526	1,596,286	531,240	387,390	15.2654	5,913,668	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	45,001,992
2128	6,494,240	2,964,152	3,530,087	2,574,207	54.9890	141,553,054	9,730,403	1,596,286	8,134,117	5,931,553	15.6593	92,883,962	1,250,000	911,524	1.0000	911,524	12,914,204	9,417,283	235,348,539
2129	3,952,204	2,964,152	988,052	720,506	57.0676	41,117,546	2,127,526	1,596,286	531,240	387,390	16.0633	6,222,767	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	48,251,836
2130	3,952,204	2,964,152	988,052	720,506	59.2248	42,671,821	2,127,526	1,596,286	531,240	387,390	16.4777	6,383,301	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	49,966,646
2131	3,952,204	2,964,152	988,052	720,506	61.4635	44,284,818	2,127,526	1,596,286	531,240	387,390	16.9028	6,547,981	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	51,744,322
2132	6,494,240	2,964,152	3,530,087	2,574,207	63.7868	164,200,410	9,730,403	1,596,286	8,134,117	5,931,553	17.3389	102,846,598	1,250,000	911,524	1.0000	911,524	12,914,204	9,417,283	267,958,531
2133	3,952,204	2,964,152	988,052	720,506	66.1979	47,695,981	2,127,526	1,596,286	531,240	387,390	17.7863	6,890,240	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	55,497,745
2134	3,952,204	2,964,152	988,052	720,506	68.7002	49,498,903	2,127,526	1,596,286	531,240	387,390	18.2451	7,067,975	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	57,478,402
2135	3,952,204	2,964,152	988,052	720,506	71.2971	51,369,985	2,127,526	1,596,286	531,240	387,390	18.7159	7,250,358	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	59,531,867
2136	3,963,032	2,964,152	998,879	728,402	73.9921	53,895,987	2,136,779	1,596,286	540,493	394,138	19.1987	7,566,939	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	62,374,450
2137	3,952,204	2,964,152	988,052	720,506	76.7890	55,326,932	2,127,526	1,596,286	531,240	387,390	19.6941	7,629,303	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	63,867,759
2138	19,139,451	2,964,152	16,175,298	11,795,335	79.6916	939,989,109	47,689,266	1,596,286	46,092,980	33,611,877	20.2022	679,033,864	1,250,000	911,524	1.0000	911,524	63,518,279	46,318,736	1,619,934,496
2139	3,952,204	2,964,152	988,052	720,506	82.7040	59,588,725	2,127,526	1,596,286	531,240	387,390	20.7234	8,028,044	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	68,528,292
2140	3,963,032	2,964,152	998,879	728,402	85.8302	62,518,881	2,136,779	1,596,286	540,493	394,138	21.2580	8,378,588	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	71,808,993
2141	3,952,204	2,964,152	988,052	720,506	89.0745	64,178,708	2,127,526	1,596,286	531,240	387,390	21.8065	8,447,626	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	73,537,858
2142	3,952,204	2,964,152	988,052	720,506	92.4416	66,604,723	2,127,526	1,596,286	531,240	387,390	22.3691	8,665,572	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	76,181,819
2143	3,952,204	2,964,152	988,052	720,506	95.9359	69,122,387	2,127,526	1,596,286	531,240	387,390	22.9462	8,889,135	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	78,923,046
2144	3,963,032	2,964,152	998,879	728,402	99.5622	72,521,296	2,136,779	1,596,286	540,493	394,138	23.5382	9,277,302	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	82,710,122
2145	5,470,929	2,964,152	2,506,776	1,827,989	103.3257	188,878,227	6,683,700	1,596,286	5,087,414	3,709,839	24.1455	89,575,918	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	279,365,669
2146	4,964,687	2,964,152	2,000,535	1,458,828	107.2314	156,432,156	5,164,975	1,596,286	3,568,689	2,602,356	24.7685	64,456,457	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	221,800,138
2147	4,964,687	2,964,152	2,000,535	1,458,828	111.2847	162,345,224	5,164,975	1,596,286	3,568,689	2,602,356	25.4075	66,119,363	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	229,376,110
2148	3,963,032	2,964,152	998,879	728,402	115.4913	84,124,083	2,136,779	1,596,286	540,493	394,138	26.0630	10,272,422	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	95,308,029
2149	4,964,687	2,964,152	2,000,535	1,458,828	119.8569	174,850,588	5,164,975	1,596,286	3,568,689	2,602,356	26.7355	69,575,292	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	245,337,404
2150	5,470,929	2,964,152	2,506,776	1,827,989	124.3875	227,378,963	6,683,700	1,596,286	5,087,414	3,709,839	27.4252	101,743,077	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	330,033,563
2151	5,470,929	2,964,152	2,506,776	1,827,989	129.0893	235,973,801	6,683,700	1,596,286	5,087,414	3,709,839	28.1328	104,368,159	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	341,253,483
2152	5,481,757	2,964,152	2,517,604	1,835,885	133.9689	245,951,467	6,692,953	1,596,286	5,096,668	3,716,587	28.8586	107,255,493	1,250,000	911,524	1.0000	911,524	8,864,272	6,463,995	354,118,484
2153	3,952,204	2,964,152	988,052	720,506	139.0329	100,174,033	2,127,526	1,596,286	531,240	387,390	29.6032	11,467,992	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	112,553,549
2154	3,952,204	2,964,152	988,052	720,506	144.2884	103,960,652	2,127,526	1,596,286	531,240	387,390	30.3669	11,763,842	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	116,636,018
2155	5,830,672	2,964,152	2,866,519	2,090,320	149.7425	313,009,782	7,762,929	1,596,286	6,166,643	4,496,833	31.1504	140,078,155	1,250,000	911,524	1.0000	911,524	10,283,162	7,498,677	453,999,461
2156	4,975,515	2,964,152	2,011,363	1,466,724	155.4027	227,932,844	5,174,228	1,596,286	3,577,943	2,609,104	31.9541	83,371,568	1,250,000	911,524	1.0000	911,524	6,839,306	4,987,352	312,215,936
2157	4,964,687	2,964,152	2,000,535	1,458,828	161.2769	235,275,239	5,164,975	1,596,286	3,568,689	2,602,356	32.7785	85,301,330	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	321,488,093
2158	3,952,204	2,964,152	988,052	720,506	167.3732	120,593,388	2,127,526	1,596,286	531,240	387,390	33.6242	13,025,689	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	134,530,600
2159	4,964,687	2,964,152	2,000,535	1,458,828	173.6999	253,398,258	5,164,975	1,596,286	3,568,689	2,602,356	34.4917	89,759,686	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	344,069,468
2160	4,975,515	2,964,152	2,011,363	1,466,724	180.2658	264,400,146	5,174,228	1,596,286	3,577,943	2,609,104	35.3816	92,314,272	1,250,000	911,524	1.0000	911,524	6,839,306	4,987,352	357,625,941
2161	4,964,687	2,964,152	2,000,535	1,458,828	187.0798	272,917,229	5,164,975	1,596,286	3,568,689	2,602,356	36.2944	94,450,954	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	368,279,706
2162	3,952,204	2,964,152	988,052	720,506	194.1514	139,887,240	2,127,526	1,596,286	531,240	387,390	37.2308	14,422,851	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	155,221,615
2163	6,989,653	2,964,152	4,025,501	2,935,472	201.4904	591,469,375	11,239,874	1,596,286	9,643,588	7,032,288	38.1914	268,572,912	1,250,000	911,524	1.0000	911,524	14,919,089	10,879,283	860,953,811
2164	5,987,998	2,964,152	3,023,846	2,205,046	209.1067	461,089,843	8,211,678	1,596,286	6,615,392	4,824,070	39.1767	188,991,132	1,250,000	911,524	1.0000	911,524	10,889,238	7,940,639	650,992,499
2165	4,964,687	2,964,152	2,000,535	1,458,828	217.0109	316,581,552	5,164,975	1,596,286	3,568,689	2,602,356	40.1875	104,582,186	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	422,075,262
2166	3,952,204	2,964,152	988,052	720,506	225.2140	162,268,029	2,127,526	1,596,286	531,240	387,390	41.2243	15,969,894	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	179,149,446
2167	3,952,204	2,964,152	988,052	720,506	233.7270	168,401,696	2,127,526	1,596,286	531,240	387,390	42.2879	16,381,922	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	185,695,142
2168	5,987,998	2,964,152	3,023,846	2,205,046	242.5619	534,860,090	8,211,678	1,596,286	6,615,392	4,824,070	43.3789	209,262,838	1,250,000	911,524	1.0000	911,524	10,889,238	7,940,639	745,034,452
2169	5,470,929	2,964,152	2,506,776	1,827,989	251.7308	460,161,095	6,683,700	1,596,286	5,087,414	3,709,839	44.4981	165,080,787	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	626,153,406
2170	3,952,204	2,964,152	988,052	720,506	261.2462	188,229,443	2,127,526	1,596,286	531,240	387,390	45.6462	17,682,895	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	206,823,862
2171	3,952,204	2,964,152	988,052	720,506	271.1213	195,344,512	2,127,526	1,596,286	531,240	387,390	46.8238	18,139,086	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	214,395,121
2172	6,494,240	2,964,152	3,530,087	2,574,207	281.3697	724,303,775	9,730,403	1,596,286	8,134,117	5,931,553	48.0319	284,903,742	1,250,000	911,524	1.0000	911,524	12,914,204	9,417,283	1,010,119,041
2173	3,952,204	2,964,152	988,052	720,506	292.0054	210,391,630	2,127,526	1,596,286	531,240	387,390	49.2711	19,087,146	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	230,390,300
2174	3,952,204	2,964,152	988,052	720,506	303.0433	218,344,503	2,127,526	1,596,286	531,240	387,390	50.5423	19,579,596	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	238,835,623
2175	6,483,412	2,964,152	3,519,259	2,566,311	314.4983	807,100,377	9,721,149	1,596,286	8,124,863	5,924,805	51.8463	307,179,207	1,250,000	911,524	1.0000	911,524	12,894,123	9,402,639	1,115,191,107
2176	3,963,032	2,964,152	998,879	728,402	326.3863	237,740,404	2,136,779	1,596,286	540,493	394,138	53.1839	20,961,802	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	259,613,730
2177	3,952,204	2,964,152	988,052	720,506	338.7237	244,052,444	2,127,526	1,596,286	531,240	387,390	54.5561	21,134,504	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	266,098,471
2178	6,483,412	2,964,152	3,519,259	2,566,311	351.5275	902,128,812	9,721,149	1,596,286	8,124,863	5,924,805	55.9636	331,573,405	1,250,000	911,524	1.0000	911,524	12,894,123	9,402,639	1,234,613,741
2179	3,952,204	2,964,152	988,052	720,506	364.8152	262,851,525	2,127,526	1,596,286	531,240	387,390	57.4075	22,239,108	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	286,002,157
2180	3,963,032	2,964,152	998,879	728,402	378.6052	275,776,750	2,136,779	1,596,286	540,493	394,138	58.8886	23,210,242	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	299,898,516
2181	3,952,204	2,964,152	988,052	720,506	392.9165	283,098,679	2,127,526	1,596,286	531,240	387,390	60.4079	23,401,434	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	307,411,637
2182	6,483,412	2,964,152	3,519,259	2,566,311	407.7688	1,046,461,466	9,721,149	1,596,286	8,124,863	5,924,805	61.9664	367,138,824	1,250,000	911,524	1.0000	911,524	12,894,123	9,402,639	1,414,511,813
2183	3,952,204	2,964,152	988,052	720,506	423.1824	304,905,440	2,127,526	1,596,286	531,240	387,390	63.5652	24,624,542	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	330,441,505
2184	3,963,032	2,964,152	998,879	728,402	439.1787	319,898,603	2,136,779	1,596,286	540,493	394,138	65.2052	25,699,855	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	346,509,982

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2185	3,952,204	2,964,152	988,052	720,506	455.7797	328,391,989	2,127,526	1,596,286	531,240	387,390	66.8874	25,911,530	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	355,215,042
2186	3,952,204	2,964,152	988,052	720,506	473.0081	340,805,154	2,127,526	1,596,286	531,240	387,390	68.6131	26,580,049	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	368,296,726
2187	3,952,204	2,964,152	988,052	720,506	490.8878	353,687,584	2,127,526	1,596,286	531,240	387,390	70.3834	27,265,846	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	381,864,954
2188	19,150,279	2,964,152	16,186,126	11,803,231	509.4434	6,013,078,045	47,698,520	1,596,286	46,102,234	33,618,625	72.1993	2,427,241,186	1,250,000	911,524	1.0000	911,524	63,538,360	46,333,380	8,441,230,755
2189	3,952,204	2,964,152	988,052	720,506	528.7004	380,931,787	2,127,526	1,596,286	531,240	387,390	74.0620	28,690,900	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	410,534,211
2190	3,952,204	2,964,152	988,052	720,506	548.6852	395,330,955	2,127,526	1,596,286	531,240	387,390	75.9728	29,431,125	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	425,673,604
2191	3,952,204	2,964,152	988,052	720,506	569.4255	410,274,465	2,127,526	1,596,286	531,240	387,390	77.9329	30,190,449	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	441,376,437
2192	3,963,032	2,964,152	998,879	728,402	590.9498	430,448,962	2,136,779	1,596,286	540,493	394,138	79.9436	31,508,820	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	462,869,306
2193	4,055,991	2,964,152	1,091,839	796,190	613.2877	488,293,395	2,438,888	1,596,286	842,603	614,442	82.0061	50,387,974	1,250,000	911,524	1.0000	911,524	3,184,442	2,322,155	539,592,893
2194	4,211,673	2,964,152	1,247,520	909,715	636.4700	579,006,624	2,905,932	1,596,286	1,309,646	955,019	84.1219	80,338,009	1,250,000	911,524	1.0000	911,524	3,807,167	2,776,258	660,256,157
2195	6,090,140	2,964,152	3,125,988	2,279,530	660.5286	1,505,694,633	8,541,335	1,596,286	6,945,049	5,064,462	86.2922	437,023,558	1,250,000	911,524	1.0000	911,524	11,321,037	8,255,515	1,943,629,715
2196	5,286,878	2,964,152	2,322,725	1,693,775	685.4966	1,161,077,200	6,108,316	1,596,286	4,512,030	3,290,258	88.5185	291,248,729	1,250,000	911,524	1.0000	911,524	8,084,756	5,895,557	1,453,237,453
2197	5,120,368	2,964,152	2,156,216	1,572,354	711.4083	1,118,585,409	5,632,019	1,596,286	4,035,733	2,942,933	90.8023	267,225,112	1,250,000	911,524	1.0000	911,524	7,441,949	5,426,811	1,386,722,044
2198	4,315,460	2,964,152	1,351,308	985,399	738.2996	727,519,921	3,217,294	1,596,286	1,621,009	1,182,070	93.1450	110,103,948	1,250,000	911,524	1.0000	911,524	4,222,317	3,078,993	838,535,393
2199	5,120,368	2,964,152	2,156,216	1,572,354	766.2073	1,204,748,814	5,632,019	1,596,286	4,035,733	2,942,933	95.5482	281,191,979	1,250,000	911,524	1.0000	911,524	7,441,949	5,426,811	1,486,852,317
2200	5,574,716	2,964,152	2,610,564	1,903,673	795.1699	1,513,743,203	6,995,062	1,596,286	5,398,777	3,936,890	98.0133	385,867,626	1,250,000	911,524	1.0000	911,524	9,259,340	6,752,087	1,900,522,353
2201	5,730,397	2,964,152	2,766,245	2,017,198	825.2273	1,664,647,182	7,462,106	1,596,286	5,865,820	4,277,468	100.5421	430,065,579	1,250,000	911,524	1.0000	911,524	9,882,065	7,206,190	2,095,624,284
2202	5,730,397	2,964,152	2,766,245	2,017,198	856.4209	1,727,570,862	7,462,106	1,596,286	5,865,820	4,277,468	103.1360	441,160,902	1,250,000	911,524	1.0000	911,524	9,882,065	7,206,190	2,169,643,287
2203	4,107,885	2,964,152	1,143,733	834,032	888.7937	741,282,105	2,594,569	1,596,286	998,284	727,968	105.7969	77,016,706	1,250,000	911,524	1.0000	911,524	3,392,017	2,473,523	819,210,334
2204	4,170,607	2,964,152	1,206,454	879,770	922.3901	811,490,716	2,759,504	1,596,286	1,163,219	848,241	108.5265	92,056,633	1,250,000	911,524	1.0000	911,524	3,619,673	2,639,534	904,458,872
2205	5,678,504	2,964,152	2,714,351	1,979,356	957.2564	1,894,751,661	7,306,425	1,596,286	5,710,139	4,163,942	111.3265	463,557,079	1,250,000	911,524	1.0000	911,524	9,674,490	7,054,822	2,359,220,264
2206	5,120,368	2,964,152	2,156,216	1,572,354	993.4407	1,562,040,071	5,632,019	1,596,286	4,035,733	2,942,933	114.1987	336,079,156	1,250,000	911,524	1.0000	911,524	7,441,949	5,426,811	1,899,030,751
2207	5,172,262	2,964,152	2,208,110	1,610,196	1,030.9927	1,660,099,825	5,787,700	1,596,286	4,191,414	3,056,459	117.1450	358,048,892	1,250,000	911,524	1.0000	911,524	7,649,524	5,578,178	2,019,060,241
2208	4,170,607	2,964,152	1,206,454	879,770	1,069.9643	941,322,002	2,759,504	1,596,286	1,163,219	848,241	120.1674	101,930,922	1,250,000	911,524	1.0000	911,524	3,619,673	2,639,534	1,044,164,448
2209	5,120,368	2,964,152	2,156,216	1,572,354	1,110.4089	1,745,955,443	5,632,019	1,596,286	4,035,733	2,942,933	123.2677	362,768,618	1,250,000	911,524	1.0000	911,524	7,441,949	5,426,811	2,109,635,585
2210	5,172,262	2,964,152	2,208,110	1,610,196	1,152.3824	1,855,560,976	5,787,700	1,596,286	4,191,414	3,056,459	126.4480	386,483,130	1,250,000	911,524	1.0000	911,524	7,649,524	5,578,178	2,242,955,630
2211	5,172,262	2,964,152	2,208,110	1,610,196	1,195.9424	1,925,701,093	5,787,700	1,596,286	4,191,414	3,056,459	129.7104	396,454,522	1,250,000	911,524	1.0000	911,524	7,649,524	5,578,178	2,323,067,139
2212	4,170,607	2,964,152	1,206,454	879,770	1,241.1491	1,091,925,175	2,759,504	1,596,286	1,163,219	848,241	133.0569	112,864,325	1,250,000	911,524	1.0000	911,524	3,619,673	2,639,534	1,205,701,024
2213	7,197,228	2,964,152	4,233,076	3,086,839	1,288.0645	3,976,048,216	11,862,599	1,596,286	10,266,313	7,486,391	136.4898	1,021,815,954	1,250,000	911,524	1.0000	911,524	15,749,389	11,484,754	4,998,775,694
2214	6,184,745	2,964,152	3,220,593	2,348,517	1,336.7533	3,139,388,447	8,825,149	1,596,286	7,228,864	5,271,425	140.0112	738,058,512	1,250,000	911,524	1.0000	911,524	11,699,457	8,531,466	3,878,358,483
2215	5,172,262	2,964,152	2,208,110	1,610,196	1,387.2826	2,233,796,226	5,787,700	1,596,286	4,191,414	3,056,459	143.6235	438,979,342	1,250,000	911,524	1.0000	911,524	7,649,524	5,578,178	2,673,687,091
2216	4,170,607	2,964,152	1,206,454	879,770	1,439.7219	1,266,623,476	2,759,504	1,596,286	1,163,219	848,241	147.3290	124,970,507	1,250,000	911,524	1.0000	911,524	3,619,673	2,639,534	1,392,505,507
2217	4,133,788	2,964,152	1,169,635	852,920	1,494.1434	1,274,385,057	14,534,310	1,596,286	12,938,024	9,434,653	151.1301	1,425,860,066	1,250,000	911,524	1.0000	911,524	15,357,659	11,199,097	2,701,156,647
2218	1,123,816	2,964,152	(1,840,336)	(1,342,008)	1,550.6220	(2,080,947,614)	3,040,582	1,596,286	1,444,296	1,053,208	155.0292	163,278,062	0	0	1.0000	0	(396,040)	(288,800)	(1,917,669,552)
	$1,249,423,317	$527,619,129	$721,804,188	$526,353,328		$61,283,682,476	$1,293,782,498	$284,138,836	$1,009,643,662	$736,251,342		$18,466,023,783	$231,250,000	$168,631,894		$168,631,894	$1,962,697,851	$1,431,236,564	$79,918,338,153

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment					
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 2																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2034	$8,345,548	$0	$8,345,548	$6,085,732	1.6811	$10,230,725	$4,974,446	$0	$4,974,446	$3,627,460	1.4285	$5,181,827	$1,250,000	$911,524	1.0000	$911,524	$14,569,994	$10,624,716	$16,324,075
2035	49,894,465	-	49,894,465	36,383,992	1.7446	63,475,512	37,951,789	-	37,951,789	27,675,166	1.4653	40,552,420	1,250,000	911,524	1.0000	911,524	89,096,254	64,970,681	104,939,456
2036	67,674,097	-	67,674,097	49,349,237	1.8106	89,351,729	75,594,885	-	75,594,885	55,125,227	1.5032	82,864,241	1,250,000	911,524	1.0000	911,524	144,518,982	105,385,988	173,127,494
2037	76,073,328	-	76,073,328	55,474,116	1.8790	104,235,864	94,046,676	-	94,046,676	68,580,623	1.5419	105,744,462	1,250,000	911,524	1.0000	911,524	171,370,003	124,966,263	210,891,850
2038	82,785,291	-	82,785,291	60,368,607	1.9501	117,724,821	103,456,871	-	103,456,871	75,442,716	1.5817	119,327,744	1,250,000	911,524	1.0000	911,524	187,492,162	136,722,847	237,964,089
2039	39,073,080	-	39,073,080	28,492,832	2.0238	57,663,794	15,617,110	-	15,617,110	11,388,294	1.6225	18,477,506	1,250,000	911,524	1.0000	911,524	55,940,190	40,792,649	77,052,824
2040	24,879,886	-	24,879,886	18,142,885	2.1003	38,105,502	14,363,504	-	14,363,504	10,474,140	1.6644	17,433,158	1,250,000	911,524	1.0000	911,524	40,493,389	29,528,549	56,450,184
2041	18,384,389	-	18,384,389	13,406,246	2.1797	29,221,594	18,969,870	-	18,969,870	13,833,189	1.7073	23,617,404	1,250,000	911,524	1.0000	911,524	38,604,259	28,150,959	53,750,522
2042	10,753,124	2,972,273	7,780,851	5,673,944	2.2620	12,834,462	10,064,192	1,600,659	8,463,533	6,171,769	1.7514	10,809,236	1,250,000	911,524	1.0000	911,524	17,494,384	12,757,237	24,555,222
2043	3,952,204	2,972,273	979,931	714,584	2.3475	1,677,486	2,127,526	1,600,659	526,867	384,201	1.7966	690,256	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	3,279,265
2044	3,963,032	2,972,273	990,759	722,480	2.4363	1,760,178	2,136,779	1,600,659	536,120	390,949	1.8429	720,480	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	3,392,181
2045	5,466,342	2,972,273	2,494,069	1,818,722	2.5284	4,598,457	6,669,939	1,600,659	5,069,280	3,696,616	1.8905	6,988,452	1,250,000	911,524	1.0000	911,524	8,813,349	6,426,861	12,498,433
2046	4,961,629	2,972,273	1,989,356	1,450,676	2.6239	3,806,429	5,155,801	1,600,659	3,555,143	2,592,477	1.9392	5,027,332	1,250,000	911,524	1.0000	911,524	6,794,498	4,954,677	9,745,285
2047	4,961,629	2,972,273	1,989,356	1,450,676	2.7231	3,950,336	5,155,801	1,600,659	3,555,143	2,592,477	1.9893	5,157,215	1,250,000	911,524	1.0000	911,524	6,794,498	4,954,677	10,019,075
2048	3,963,032	2,972,273	990,759	722,480	2.8261	2,041,801	2,136,779	1,600,659	536,120	390,949	2.0406	797,770	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	3,751,095
2049	4,961,629	2,972,273	1,989,356	1,450,676	2.9329	4,254,688	5,155,801	1,600,659	3,555,143	2,592,477	2.0932	5,426,574	1,250,000	911,524	1.0000	911,524	6,794,498	4,954,677	10,592,785
2050	5,466,342	2,972,273	2,494,069	1,818,722	3.0438	5,535,826	6,669,939	1,600,659	5,069,280	3,696,616	2.1472	7,937,373	1,250,000	911,524	1.0000	911,524	8,813,349	6,426,861	14,384,723
2051	5,411,567	2,972,273	2,439,293	1,778,779	3.1588	5,618,807	6,505,614	1,600,659	4,904,955	3,576,786	2.2026	7,878,230	1,250,000	911,524	1.0000	911,524	8,594,248	6,267,089	14,408,561
2052	5,477,170	2,972,273	2,504,896	1,826,618	3.2782	5,988,019	6,679,193	1,600,659	5,078,534	3,703,363	2.2595	8,367,750	1,250,000	911,524	1.0000	911,524	8,833,430	6,441,505	15,267,293
2053	3,952,204	2,972,273	979,931	714,584	3.4021	2,431,086	2,127,526	1,600,659	526,867	384,201	2.3178	890,501	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	4,233,111
2054	3,952,204	2,972,273	979,931	714,584	3.5307	2,522,982	2,127,526	1,600,659	526,867	384,201	2.3776	913,477	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	4,347,982
2055	5,466,342	2,972,273	2,494,069	1,818,722	3.6642	6,664,162	6,669,939	1,600,659	5,069,280	3,696,616	2.4389	9,015,676	1,250,000	911,524	1.0000	911,524	8,813,349	6,426,861	16,591,361
2056	4,972,457	2,972,273	2,000,184	1,458,572	3.8027	5,546,512	5,165,055	1,600,659	3,564,396	2,599,225	2.5018	6,502,742	1,250,000	911,524	1.0000	911,524	6,814,580	4,969,321	12,960,777
2057	4,961,629	2,972,273	1,989,356	1,450,676	3.9464	5,724,948	5,155,801	1,600,659	3,555,143	2,592,477	2.5664	6,653,334	1,250,000	911,524	1.0000	911,524	6,794,498	4,954,677	13,289,806
2058	3,952,204	2,972,273	979,931	714,584	4.0956	2,926,650	2,127,526	1,600,659	526,867	384,201	2.6326	1,011,448	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	4,849,622
2059	4,906,854	2,972,273	1,934,581	1,410,733	4.2504	5,996,180	4,991,476	1,600,659	3,390,817	2,472,648	2.7005	6,677,387	1,250,000	911,524	1.0000	911,524	6,575,398	4,794,905	13,585,090
2060	4,972,457	2,972,273	2,000,184	1,458,572	4.4111	6,433,907	5,165,055	1,600,659	3,564,396	2,599,225	2.7702	7,200,374	1,250,000	911,524	1.0000	911,524	6,814,580	4,969,321	14,545,805
2061	4,961,629	2,972,273	1,989,356	1,450,676	4.5778	6,640,905	5,155,801	1,600,659	3,555,143	2,592,477	2.8416	7,366,784	1,250,000	911,524	1.0000	911,524	6,794,498	4,954,677	14,919,213
2062	3,952,204	2,972,273	979,931	714,584	4.7509	3,394,917	2,127,526	1,600,659	526,867	384,201	2.9150	1,119,946	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	5,426,387
2063	6,980,480	2,972,273	4,008,206	2,922,860	4.9305	14,411,163	11,212,353	1,600,659	9,611,694	7,009,030	2.9902	20,958,402	1,250,000	911,524	1.0000	911,524	14,869,901	10,843,414	36,281,088
2064	5,927,107	2,972,273	2,954,834	2,154,721	5.1168	11,025,277	8,029,005	1,600,659	6,428,346	4,687,672	3.0673	14,378,497	1,250,000	911,524	1.0000	911,524	10,633,180	7,753,917	26,315,298
2065	4,961,629	2,972,273	1,989,356	1,450,676	5.3103	7,703,525	5,155,801	1,600,659	3,555,143	2,592,477	3.1465	8,157,230	1,250,000	911,524	1.0000	911,524	6,794,498	4,954,677	16,772,279
2066	3,952,204	2,972,273	979,931	714,584	5.5110	3,938,072	2,127,526	1,600,659	526,867	384,201	3.2276	1,240,048	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	6,089,644
2067	3,952,204	2,972,273	979,931	714,584	5.7193	4,086,920	2,127,526	1,600,659	526,867	384,201	3.3109	1,272,052	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	6,270,496
2068	5,981,882	2,972,273	3,009,609	2,194,664	5.9355	13,026,429	8,193,331	1,600,659	6,592,672	4,807,502	3.3963	16,327,718	1,250,000	911,524	1.0000	911,524	10,852,281	7,913,689	30,265,670
2069	5,466,342	2,972,273	2,494,069	1,818,722	6.1598	11,202,965	6,669,939	1,600,659	5,069,280	3,696,616	3.4840	12,879,009	1,250,000	911,524	1.0000	911,524	8,813,349	6,426,861	24,993,497
2070	3,952,204	2,972,273	979,931	714,584	6.3927	4,568,121	2,127,526	1,600,659	526,867	384,201	3.5738	1,373,058	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	6,852,703
2071	3,952,204	2,972,273	979,931	714,584	6.6343	4,740,765	2,127,526	1,600,659	526,867	384,201	3.6660	1,408,481	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	7,060,770
2072	6,431,820	2,972,273	3,459,547	2,522,767	6.8851	17,369,504	9,543,143	1,600,659	7,942,484	5,791,810	3.7606	21,780,683	1,250,000	911,524	1.0000	911,524	12,652,031	9,226,101	40,061,710
2073	3,952,204	2,972,273	979,931	714,584	7.1454	5,105,988	2,127,526	1,600,659	526,867	384,201	3.8576	1,482,094	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	7,499,607
2074	3,952,204	2,972,273	979,931	714,584	7.4155	5,298,998	2,127,526	1,600,659	526,867	384,201	3.9572	1,520,361	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	7,730,882
2075	6,835,510	2,972,273	3,863,237	2,817,146	7.6958	21,680,190	10,777,444	1,600,659	9,176,785	6,691,886	4.0593	27,164,373	1,250,000	911,524	1.0000	911,524	14,290,022	10,420,556	49,756,087
2076	3,963,032	2,972,273	990,759	722,480	7.9867	5,770,231	2,136,779	1,600,659	536,120	390,949	4.1640	1,627,911	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	8,309,666
2077	3,952,204	2,972,273	979,931	714,584	8.2886	5,922,901	2,127,526	1,600,659	526,867	384,201	4.2714	1,641,077	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	8,475,501
2078	6,475,767	2,972,273	3,503,494	2,554,814	8.6019	21,976,257	9,698,215	1,600,659	8,097,556	5,904,892	4.3816	25,872,874	1,250,000	911,524	1.0000	911,524	12,851,050	9,371,230	48,760,655
2079	3,952,204	2,972,273	979,931	714,584	8.9270	6,379,091	2,127,526	1,600,659	526,867	384,201	4.4947	1,726,869	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	9,017,484
2080	3,963,032	2,972,273	990,759	722,480	9.2645	6,693,415	2,136,779	1,600,659	536,120	390,949	4.6106	1,802,509	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	9,407,448
2081	3,952,204	2,972,273	979,931	714,584	9.6147	6,870,511	2,127,526	1,600,659	526,867	384,201	4.7296	1,817,118	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	9,599,152
2082	6,366,217	2,972,273	3,393,944	2,474,928	9.9781	24,695,080	9,369,564	1,600,659	7,768,905	5,665,233	4.8516	27,485,447	1,250,000	911,524	1.0000	911,524	12,412,849	9,051,685	53,092,050
2083	3,952,204	2,972,273	979,931	714,584	10.3553	7,399,732	2,127,526	1,600,659	526,867	384,201	4.9768	1,912,092	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	10,223,348
2084	3,963,032	2,972,273	990,759	722,480	10.7467	7,764,275	2,136,779	1,600,659	536,120	390,949	5.1052	1,995,873	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	10,671,672
2085	3,952,204	2,972,273	979,931	714,584	11.1529	7,969,684	2,127,526	1,600,659	526,867	384,201	5.2369	2,012,023	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	10,893,231
2086	3,952,204	2,972,273	979,931	714,584	11.5745	8,270,952	2,127,526	1,600,659	526,867	384,201	5.3720	2,063,929	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	11,246,405
2087	3,952,204	2,972,273	979,931	714,584	12.0120	8,583,583	2,127,526	1,600,659	526,867	384,201	5.5106	2,117,179	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	11,612,285
2088	19,159,622	2,972,273	16,187,349	11,804,122	12.4661	147,151,368	51,265,873	1,600,659	49,665,214	36,216,817	5.6528	204,726,425	1,250,000	911,524	1.0000	911,524	67,102,562	48,932,463	352,789,317
2089	3,952,204	2,972,273	979,931	714,584	12.9373	9,244,788	2,127,526	1,600,659	526,867	384,201	5.7986	2,227,829	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	12,384,140
2090	3,952,204	2,972,273	979,931	714,584	13.4263	9,594,219	2,127,526	1,600,659	526,867	384,201	5.9482	2,285,305	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	12,791,048
2091	3,952,204	2,972,273	979,931	714,584	13.9338	9,956,870	2,127,526	1,600,659	526,867	384,201	6.1017	2,344,280	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	13,212,674
2092	3,963,032	2,972,273	990,759	722,480	14.4605	10,447,421	2,136,779	1,600,659	536,120	390,949	6.2591	2,446,989	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	13,805,934
2093	3,952,204	2,972,273	979,931	714,584	15.0071	10,723,833	2,127,526	1,600,659	526,867	384,201	6.4206	2,466,802	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	14,102,159
2094	3,952,204	2,972,273	979,931	714,584	15.5744	11,129,217	2,127,526	1,600,659	526,867	384,201	6.5863	2,530,464	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	14,571,205
2095	5,470,929	2,972,273	2,498,655	1,822,067	16.1631	29,450,249	6,683,700	1,600,659	5,083,041	3,706,650	6.7562	25,042,868	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	55,404,641
2096	4,975,515	2,972,273	2,003,242	1,460,802	16.7741	24,503,637	5,174,228	1,600,659	3,573,570	2,605,915	6.9305	18,060,292	1,250,000	911,524	1.0000	911,524	6,826,811	4,978,240	43,475,453
2097	4,964,687	2,972,273	1,992,414	1,452,906	17.4081	25,292,332	5,164,975	1,600,659	3,564,316	2,599,167	7.1093	18,478,258	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	44,682,113
2098	3,952,204	2,972,273	979,931	714,584	18.0662	12,909,817	2,127,526	1,600,659	526,867	384,201	7.2927	2,801,864	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	16,623,205
2099	4,964,687	2,972,273	1,992,414	1,452,906	18.7491	27,240,678	5,164,975	1,600,659	3,564,316	2,599,167	7.4809	19,444,108	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	47,596,310
2100	5,470,929	2,972,273	2,498,655	1,822,067	19.4578	35,453,413	6,683,700	1,600,659	5,083,041	3,706,650	7.6739	28,444,460	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	64,809,397
2101	5,470,929	2,972,273	2,498,655	1,822,067	20.1933	36,793,543	6,683,700	1,600,659	5,083,041	3,706,650	7.8719	29,178,377	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	66,883,444
2102	5,470,929	2,972,273	2,498,655	1,822,067	20.9566	38,184,327	6,683,700	1,600,659	5,083,041	3,706,650	8.0750	29,931,198	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	69,027,048
2103	3,952,204	2,972,273	979,931	714,584	21.7488	15,541,344	2,127,526	1,600,659	526,867	384,201	8.2833	3,182,453	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	19,635,321
2104	3,963,032	2,972,273	990,759	722,480	22.5709	16,307,023	2,136,779	1,600,659	536,120	390,949	8.4970	3,321,893	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	20,540,440
2105	5,470,929	2,972,273	2,498,655	1,822,067	23.4240	42,680,095	6,683,700	1,600,659	5,083,041	3,706,650	8.7162	32,307,901	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	75,899,520
2106	4,964,687	2,972,273	1,992,414	1,452,906	24.3095	35,319,417	5,164,975	1,600,659	3,564,316	2,599,167	8.9411	23,239,412	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	59,470,352
2107	4,964,687	2,972,273	1,992,414	1,452,906	25.2284	36,654,492	5,164,975	1,600,659	3,564,316	2,599,167	9.1718	23,839,040	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	61,405,055
2108	3,963,032	2,972,273	990,759	722,480	26.1820	18,915,970	2,136,779	1,600,659	536,120	390,949	9.4084	3,678,204	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	23,505,698

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.4
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2109	4,964,687	2,972,273	1,992,414	1,452,906	27.1717	39,477,924	5,164,975	1,600,659	3,564,316	2,599,167	9.6512	25,085,080	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	65,474,528
2110	4,964,687	2,972,273	1,992,414	1,452,906	28.1988	40,970,204	5,164,975	1,600,659	3,564,316	2,599,167	9.9002	25,732,273	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	67,614,000
2111	4,964,687	2,972,273	1,992,414	1,452,906	29.2647	42,518,856	5,164,975	1,600,659	3,564,316	2,599,167	10.1556	26,396,100	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	69,826,480
2112	3,963,032	2,972,273	990,759	722,480	30.3709	21,942,366	2,136,779	1,600,659	536,120	390,949	10.4176	4,072,750	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	26,926,640
2113	6,989,653	2,972,273	4,017,380	2,929,550	31.5189	92,336,187	11,239,874	1,600,659	9,639,215	7,029,099	10.6864	75,115,759	1,250,000	911,524	1.0000	911,524	14,906,595	10,870,172	168,363,469
2114	5,977,170	2,972,273	3,004,897	2,191,228	32.7103	71,675,720	8,202,424	1,600,659	6,601,765	4,814,133	10.9621	52,773,005	1,250,000	911,524	1.0000	911,524	10,856,662	7,916,884	125,360,249
2115	5,324,430	2,972,273	2,352,157	1,715,237	33.9468	58,226,819	6,244,204	1,600,659	4,643,545	3,386,161	11.2449	38,077,044	1,250,000	911,524	1.0000	911,524	8,245,702	6,012,922	97,215,387
2116	3,963,032	2,972,273	990,759	722,480	35.2299	25,452,896	2,136,779	1,600,659	536,120	390,949	11.5350	4,509,596	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	30,874,016
2117	3,952,204	2,972,273	979,931	714,584	36.5616	26,126,334	2,127,526	1,600,659	526,867	384,201	11.8326	4,546,098	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	31,583,956
2118	5,977,170	2,972,273	3,004,897	2,191,228	37.9437	83,143,292	8,202,424	1,600,659	6,601,765	4,814,133	12.1379	58,433,462	1,250,000	911,524	1.0000	911,524	10,856,662	7,916,884	142,488,278
2119	5,470,929	2,972,273	2,498,655	1,822,067	39.3779	71,749,168	6,683,700	1,600,659	5,083,041	3,706,650	12.4511	46,151,868	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	118,812,559
2120	3,963,032	2,972,273	990,759	722,480	40.8664	29,525,154	2,136,779	1,600,659	536,120	390,949	12.7723	4,993,317	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	35,429,996
2121	3,952,204	2,972,273	979,931	714,584	42.4112	30,306,365	2,127,526	1,600,659	526,867	384,201	13.1018	5,033,726	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	36,251,615
2122	6,483,412	2,972,273	3,511,138	2,560,389	44.0143	112,693,721	9,721,149	1,600,659	8,120,490	5,921,616	13.4399	79,585,922	1,250,000	911,524	1.0000	911,524	12,881,628	9,393,528	193,191,167
2123	3,952,204	2,972,273	979,931	714,584	45.6781	32,640,839	2,127,526	1,600,659	526,867	384,201	13.7866	5,296,827	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	38,849,190
2124	3,963,032	2,972,273	990,759	722,480	47.4047	34,248,945	2,136,779	1,600,659	536,120	390,949	14.1423	5,528,918	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	40,689,386
2125	6,483,412	2,972,273	3,511,138	2,560,389	49.1966	125,962,424	9,721,149	1,600,659	8,120,490	5,921,616	14.5072	85,906,062	1,250,000	911,524	1.0000	911,524	12,881,628	9,393,528	212,780,010
2126	3,952,204	2,972,273	979,931	714,584	51.0562	36,483,943	2,127,526	1,600,659	526,867	384,201	14.8815	5,717,489	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	43,112,956
2127	3,952,204	2,972,273	979,931	714,584	52.9861	37,863,019	2,127,526	1,600,659	526,867	384,201	15.2654	5,864,984	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	44,639,527
2128	6,494,240	2,972,273	3,521,966	2,568,285	54.9890	141,227,411	9,730,403	1,600,659	8,129,744	5,928,363	15.6593	92,834,022	1,250,000	911,524	1.0000	911,524	12,901,710	9,408,172	234,972,957
2129	3,952,204	2,972,273	979,931	714,584	57.0676	40,779,594	2,127,526	1,600,659	526,867	384,201	16.0633	6,171,538	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	47,862,655
2130	3,952,204	2,972,273	979,931	714,584	59.2248	42,321,094	2,127,526	1,600,659	526,867	384,201	16.4777	6,330,751	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	49,563,369
2131	3,952,204	2,972,273	979,931	714,584	61.4635	43,920,833	2,127,526	1,600,659	526,867	384,201	16.9028	6,494,075	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	51,326,432
2132	6,494,240	2,972,273	3,521,966	2,568,285	63.7868	163,822,667	9,730,403	1,600,659	8,129,744	5,928,363	17.3389	102,791,301	1,250,000	911,524	1.0000	911,524	12,901,710	9,408,172	267,525,492
2133	3,952,204	2,972,273	979,931	714,584	66.1979	47,303,960	2,127,526	1,600,659	526,867	384,201	17.7863	6,833,517	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	55,049,000
2134	3,952,204	2,972,273	979,931	714,584	68.7002	49,092,063	2,127,526	1,600,659	526,867	384,201	18.2451	7,009,788	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	57,013,375
2135	3,952,204	2,972,273	979,931	714,584	71.2971	50,947,767	2,127,526	1,600,659	526,867	384,201	18.7159	7,190,670	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	59,049,960
2136	3,963,032	2,972,273	990,759	722,480	73.9921	53,457,808	2,136,779	1,600,659	536,120	390,949	19.1987	7,505,712	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	61,875,044
2137	3,952,204	2,972,273	979,931	714,584	76.7890	54,872,190	2,127,526	1,600,659	526,867	384,201	19.6941	7,566,496	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	63,350,210
2138	19,139,451	2,972,273	16,167,177	11,789,413	79.6916	939,517,178	47,689,266	1,600,659	46,088,607	33,608,688	20.2022	678,969,436	1,250,000	911,524	1.0000	911,524	63,505,784	46,309,625	1,619,398,138
2139	3,952,204	2,972,273	979,931	714,584	82.7040	59,098,955	2,127,526	1,600,659	526,867	384,201	20.7234	7,961,954	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	67,972,432
2140	3,963,032	2,972,273	990,759	722,480	85.8302	62,010,598	2,136,779	1,600,659	536,120	390,949	21.2580	8,310,793	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	71,232,915
2141	3,952,204	2,972,273	979,931	714,584	89.0745	63,651,212	2,127,526	1,600,659	526,867	384,201	21.8065	8,378,082	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	72,940,818
2142	3,952,204	2,972,273	979,931	714,584	92.4416	66,057,288	2,127,526	1,600,659	526,867	384,201	22.3691	8,594,234	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	75,563,045
2143	3,952,204	2,972,273	979,931	714,584	95.9359	68,554,259	2,127,526	1,600,659	526,867	384,201	22.9462	8,815,956	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	78,281,739
2144	3,963,032	2,972,273	990,759	722,480	99.5622	71,931,693	2,136,779	1,600,659	536,120	390,949	23.5382	9,202,235	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	82,045,451
2145	5,470,929	2,972,273	2,498,655	1,822,067	103.3257	188,266,336	6,683,700	1,600,659	5,083,041	3,706,650	24.1455	89,498,914	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	278,676,774
2146	4,964,687	2,972,273	1,992,414	1,452,906	107.2314	155,797,136	5,164,975	1,600,659	3,564,316	2,599,167	24.7685	64,377,467	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	221,086,127
2147	4,964,687	2,972,273	1,992,414	1,452,906	111.2847	161,686,200	5,164,975	1,600,659	3,564,316	2,599,167	25.4075	66,038,335	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	228,636,058
2148	3,963,032	2,972,273	990,759	722,480	115.4913	83,440,148	2,136,779	1,600,659	536,120	390,949	26.0630	10,189,303	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	94,540,975
2149	4,964,687	2,972,273	1,992,414	1,452,906	119.8569	174,140,800	5,164,975	1,600,659	3,564,316	2,599,167	26.7355	69,490,028	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	244,542,352
2150	5,470,929	2,972,273	2,498,655	1,822,067	124.3875	226,642,345	6,683,700	1,600,659	5,083,041	3,706,650	27.4252	101,655,614	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	329,209,482
2151	5,470,929	2,972,273	2,498,655	1,822,067	129.0893	235,209,339	6,683,700	1,600,659	5,083,041	3,706,650	28.1328	104,278,439	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	340,399,302
2152	5,481,757	2,972,273	2,509,483	1,829,963	133.9689	245,158,108	6,692,953	1,600,659	5,092,294	3,713,398	28.8586	107,163,458	1,250,000	911,524	1.0000	911,524	8,851,777	6,454,884	353,233,090
2153	3,952,204	2,972,273	979,931	714,584	139.0329	99,350,685	2,127,526	1,600,659	526,867	384,201	29.6032	11,373,583	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	111,635,792
2154	3,952,204	2,972,273	979,931	714,584	144.2884	103,106,181	2,127,526	1,600,659	526,867	384,201	30.3669	11,666,998	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	115,684,703
2155	5,830,672	2,972,273	2,858,398	2,084,398	149.7425	312,123,013	7,762,929	1,600,659	6,162,270	4,493,644	31.1504	139,978,811	1,250,000	911,524	1.0000	911,524	10,270,668	7,489,566	453,013,348
2156	4,975,515	2,972,273	2,003,242	1,460,802	155.4027	227,012,555	5,174,228	1,600,659	3,573,570	2,605,915	31.9541	83,269,662	1,250,000	911,524	1.0000	911,524	6,826,811	4,978,240	311,193,741
2157	4,964,687	2,972,273	1,992,414	1,452,906	161.2769	234,320,163	5,164,975	1,600,659	3,564,316	2,599,167	32.7785	85,196,794	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	320,428,481
2158	3,952,204	2,972,273	979,931	714,584	167.3732	119,602,210	2,127,526	1,600,659	526,867	384,201	33.6242	12,918,456	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	133,432,189
2159	4,964,687	2,972,273	1,992,414	1,452,906	173.6999	252,369,613	5,164,975	1,600,659	3,564,316	2,599,167	34.4917	89,649,687	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	342,930,824
2160	4,975,515	2,972,273	2,003,242	1,460,802	180.2658	263,332,618	5,174,228	1,600,659	3,573,570	2,605,915	35.3816	92,201,435	1,250,000	911,524	1.0000	911,524	6,826,811	4,978,240	356,445,577
2161	4,964,687	2,972,273	1,992,414	1,452,906	187.0798	271,809,349	5,164,975	1,600,659	3,564,316	2,599,167	36.2944	94,335,205	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	367,056,078
2162	3,952,204	2,972,273	979,931	714,584	194.1514	138,737,483	2,127,526	1,600,659	526,867	384,201	37.2308	14,304,116	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	153,953,122
2163	6,989,653	2,972,273	4,017,380	2,929,550	201.4904	590,276,157	11,239,874	1,600,659	9,639,215	7,029,099	38.1914	268,451,114	1,250,000	911,524	1.0000	911,524	14,906,595	10,870,172	859,638,794
2164	5,987,998	2,972,273	3,015,725	2,199,124	209.1067	459,851,521	8,211,678	1,600,659	6,611,019	4,820,881	39.1767	188,866,192	1,250,000	911,524	1.0000	911,524	10,876,744	7,931,528	649,629,237
2165	4,964,687	2,972,273	1,992,414	1,452,906	217.0109	315,296,422	5,164,975	1,600,659	3,564,316	2,599,167	40.1875	104,454,022	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	420,661,968
2166	3,952,204	2,972,273	979,931	714,584	225.2140	160,934,320	2,127,526	1,600,659	526,867	384,201	41.2243	15,838,423	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	177,684,266
2167	3,952,204	2,972,273	979,931	714,584	233.7270	167,017,573	2,127,526	1,600,659	526,867	384,201	42.2879	16,247,059	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	184,176,156
2168	5,987,998	2,972,273	3,015,725	2,199,124	242.5619	533,423,648	8,211,678	1,600,659	6,611,019	4,820,881	43.3789	209,124,496	1,250,000	911,524	1.0000	911,524	10,876,744	7,931,528	743,459,668
2169	5,470,929	2,972,273	2,498,655	1,822,067	251.7308	458,670,355	6,683,700	1,600,659	5,083,041	3,706,650	44.4981	164,938,876	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	624,520,755
2170	3,952,204	2,972,273	979,931	714,584	261.2462	186,682,353	2,127,526	1,600,659	526,867	384,201	45.6462	17,537,322	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	205,131,199
2171	3,952,204	2,972,273	979,931	714,584	271.1213	193,738,941	2,127,526	1,600,659	526,867	384,201	46.8238	17,989,757	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	212,640,223
2172	6,494,240	2,972,273	3,521,966	2,568,285	281.3697	722,637,514	9,730,403	1,600,659	8,129,744	5,928,363	48.0319	284,750,561	1,250,000	911,524	1.0000	911,524	12,901,710	9,408,172	1,008,299,599
2173	3,952,204	2,972,273	979,931	714,584	292.0054	208,662,385	2,127,526	1,600,659	526,867	384,201	49.2711	18,930,013	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	228,503,922
2174	3,952,204	2,972,273	979,931	714,584	303.0433	216,549,892	2,127,526	1,600,659	526,867	384,201	50.5423	19,418,409	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	236,879,825
2175	6,483,412	2,972,273	3,511,138	2,560,389	314.4983	805,237,930	9,721,149	1,600,659	8,120,490	5,921,616	51.8463	307,013,861	1,250,000	911,524	1.0000	911,524	12,881,628	9,393,528	1,113,163,314
2176	3,963,032	2,972,273	990,759	722,480	326.3863	235,807,556	2,136,779	1,600,659	536,120	390,949	53.1839	20,792,191	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	257,511,271
2177	3,952,204	2,972,273	979,931	714,584	338.7237	242,046,535	2,127,526	1,600,659	526,867	384,201	54.5561	20,960,516	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	263,918,574
2178	6,483,412	2,972,273	3,511,138	2,560,389	351.5275	900,047,079	9,721,149	1,600,659	8,120,490	5,921,616	55.9636	331,394,929	1,250,000	911,524	1.0000	911,524	12,881,628	9,393,528	1,232,353,532
2179	3,952,204	2,972,273	979,931	714,584	364.8152	260,691,103	2,127,526	1,600,659	526,867	384,201	57.4075	22,056,027	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	283,658,653
2180	3,963,032	2,972,273	990,759	722,480	378.6052	273,534,664	2,136,779	1,600,659	536,120	390,949	58.8886	23,022,437	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	297,468,625
2181	3,952,204	2,972,273	979,931	714,584	392.9165	280,771,842	2,127,526	1,600,659	526,867	384,201	60.4079	23,208,784	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	304,892,150
2182	6,483,412	2,972,273	3,511,138	2,560,389	407.7688	1,044,046,674	9,721,149	1,600,659	8,120,490	5,921,616	61.9664	366,941,203	1,250,000	911,524	1.0000	911,524	12,881,628	9,393,528	1,411,899,401
2183	3,952,204	2,972,273	979,931	714,584	423.1824	302,399,370	2,127,526	1,600,659	526,867	384,201	63.5652	24,421,822	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	327,732,716
2184	3,963,032	2,972,273	990,759	722,480	439.1787	317,297,803	2,136,779	1,600,659	536,120	390,949	65.2052	25,491,905	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	343,701,232
2185	3,952,204	2,972,273	979,931	714,584	455.7797	325,692,879	2,127,526	1,600,659	526,867	384,201	66.8874	25,698,215	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	352,302,618

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.4
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2186	3,952,204	2,972,273	979,931	714,584	473.0081	338,004,017	2,127,526	1,600,659	526,867	384,201	68.6131	26,361,231	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	365,276,772
2187	3,952,204	2,972,273	979,931	714,584	490.8878	350,780,565	2,127,526	1,600,659	526,867	384,201	70.3834	27,041,382	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	378,733,471
2188	19,150,279	2,972,273	16,178,005	11,797,309	509.4434	6,010,061,141	47,698,520	1,600,659	46,097,861	33,615,436	72.1993	2,427,010,932	1,250,000	911,524	1.0000	911,524	63,525,866	46,324,268	8,437,983,596
2189	3,952,204	2,972,273	979,931	714,584	528.7004	377,800,844	2,127,526	1,600,659	526,867	384,201	74.0620	28,454,705	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	407,167,072
2190	3,952,204	2,972,273	979,931	714,584	548.6852	392,081,662	2,127,526	1,600,659	526,867	384,201	75.9728	29,188,836	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	422,182,022
2191	3,952,204	2,972,273	979,931	714,584	569.4255	406,902,348	2,127,526	1,600,659	526,867	384,201	77.9329	29,941,909	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	437,755,781
2192	3,963,032	2,972,273	990,759	722,480	590.9498	426,949,379	2,136,779	1,600,659	536,120	390,949	79.9436	31,253,868	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	459,114,771
2193	4,055,991	2,972,273	1,083,718	790,268	613.2877	484,661,528	2,438,888	1,600,659	838,229	611,253	82.0061	50,126,444	1,250,000	911,524	1.0000	911,524	3,171,947	2,313,044	535,699,496
2194	4,211,673	2,972,273	1,239,399	903,794	636.4700	575,237,472	2,905,932	1,600,659	1,305,273	951,830	84.1219	80,069,731	1,250,000	911,524	1.0000	911,524	3,794,672	2,767,147	656,218,728
2195	6,090,140	2,972,273	3,117,867	2,273,608	660.5286	1,501,783,008	8,541,335	1,600,659	6,940,676	5,061,273	86.2922	436,748,359	1,250,000	911,524	1.0000	911,524	11,308,543	8,246,404	1,939,442,890
2196	5,286,878	2,972,273	2,314,604	1,687,853	685.4966	1,157,017,715	6,108,316	1,600,659	4,507,657	3,287,069	88.5185	290,966,429	1,250,000	911,524	1.0000	911,524	8,072,261	5,886,446	1,448,895,668
2197	5,120,368	2,972,273	2,148,095	1,566,432	711.4083	1,114,372,476	5,632,019	1,600,659	4,031,360	2,939,744	90.8023	266,935,529	1,250,000	911,524	1.0000	911,524	7,429,455	5,417,700	1,382,219,528
2198	4,315,460	2,972,273	1,343,187	979,477	738.2996	723,147,738	3,217,294	1,600,659	1,616,635	1,178,881	93.1450	109,806,894	1,250,000	911,524	1.0000	911,524	4,209,822	3,069,882	833,866,156
2199	5,120,368	2,972,273	2,148,095	1,566,432	766.2073	1,200,211,364	5,632,019	1,600,659	4,031,360	2,939,744	95.5482	280,887,261	1,250,000	911,524	1.0000	911,524	7,429,455	5,417,700	1,482,010,148
2200	5,574,716	2,972,273	2,602,443	1,897,751	795.1699	1,509,034,237	6,995,062	1,600,659	5,394,403	3,933,701	98.0133	385,555,046	1,250,000	911,524	1.0000	911,524	9,246,846	6,742,976	1,895,500,807
2201	5,730,397	2,972,273	2,758,124	2,011,276	825.2273	1,659,760,217	7,462,106	1,600,659	5,861,447	4,274,278	100.5421	429,744,934	1,250,000	911,524	1.0000	911,524	9,869,571	7,197,079	2,090,416,675
2202	5,730,397	2,972,273	2,758,124	2,011,276	856.4209	1,722,499,169	7,462,106	1,600,659	5,861,447	4,274,278	103.1360	440,831,985	1,250,000	911,524	1.0000	911,524	9,869,571	7,197,079	2,164,242,678
2203	4,107,885	2,972,273	1,135,612	828,110	888.7937	736,018,702	2,594,569	1,600,659	993,910	724,778	105.7969	76,679,303	1,250,000	911,524	1.0000	911,524	3,379,522	2,464,412	813,609,528
2204	4,170,607	2,972,273	1,198,334	873,848	922.3901	806,028,356	2,759,504	1,600,659	1,158,845	845,052	108.5265	91,710,525	1,250,000	911,524	1.0000	911,524	3,607,179	2,630,423	898,650,405
2205	5,678,504	2,972,273	2,706,230	1,973,435	957.2564	1,889,082,825	7,306,425	1,600,659	5,705,766	4,160,753	111.3265	463,202,041	1,250,000	911,524	1.0000	911,524	9,661,996	7,045,711	2,353,196,390
2206	5,120,368	2,972,273	2,148,095	1,566,432	993.4407	1,556,156,953	5,632,019	1,600,659	4,031,360	2,939,744	114.1987	335,714,959	1,250,000	911,524	1.0000	911,524	7,429,455	5,417,700	1,892,783,435
2207	5,172,262	2,972,273	2,199,989	1,604,274	1,030.9927	1,653,994,325	5,787,700	1,600,659	4,187,041	3,053,270	117.1450	357,675,298	1,250,000	911,524	1.0000	911,524	7,637,030	5,569,067	2,012,581,147
2208	4,170,607	2,972,273	1,198,334	873,848	1,069.9643	934,985,714	2,759,504	1,600,659	1,158,845	845,052	120.1674	101,547,690	1,250,000	911,524	1.0000	911,524	3,607,179	2,630,423	1,037,444,927
2209	5,120,368	2,972,273	2,148,095	1,566,432	1,110.4089	1,739,379,643	5,632,019	1,600,659	4,031,360	2,939,744	123.2677	362,375,498	1,250,000	911,524	1.0000	911,524	7,429,455	5,417,700	2,102,666,665
2210	5,172,262	2,972,273	2,199,989	1,604,274	1,152.3824	1,848,736,611	5,787,700	1,600,659	4,187,041	3,053,270	126.4480	386,079,867	1,250,000	911,524	1.0000	911,524	7,637,030	5,569,067	2,235,728,002
2211	5,172,262	2,972,273	2,199,989	1,604,274	1,195.9424	1,918,618,767	5,787,700	1,600,659	4,187,041	3,053,270	129.7104	396,040,855	1,250,000	911,524	1.0000	911,524	7,637,030	5,569,067	2,315,571,146
2212	4,170,607	2,972,273	1,198,334	873,848	1,241.1491	1,084,575,137	2,759,504	1,600,659	1,158,845	845,052	133.0569	112,439,986	1,250,000	911,524	1.0000	911,524	3,607,179	2,630,423	1,197,926,647
2213	7,197,228	2,972,273	4,224,955	3,080,917	1,288.0645	3,968,420,347	11,862,599	1,600,659	10,261,940	7,483,201	136.4898	1,021,380,667	1,250,000	911,524	1.0000	911,524	15,736,895	11,475,643	4,990,712,537
2214	6,184,745	2,972,273	3,212,472	2,342,595	1,336.7533	3,131,472,245	8,825,149	1,600,659	7,224,490	5,268,236	140.0112	737,611,995	1,250,000	911,524	1.0000	911,524	11,686,962	8,522,355	3,869,995,763
2215	5,172,262	2,972,273	2,199,989	1,604,274	1,387.2826	2,225,580,790	5,787,700	1,600,659	4,187,041	3,053,270	143.6235	438,521,304	1,250,000	911,524	1.0000	911,524	7,637,030	5,569,067	2,665,013,618
2216	4,170,607	2,972,273	1,198,334	873,848	1,439.7219	1,258,097,497	2,759,504	1,600,659	1,158,845	845,052	147.3290	124,500,652	1,250,000	911,524	1.0000	911,524	3,607,179	2,630,423	1,383,509,673
2217	4,133,788	2,972,273	1,161,514	846,998	1,494.1434	1,265,536,796	14,534,310	1,600,659	12,933,651	9,431,464	151.1301	1,425,378,089	1,250,000	911,524	1.0000	911,524	15,345,165	11,189,986	2,691,826,408
2218	1,123,816	2,972,273	(1,848,457)	(1,347,930)	1,550.6220	(2,090,130,339)	3,040,582	1,600,659	1,439,923	1,050,019	155.0292	162,783,650	0	0	1.0000	0	(408,534)	(297,911)	(1,927,346,689)
	$1,250,894,368	$526,092,387	$724,801,981	$528,539,376		$61,058,494,756	$1,305,637,546	$283,316,640	$1,022,320,907	$745,495,829		$18,471,829,558	$230,000,000	$167,720,370		$167,720,370	$1,977,122,888	$1,441,755,575	$79,698,044,684
	$4,920,357,293	$2,180,366,546	$2,739,990,746	$1,998,053,312		$279,053,393,595	$4,877,888,714	$922,815,290	$3,955,073,424	$2,884,114,687		$72,816,239,635	$461,250,000	$336,352,264		$336,352,264	$7,156,314,171	$5,218,520,263	$352,205,985,494

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	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$757,935,327	$14,768,898	$0	$6,696,113	$779,400,337
2021	779,400,337	30,405,771	-	8,507,110	818,313,218
2022	818,313,218	33,670,327	-	98,957,412	950,940,957
2023	950,940,957	38,816,283	-	98,957,412	1,088,714,651
2024	1,088,714,651	44,161,902	-	98,957,412	1,231,833,965
2025	1,231,833,965	49,714,932	-	98,957,412	1,380,506,309
2026	1,380,506,309	55,483,419	-	98,957,412	1,534,947,139
2027	1,534,947,139	61,475,723	-	98,957,412	1,695,380,274
2028	1,695,380,274	67,700,528	-	98,957,412	1,862,038,214
2029	1,862,038,214	74,166,856	-	98,957,412	2,035,162,482
2030	2,035,162,482	80,818,589	(32,782,380)	74,218,059	2,157,416,750
2031	2,157,416,750	84,139,253	(131,799,357)	-	2,109,756,647
2032	2,109,756,647	82,280,509	(234,736,293)	-	1,957,300,863
2033	1,957,300,863	76,334,734	(273,342,557)	-	1,760,293,040
2034	1,760,293,040	68,651,429	(255,772,211)	-	1,573,172,257
2035	1,573,172,257	61,353,718	(91,595,735)	-	1,542,930,241
2036	1,542,930,241	60,174,279	(69,812,556)	-	1,533,291,964
2037	1,533,291,964	59,798,387	(66,778,988)	-	1,526,311,362
2038	1,526,311,362	59,526,143	(3,544,955)	-	1,582,292,550
2039	1,582,292,550	61,709,409	(3,669,733)	-	1,640,332,226
2040	1,640,332,226	63,972,957	(3,839,647)	-	1,700,465,536
2041	1,700,465,536	66,318,156	(3,932,950)	-	1,762,850,742
2042	1,762,850,742	68,751,179	(4,071,580)	-	1,827,530,342
2043	1,827,530,342	71,273,683	(4,215,302)	-	1,894,588,723
2044	1,894,588,723	73,888,960	(4,410,941)	-	1,964,066,742
2045	1,964,066,742	76,598,603	(4,518,548)	-	2,036,146,797
2046	2,036,146,797	79,409,725	(4,678,214)	-	2,110,878,308
2047	2,110,878,308	82,324,254	(4,843,830)	-	2,188,358,732
2048	2,188,358,732	85,345,991	(9,763,750)	-	2,263,940,973
2049	2,263,940,973	88,293,698	(5,193,098)	-	2,347,041,573
2050	2,347,041,573	91,534,621	(16,574,707)	-	2,422,001,487
2051	2,422,001,487	94,458,058	(17,097,357)	-	2,499,362,188
2052	2,499,362,188	97,475,125	(17,699,249)	-	2,579,138,064
2053	2,579,138,064	100,586,385	(18,195,022)	-	2,661,529,427
2054	2,661,529,427	103,799,648	(18,770,819)	-	2,746,558,256
2055	2,746,558,256	107,115,772	(19,365,420)	-	2,834,308,607
2056	2,834,308,607	110,538,036	(20,050,525)	-	2,924,796,118
2057	2,924,796,118	114,067,049	(20,613,951)	-	3,018,249,216
2058	3,018,249,216	117,711,719	(84,132,700)	-	3,051,828,235
2059	3,051,828,235	119,021,301	(21,945,848)	-	3,148,903,688
2060	3,148,903,688	122,807,244	(22,726,889)	-	3,248,984,043

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2061	3,248,984,043	126,710,378	(23,366,891)	-	3,352,327,529
2062	3,352,327,529	130,740,774	(24,113,377)	-	3,458,954,926
2063	3,458,954,926	134,899,242	(61,315,416)	-	3,532,538,753
2064	3,532,538,753	137,769,011	(25,773,939)	-	3,644,533,825
2065	3,644,533,825	142,136,819	(26,502,798)	-	3,760,167,846
2066	3,760,167,846	146,646,546	(35,316,034)	-	3,871,498,358
2067	3,871,498,358	150,988,436	(28,230,239)	-	3,994,256,555
2068	3,994,256,555	155,776,006	(147,568,388)	-	4,002,464,172
2069	4,002,464,172	156,096,103	(30,074,771)	-	4,128,485,504
2070	4,128,485,504	161,010,935	(31,043,079)	-	4,258,453,359
2071	4,258,453,359	166,079,681	(32,043,715)	-	4,392,489,325
2072	4,392,489,325	171,307,084	(33,202,846)	-	4,530,593,563
2073	4,530,593,563	176,693,149	(34,146,662)	-	4,673,140,050
2074	4,673,140,050	182,252,462	(35,251,341)	-	4,820,141,170
2075	4,820,141,170	187,985,506	(36,392,659)	-	4,971,734,017
2076	4,971,734,017	193,897,627	(37,715,934)	-	5,127,915,709
2077	5,127,915,709	199,988,713	(38,790,991)	-	5,289,113,432
2078	5,289,113,432	206,275,424	(40,050,893)	-	5,455,337,962
2079	5,455,337,962	212,758,181	(41,353,214)	-	5,626,742,928
2080	5,626,742,928	219,442,974	(42,864,933)	-	5,803,320,970
2081	5,803,320,970	226,329,518	(44,090,579)	-	5,985,559,908
2082	5,985,559,908	233,436,836	(45,528,513)	-	6,173,468,231
2083	6,173,468,231	240,765,261	(47,015,284)	-	6,367,218,208
2084	6,367,218,208	248,321,510	(526,863,353)	-	6,088,676,366
2085	6,088,676,366	237,458,378	(50,140,425)	-	6,275,994,320
2086	6,275,994,320	244,763,778	(51,782,727)	-	6,468,975,371
2087	6,468,975,371	252,290,039	(53,480,544)	-	6,667,784,867
2088	6,667,784,867	260,043,610	(70,894,478)	-	6,856,933,999
2089	6,856,933,999	267,420,426	(57,050,704)	-	7,067,303,721
2090	7,067,303,721	275,624,845	(58,926,979)	-	7,284,001,587
2091	7,284,001,587	284,076,062	(60,867,153)	-	7,507,210,496
2092	7,507,210,496	292,781,209	(63,127,296)	-	7,736,864,409
2093	7,736,864,409	301,737,712	(64,947,298)	-	7,973,654,824
2094	7,973,654,824	310,972,538	(67,092,384)	-	8,217,534,977
2095	8,217,534,977	320,483,864	(69,310,133)	-	8,468,708,708
2096	8,468,708,708	330,279,640	(71,897,009)	-	8,727,091,339
2097	8,727,091,339	340,356,562	(73,975,294)	-	8,993,472,608
2098	8,993,472,608	350,745,432	(76,428,200)	-	9,267,789,840
2099	9,267,789,840	361,443,804	(78,965,041)	-	9,550,268,602
2100	9,550,268,602	372,460,475	(81,588,424)	-	9,841,140,653
2101	9,841,140,653	383,804,485	(84,301,758)	-	10,140,643,381
2102	10,140,643,381	395,485,092	(87,108,052)	-	10,449,020,421
2103	10,449,020,421	407,511,796	(90,010,573)	-	10,766,521,645
2104	10,766,521,645	419,894,344	(93,403,367)	-	11,093,012,622
2105	11,093,012,622	432,627,492	(96,117,797)	-	11,429,522,317
2106	11,429,522,317	445,751,370	(99,330,222)	-	11,775,943,465
2107	11,775,943,465	459,261,795	(102,653,014)	-	12,132,552,246
2108	12,132,552,246	473,169,538	(391,716,754)	-	12,214,005,030

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External Levelized	2109	12,214,005,030	476,346,196	(109,645,922)	-	12,580,705,304
	2110	12,580,705,304	490,647,507	(113,324,281)	-	12,958,028,530
	2111	12,958,028,530	505,363,113	(117,129,490)	-	13,346,262,153
	2112	13,346,262,153	520,504,224	(121,586,937)	-	13,745,179,440
	2113	13,745,179,440	536,061,998	(291,761,915)	-	13,989,479,523
	2114	13,989,479,523	545,589,701	(129,353,213)	-	14,405,716,011
	2115	14,405,716,011	561,822,924	(133,713,195)	-	14,833,825,740
	2116	14,833,825,740	578,519,204	(175,429,295)	-	15,236,915,649
	2117	15,236,915,649	594,239,710	(142,891,560)	-	15,688,263,799
	2118	15,688,263,799	611,842,288	(693,364,459)	-	15,606,741,628
	2119	15,606,741,628	608,662,923	(152,718,889)	-	16,062,685,662
	2120	16,062,685,662	626,444,741	(158,584,528)	-	16,530,545,875
	2121	16,530,545,875	644,691,289	(163,241,199)	-	17,011,995,965
	2122	17,011,995,965	663,467,843	(168,778,912)	-	17,506,684,895
	2123	17,506,684,895	682,760,711	(174,509,388)	-	18,014,936,218
	2124	18,014,936,218	702,582,513	(181,242,072)	-	18,536,276,658
	2125	18,536,276,658	722,914,790	(186,577,194)	-	19,072,614,254
	2126	19,072,614,254	743,831,956	(192,928,900)	-	19,623,517,310
	2127	19,623,517,310	765,317,175	(199,502,406)	-	20,189,332,080
	2128	20,189,332,080	787,383,951	(260,731,695)	-	20,715,984,335
	2129	20,715,984,335	807,923,389	(213,348,190)	-	21,310,559,535
	2130	21,310,559,535	831,111,822	(220,636,667)	-	21,921,034,690
	2131	21,921,034,690	854,920,353	(228,180,552)	-	22,547,774,490
	2132	22,547,774,490	879,363,205	(237,060,524)	-	23,190,077,171
	2133	23,190,077,171	904,413,010	(244,071,943)	-	23,850,418,238
	2134	23,850,418,238	930,166,311	(2,516,897,377)	-	22,263,687,172
	2135	22,263,687,172	868,283,800	(261,099,336)	-	22,870,871,636
	2136	22,870,871,636	891,963,994	(271,302,652)	-	23,491,532,978
	2137	23,491,532,978	916,169,786	(279,345,482)	-	24,128,357,282
	2138	24,128,357,282	941,005,934	(288,953,164)	-	24,780,410,052
	2139	24,780,410,052	966,435,992	(298,899,646)	-	25,447,946,397
	2140	25,447,946,397	992,469,909	(310,628,087)	-	26,129,788,220
	2141	26,129,788,220	1,019,061,741	(319,857,110)	-	26,828,992,850
	2142	26,828,992,850	1,046,330,721	(330,894,358)	-	27,544,429,214
	2143	27,544,429,214	1,074,232,739	(342,321,372)	-	28,276,340,581
	2144	28,276,340,581	1,102,777,283	(355,807,363)	-	29,023,310,500
	2145	29,023,310,500	1,131,909,110	(366,402,209)	-	29,788,817,401
	2146	29,788,817,401	1,161,763,879	(379,085,825)	-	30,571,495,454
	2147	30,571,495,454	1,192,288,323	(392,218,395)	-	31,371,565,382
	2148	31,371,565,382	1,223,491,050	(407,730,619)	-	32,187,325,812
	2149	32,187,325,812	1,255,305,707	(419,897,848)	-	33,022,733,670
	2150	33,022,733,670	1,287,886,613	(434,478,032)	-	33,876,142,252
	2151	33,876,142,252	1,321,169,548	(449,576,302)	-	34,747,735,498
	2152	34,747,735,498	1,355,161,684	(467,424,392)	-	35,635,472,790
	2153	35,635,472,790	1,389,783,439	(481,401,924)	-	36,543,854,305
	2154	36,543,854,305	1,425,210,318	(498,168,590)	-	37,470,896,033
	2155	37,470,896,033	1,461,364,945	(515,532,378)	-	38,416,728,600
	2156	38,416,728,600	1,498,252,415	(536,074,453)	-	39,378,906,562

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2157	39,378,906,562	1,535,777,356	(552,137,361)	-	40,362,546,558
2158	40,362,546,558	1,574,139,316	(1,977,437,523)	-	39,959,248,350
2159	39,959,248,350	1,558,410,686	(591,399,998)	-	40,926,259,038
2160	40,926,259,038	1,596,124,102	(615,050,065)	-	41,907,333,076
2161	41,907,333,076	1,634,385,990	(633,515,942)	-	42,908,203,123
2162	42,908,203,123	1,673,419,922	(655,709,327)	-	43,925,913,718
2163	43,925,913,718	1,713,110,635	(1,507,024,558)	-	44,131,999,795
2164	44,131,999,795	1,721,147,992	(705,932,200)	-	45,147,215,587
2165	45,147,215,587	1,760,741,408	(727,168,198)	-	46,180,788,796
2166	46,180,788,796	1,801,050,763	(935,583,046)	-	47,046,256,513
2167	47,046,256,513	1,834,804,004	(779,174,377)	-	48,101,886,140
2168	48,101,886,140	1,875,973,559	(3,740,993,727)	-	46,236,865,973
2169	46,236,865,973	1,803,237,773	(834,977,414)	-	47,205,126,332
2170	47,205,126,332	1,840,999,927	(864,389,855)	-	48,181,736,404
2171	48,181,736,404	1,879,087,720	(894,858,177)	-	49,165,965,946
2172	49,165,965,946	1,917,472,672	(931,009,031)	-	50,152,429,587
2173	50,152,429,587	1,955,944,754	(959,119,729)	-	51,149,254,612
2174	51,149,254,612	1,994,820,930	(992,994,290)	-	52,151,081,252
2175	52,151,081,252	2,033,892,169	(1,028,087,560)	-	53,156,885,861
2176	53,156,885,861	2,073,118,549	(1,069,752,927)	-	54,160,251,483
2177	54,160,251,483	2,112,249,808	(1,102,110,914)	-	55,170,390,377
2178	55,170,390,377	2,151,645,225	(1,141,134,859)	-	56,180,900,743
2179	56,180,900,743	2,191,055,129	(1,181,566,038)	-	57,190,389,834
2180	57,190,389,834	2,230,425,204	(1,229,600,021)	-	58,191,215,016
2181	58,191,215,016	2,269,457,386	(1,266,857,100)	-	59,193,815,301
2182	59,193,815,301	2,308,558,797	(1,311,825,859)	-	60,190,548,239
2183	60,190,548,239	2,347,431,381	(1,358,419,201)	-	61,179,560,420
2184	61,179,560,420	2,386,002,856	(13,059,289,599)	-	50,506,273,677
2185	50,506,273,677	1,969,744,673	(1,456,719,106)	-	51,019,299,244
2186	51,019,299,244	1,989,752,671	(1,508,551,385)	-	51,500,500,530
2187	51,500,500,530	2,008,519,521	(1,562,260,032)	-	51,946,760,018
2188	51,946,760,018	2,025,923,641	(1,626,146,607)	-	52,346,537,052
2189	52,346,537,052	2,041,514,945	(1,675,582,047)	-	52,712,469,951
2190	52,712,469,951	2,055,786,328	(1,735,340,692)	-	53,032,915,587
2191	53,032,915,587	2,068,283,708	(1,797,266,097)	-	53,303,933,198
2192	53,303,933,198	2,078,853,395	(2,307,100,427)	-	53,075,686,166
2193	53,075,686,166	2,069,951,760	(2,717,371,977)	-	52,428,265,950
2194	52,428,265,950	2,044,702,372	(2,113,503,752)	-	52,359,464,570
2195	52,359,464,570	2,042,019,118	(2,792,251,612)	-	51,609,232,076
2196	51,609,232,076	2,012,760,051	(3,151,854,332)	-	50,470,137,795
2197	50,470,137,795	1,968,335,374	(1,044,691,873)	-	51,393,781,296
2198	51,393,781,296	2,004,357,471	(1,083,696,147)	-	52,314,442,619
2199	52,314,442,619	2,040,263,262	(1,124,162,162)	-	53,230,543,719
2200	53,230,543,719	2,075,991,205	(1,166,144,891)	-	54,140,390,033
2201	54,140,390,033	2,111,475,211	(1,209,701,460)	-	55,042,163,785
2202	55,042,163,785	2,146,644,388	(1,254,890,934)	-	55,933,917,239
2203	55,933,917,239	2,181,422,772	(1,301,774,860)	-	56,813,565,151
2204	56,813,565,151	2,215,729,041	(1,365,215,706)	-	57,664,078,485

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2205	57,664,078,485	2,248,899,061	(1,400,882,490)	-	58,512,095,056
2206	58,512,095,056	2,281,971,707	(1,453,241,012)	-	59,340,825,751
2207	59,340,825,751	2,314,292,204	(1,507,563,244)	-	60,147,554,711
2208	60,147,554,711	2,345,754,634	(9,829,378,232)	-	52,663,931,113
2209	52,663,931,113	2,053,893,313	(1,622,397,489)	-	53,095,426,937
2210	53,095,426,937	2,070,721,651	(1,683,065,532)	-	53,483,083,055
2211	53,483,083,055	2,085,840,239	(1,746,009,716)	-	53,822,913,578
2212	53,822,913,578	2,099,093,630	(1,831,165,881)	-	54,090,841,327
2213	54,090,841,327	2,109,542,812	(6,327,892,531)	-	49,872,491,608
2214	49,872,491,608	1,945,027,173	(1,949,372,261)	-	49,868,146,519
2215	49,868,146,519	1,944,857,714	(2,022,310,469)	-	49,790,693,765
2216	49,790,693,765	1,941,837,057	(3,107,277,449)	-	48,625,253,372
2217	48,625,253,372	1,896,384,882	(2,176,503,134)	-	48,345,135,120
2218	48,345,135,120	1,885,460,270	(17,812,255,213)	-	32,418,340,176
2219	32,418,340,176	1,264,315,267	(3,289,895,309)	-	30,392,760,134
2220	30,392,760,134	1,185,317,645	(3,273,999,672)	-	28,304,078,108
2221	28,304,078,108	1,103,859,046	(3,367,023,996)	-	26,040,913,158
2222	26,040,913,158	1,015,595,613	(3,491,123,699)	-	23,565,385,072
2223	23,565,385,072	919,050,018	(3,801,092,267)	-	20,683,342,823
2224	20,683,342,823	806,650,370	(3,784,173,459)	-	17,705,819,735
2225	17,705,819,735	690,526,970	(3,891,772,179)	-	14,504,574,525
2226	14,504,574,525	565,678,406	(4,035,366,987)	-	11,034,885,945
2227	11,034,885,945	430,360,552	(4,392,450,338)	-	7,072,796,159
2228	7,072,796,159	275,839,050	(4,374,507,778)	-	2,974,127,431
2229	2,974,127,431	115,990,970	(4,498,979,657)	-	(1,408,861,257)
2230	(1,408,861,257)	(54,945,589)	(4,847,791,008)	-	(6,311,597,853)
2231	(6,311,597,853)	(246,152,316)	6,557,750,169	-	(0)

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Prairie Island Unit 1

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$437,068,622	$8,807,181	$0	$24,632	$445,900,435
2021	445,900,435	18,219,642	-	12,399,703	476,519,779
2022	476,519,779	20,098,666	-	44,412,832	541,031,277
2023	541,031,277	22,698,479	-	44,412,832	608,142,588
2024	608,142,588	25,403,065	-	44,412,832	677,958,485
2025	677,958,485	28,216,646	-	44,412,832	750,587,963
2026	750,587,963	31,143,613	-	44,412,832	826,144,408
2027	826,144,408	34,188,538	-	44,412,832	904,745,779
2028	904,745,779	37,356,173	-	44,412,832	986,514,784
2029	986,514,784	40,651,464	-	44,412,832	1,071,579,080
2030	1,071,579,080	44,079,556	-	44,412,832	1,160,071,468
2031	1,160,071,468	47,645,799	-	44,412,832	1,252,130,099
2032	1,252,130,099	51,355,762	-	44,412,832	1,347,898,692
2033	1,347,898,692	52,466,914	(39,900,645)	29,756,597	1,390,221,559
2034	1,390,221,559	53,523,530	(122,923,789)	-	1,320,821,300
2035	1,320,821,300	50,851,620	(171,342,706)	-	1,200,330,214
2036	1,200,330,214	46,212,713	(175,316,670)	-	1,071,226,257
2037	1,071,226,257	41,242,211	(141,970,869)	-	970,497,598
2038	970,497,598	37,364,158	(89,804,897)	-	918,056,859
2039	918,056,859	35,345,189	(67,496,013)	-	885,906,035
2040	885,906,035	34,107,382	(44,142,529)	-	875,870,889
2041	875,870,889	33,721,029	(33,346,820)	-	876,245,098
2042	876,245,098	33,735,436	(17,924,460)	-	892,056,074
2043	892,056,074	34,344,159	(3,298,897)	-	923,101,336
2044	923,101,336	35,539,401	(3,412,486)	-	955,228,251
2045	955,228,251	36,776,288	(12,519,435)	-	979,485,104
2046	979,485,104	37,710,177	(9,767,008)	-	1,007,428,272
2047	1,007,428,272	38,785,988	(10,041,546)	-	1,036,172,715
2048	1,036,172,715	39,892,650	(3,774,339)	-	1,072,291,026
2049	1,072,291,026	41,283,205	(10,616,830)	-	1,102,957,401
2050	1,102,957,401	42,463,860	(14,409,596)	-	1,131,011,665
2051	1,131,011,665	43,543,949	(14,434,291)	-	1,160,121,323
2052	1,160,121,323	44,664,671	(15,293,912)	-	1,189,492,081
2053	1,189,492,081	45,795,445	(4,260,650)	-	1,231,026,876
2054	1,231,026,876	47,394,535	(4,376,473)	-	1,274,044,938
2055	1,274,044,938	49,050,730	(16,620,838)	-	1,306,474,829
2056	1,306,474,829	50,299,281	(12,991,276)	-	1,343,782,835
2057	1,343,782,835	51,735,639	(13,321,361)	-	1,382,197,113
2058	1,382,197,113	53,214,589	(4,882,272)	-	1,430,529,430
2059	1,430,529,430	55,075,383	(13,618,873)	-	1,471,985,940
2060	1,471,985,940	56,671,459	(14,580,762)	-	1,514,076,637

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2061	1,514,076,637	58,291,951	(14,955,385)	-	1,557,413,203
2062	1,557,413,203	59,960,408	(5,463,818)	-	1,611,909,793
2063	1,611,909,793	62,058,527	(36,319,822)	-	1,637,648,498
2064	1,637,648,498	63,049,467	(26,355,381)	-	1,674,342,583
2065	1,674,342,583	64,462,189	(16,813,761)	-	1,721,991,011
2066	1,721,991,011	66,296,654	(6,132,573)	-	1,782,155,092
2067	1,782,155,092	68,612,971	(6,314,924)	-	1,844,453,139
2068	1,844,453,139	71,011,446	(30,311,651)	-	1,885,152,934
2069	1,885,152,934	72,578,388	(25,041,086)	-	1,932,690,235
2070	1,932,690,235	74,408,574	(6,901,958)	-	2,000,196,852
2071	2,000,196,852	77,007,579	(7,111,749)	-	2,070,092,681
2072	2,070,092,681	79,698,568	(40,114,477)	-	2,109,676,773
2073	2,109,676,773	81,222,556	(7,554,224)	-	2,183,345,105
2074	2,183,345,105	84,058,787	(7,787,417)	-	2,259,616,475
2075	2,259,616,475	86,995,234	(49,814,607)	-	2,296,797,103
2076	2,296,797,103	88,426,688	(8,370,242)	-	2,376,853,549
2077	2,376,853,549	91,508,862	(8,538,208)	-	2,459,824,202
2078	2,459,824,202	94,703,232	(48,825,568)	-	2,505,701,865
2079	2,505,701,865	96,469,522	(9,084,684)	-	2,593,086,704
2080	2,593,086,704	99,833,838	(9,477,016)	-	2,683,443,525
2081	2,683,443,525	103,312,576	(9,671,174)	-	2,777,084,928
2082	2,777,084,928	106,917,770	(53,166,613)	-	2,830,836,085
2083	2,830,836,085	108,987,189	(10,300,543)	-	2,929,522,731
2084	2,929,522,731	112,786,625	(10,751,594)	-	3,031,557,761
2085	3,031,557,761	116,714,974	(10,975,979)	-	3,137,296,756
2086	3,137,296,756	120,785,925	(11,332,081)	-	3,246,750,601
2087	3,246,750,601	124,999,898	(11,700,994)	-	3,360,049,505
2088	3,360,049,505	129,361,906	(352,881,169)	-	3,136,530,242
2089	3,136,530,242	120,756,414	(12,479,247)	-	3,244,807,410
2090	3,244,807,410	124,925,085	(12,889,528)	-	3,356,842,967
2091	3,356,842,967	129,238,454	(13,314,649)	-	3,472,766,772
2092	3,472,766,772	133,701,521	(13,911,529)	-	3,592,556,763
2093	3,592,556,763	138,313,435	(14,211,507)	-	3,716,658,692
2094	3,716,658,692	143,091,360	(14,684,440)	-	3,845,065,611
2095	3,845,065,611	148,035,026	(55,521,905)	-	3,937,578,733
2096	3,937,578,733	151,596,781	(43,596,891)	-	4,045,578,623
2097	4,045,578,623	155,754,777	(44,807,876)	-	4,156,525,524
2098	4,156,525,524	160,026,233	(16,753,450)	-	4,299,798,307
2099	4,299,798,307	165,542,235	(47,731,200)	-	4,417,609,343
2100	4,417,609,343	170,077,960	(64,949,099)	-	4,522,738,203
2101	4,522,738,203	174,125,421	(67,028,133)	-	4,629,835,492
2102	4,629,835,492	178,248,666	(69,176,905)	-	4,738,907,253
2103	4,738,907,253	182,447,929	(19,790,534)	-	4,901,564,649
2104	4,901,564,649	188,710,239	(20,701,202)	-	5,069,573,686
2105	5,069,573,686	195,178,587	(76,066,033)	-	5,188,686,239
2106	5,188,686,239	199,764,420	(59,642,826)	-	5,328,807,833
2107	5,328,807,833	205,159,102	(61,583,707)	-	5,472,383,228
2108	5,472,383,228	210,686,754	(23,690,752)	-	5,659,379,230

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External Levelized	2109	5,659,379,230	217,886,100	(65,666,217)	-	5,811,599,114
	2110	5,811,599,114	223,746,566	(67,812,566)	-	5,967,533,114
	2111	5,967,533,114	229,750,025	(70,032,172)	-	6,127,250,967
	2112	6,127,250,967	235,899,162	(27,139,719)	-	6,336,010,411
	2113	6,336,010,411	243,936,401	(168,584,203)	-	6,411,362,609
	2114	6,411,362,609	246,837,460	(125,588,918)	-	6,532,611,152
	2115	6,532,611,152	251,505,529	(97,452,280)	-	6,686,664,401
	2116	6,686,664,401	257,436,579	(31,119,433)	-	6,912,981,547
	2117	6,912,981,547	266,149,790	(31,838,209)	-	7,147,293,128
	2118	7,147,293,128	275,170,785	(142,751,689)	-	7,279,712,224
	2119	7,279,712,224	280,268,921	(119,085,462)	-	7,440,895,683
	2120	7,440,895,683	286,474,484	(35,712,738)	-	7,691,657,429
	2121	7,691,657,429	296,128,811	(36,544,556)	-	7,951,241,684
	2122	7,951,241,684	306,122,805	(193,494,680)	-	8,063,869,808
	2123	8,063,869,808	310,458,988	(39,163,662)	-	8,335,165,134
	2124	8,335,165,134	320,903,858	(41,015,217)	-	8,615,053,774
	2125	8,615,053,774	331,679,570	(213,117,617)	-	8,733,615,728
	2126	8,733,615,728	336,244,206	(43,462,769)	-	9,026,397,165
	2127	9,026,397,165	347,516,291	(45,001,992)	-	9,328,911,464
	2128	9,328,911,464	359,163,091	(235,348,539)	-	9,452,726,016
	2129	9,452,726,016	363,929,952	(48,251,836)	-	9,768,404,131
	2130	9,768,404,131	376,083,559	(49,966,646)	-	10,094,521,044
	2131	10,094,521,044	388,639,060	(51,744,322)	-	10,431,415,782
	2132	10,431,415,782	401,609,508	(267,958,531)	-	10,565,066,759
	2133	10,565,066,759	406,755,070	(55,497,745)	-	10,916,324,084
	2134	10,916,324,084	420,278,477	(57,478,402)	-	11,279,124,159
	2135	11,279,124,159	434,246,280	(59,531,867)	-	11,653,838,573
	2136	11,653,838,573	448,672,785	(62,374,450)	-	12,040,136,908
	2137	12,040,136,908	463,545,271	(63,867,759)	-	12,439,814,420
	2138	12,439,814,420	478,932,855	(1,619,934,496)	-	11,298,812,779
	2139	11,298,812,779	435,004,292	(68,528,292)	-	11,665,288,778
	2140	11,665,288,778	449,113,618	(71,808,993)	-	12,042,593,403
	2141	12,042,593,403	463,639,846	(73,537,858)	-	12,432,695,391
	2142	12,432,695,391	478,658,773	(76,181,819)	-	12,835,172,344
	2143	12,835,172,344	494,154,135	(78,923,046)	-	13,250,403,433
	2144	13,250,403,433	510,140,532	(82,710,122)	-	13,677,833,843
	2145	13,677,833,843	526,596,603	(279,365,669)	-	13,925,064,777
	2146	13,925,064,777	536,114,994	(221,800,138)	-	14,239,379,633
	2147	14,239,379,633	548,216,116	(229,376,110)	-	14,558,219,639
	2148	14,558,219,639	560,491,456	(95,308,029)	-	15,023,403,066
	2149	15,023,403,066	578,401,018	(245,337,404)	-	15,356,466,681
	2150	15,356,466,681	591,223,967	(330,033,563)	-	15,617,657,084
	2151	15,617,657,084	601,279,798	(341,253,483)	-	15,877,683,399
	2152	15,877,683,399	611,290,811	(354,118,484)	-	16,134,855,726
	2153	16,134,855,726	621,191,945	(112,553,549)	-	16,643,494,122
	2154	16,643,494,122	640,774,524	(116,636,018)	-	17,167,632,628
	2155	17,167,632,628	660,953,856	(453,999,461)	-	17,374,587,024
	2156	17,374,587,024	668,921,600	(312,215,936)	-	17,731,292,688

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2157	17,731,292,688	682,654,768	(321,488,093)	-	18,092,459,364
2158	18,092,459,364	696,559,686	(134,530,600)	-	18,654,488,449
2159	18,654,488,449	718,197,805	(344,069,468)	-	19,028,616,787
2160	19,028,616,787	732,601,746	(357,625,941)	-	19,403,592,591
2161	19,403,592,591	747,038,315	(368,279,706)	-	19,782,351,200
2162	19,782,351,200	761,620,521	(155,221,615)	-	20,388,750,106
2163	20,388,750,106	784,966,879	(860,953,811)	-	20,312,763,175
2164	20,312,763,175	782,041,382	(650,992,499)	-	20,443,812,058
2165	20,443,812,058	787,086,764	(422,075,262)	-	20,808,823,559
2166	20,808,823,559	801,139,707	(179,149,446)	-	21,430,813,821
2167	21,430,813,821	825,086,332	(185,695,142)	-	22,070,205,011
2168	22,070,205,011	849,702,893	(745,034,452)	-	22,174,873,452
2169	22,174,873,452	853,732,628	(626,153,406)	-	22,402,452,674
2170	22,402,452,674	862,494,428	(206,823,862)	-	23,058,123,240
2171	23,058,123,240	887,737,745	(214,395,121)	-	23,731,465,863
2172	23,731,465,863	913,661,436	(1,010,119,041)	-	23,635,008,258
2173	23,635,008,258	909,947,818	(230,390,300)	-	24,314,565,777
2174	24,314,565,777	936,110,782	(238,835,623)	-	25,011,840,936
2175	25,011,840,936	962,955,876	(1,115,191,107)	-	24,859,605,705
2176	24,859,605,705	957,094,820	(259,613,730)	-	25,557,086,795
2177	25,557,086,795	983,947,842	(266,098,471)	-	26,274,936,166
2178	26,274,936,166	1,011,585,042	(1,234,613,741)	-	26,051,907,467
2179	26,051,907,467	1,002,998,437	(286,002,157)	-	26,768,903,748
2180	26,768,903,748	1,030,602,794	(299,898,516)	-	27,499,608,026
2181	27,499,608,026	1,058,734,909	(307,411,637)	-	28,250,931,299
2182	28,250,931,299	1,087,660,855	(1,414,511,813)	-	27,924,080,341
2183	27,924,080,341	1,075,077,093	(330,441,505)	-	28,668,715,928
2184	28,668,715,928	1,103,745,563	(346,509,982)	-	29,425,951,510
2185	29,425,951,510	1,132,899,133	(355,215,042)	-	30,203,635,601
2186	30,203,635,601	1,162,839,971	(368,296,726)	-	30,998,178,845
2187	30,998,178,845	1,193,429,886	(381,864,954)	-	31,809,743,777
2188	31,809,743,777	1,224,675,135	(8,441,230,755)	-	24,593,188,157
2189	24,593,188,157	946,837,744	(410,534,211)	-	25,129,491,690
2190	25,129,491,690	967,485,430	(425,673,604)	-	25,671,303,516
2191	25,671,303,516	988,345,185	(441,376,437)	-	26,218,272,264
2192	26,218,272,264	1,009,403,482	(462,869,306)	-	26,764,806,441
2193	26,764,806,441	1,030,445,048	(539,592,893)	-	27,255,658,596
2194	27,255,658,596	1,049,342,856	(660,256,157)	-	27,644,745,295
2195	27,644,745,295	1,064,322,694	(1,943,629,715)	-	26,765,438,274
2196	26,765,438,274	1,030,469,374	(1,453,237,453)	-	26,342,670,195
2197	26,342,670,195	1,014,192,802	(1,386,722,044)	-	25,970,140,953
2198	25,970,140,953	999,850,427	(838,535,393)	-	26,131,455,987
2199	26,131,455,987	1,006,061,055	(1,486,852,317)	-	25,650,664,725
2200	25,650,664,725	987,550,592	(1,900,522,353)	-	24,737,692,965
2201	24,737,692,965	952,401,179	(2,095,624,284)	-	23,594,469,859
2202	23,594,469,859	908,387,090	(2,169,643,287)	-	22,333,213,662
2203	22,333,213,662	859,828,726	(819,210,334)	-	22,373,832,054
2204	22,373,832,054	861,392,534	(904,458,872)	-	22,330,765,715

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2205	22,330,765,715	859,734,480	(2,359,220,264)	-	20,831,279,931
2206	20,831,279,931	802,004,277	(1,899,030,751)	-	19,734,253,458
2207	19,734,253,458	759,768,758	(2,019,060,241)	-	18,474,961,975
2208	18,474,961,975	711,286,036	(1,044,164,448)	-	18,142,083,563
2209	18,142,083,563	698,470,217	(2,109,635,585)	-	16,730,918,196
2210	16,730,918,196	644,140,351	(2,242,955,630)	-	15,132,102,917
2211	15,132,102,917	582,585,962	(2,323,067,139)	-	13,391,621,740
2212	13,391,621,740	515,577,437	(1,205,701,024)	-	12,701,498,153
2213	12,701,498,153	489,007,679	(4,998,775,694)	-	8,191,730,138
2214	8,191,730,138	315,381,610	(3,878,358,483)	-	4,628,753,265
2215	4,628,753,265	178,207,001	(2,673,687,091)	-	2,133,273,175
2216	2,133,273,175	82,131,017	(1,392,505,507)	-	822,898,685
2217	822,898,685	31,681,599	(2,701,156,647)	-	(1,846,576,362)
2218	(1,846,576,362)	(71,093,190)	1,917,669,552	-	(0)

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Prairie Island Unit 2

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$487,163,479	$9,746,216	$0	$294,670	$497,204,366
2021	497,204,366	20,018,407	-	6,511,608	523,734,381
2022	523,734,381	21,702,797	-	37,671,093	583,108,271
2023	583,108,271	24,077,753	-	37,671,093	644,857,117
2024	644,857,117	26,547,707	-	37,671,093	709,075,916
2025	709,075,916	29,116,459	-	37,671,093	775,863,468
2026	775,863,468	31,787,961	-	37,671,093	845,322,521
2027	845,322,521	34,566,323	-	37,671,093	917,559,937
2028	917,559,937	37,455,819	-	37,671,093	992,686,849
2029	992,686,849	40,460,896	-	37,671,093	1,070,818,838
2030	1,070,818,838	43,586,175	-	37,671,093	1,152,076,106
2031	1,152,076,106	46,836,466	-	37,671,093	1,236,583,665
2032	1,236,583,665	50,216,768	-	37,671,093	1,324,471,527
2033	1,324,471,527	53,732,283	-	37,671,093	1,415,874,903
2034	1,415,874,903	54,969,923	(16,324,075)	31,267,007	1,485,787,757
2035	1,485,787,757	57,054,250	(104,939,456)	-	1,437,902,551
2036	1,437,902,551	55,215,458	(173,127,494)	-	1,319,990,515
2037	1,319,990,515	50,687,636	(210,891,850)	-	1,159,786,301
2038	1,159,786,301	44,535,794	(237,964,089)	-	966,358,006
2039	966,358,006	37,108,147	(77,052,824)	-	926,413,330
2040	926,413,330	35,574,272	(56,450,184)	-	905,537,418
2041	905,537,418	34,772,637	(53,750,522)	-	886,559,533
2042	886,559,533	34,043,886	(24,555,222)	-	896,048,196
2043	896,048,196	34,408,251	(3,279,265)	-	927,177,182
2044	927,177,182	35,603,604	(3,392,181)	-	959,388,604
2045	959,388,604	36,840,522	(12,498,433)	-	983,730,694
2046	983,730,694	37,775,259	(9,745,285)	-	1,011,760,667
2047	1,011,760,667	38,851,610	(10,019,075)	-	1,040,593,202
2048	1,040,593,202	39,958,779	(3,751,095)	-	1,076,800,886
2049	1,076,800,886	41,349,154	(10,592,785)	-	1,107,557,254
2050	1,107,557,254	42,530,199	(14,384,723)	-	1,135,702,730
2051	1,135,702,730	43,610,985	(14,408,561)	-	1,164,905,154
2052	1,164,905,154	44,732,358	(15,267,293)	-	1,194,370,219
2053	1,194,370,219	45,863,816	(4,233,111)	-	1,236,000,924
2054	1,236,000,924	47,462,435	(4,347,982)	-	1,279,115,377
2055	1,279,115,377	49,118,030	(16,591,361)	-	1,311,642,047
2056	1,311,642,047	50,367,055	(12,960,777)	-	1,349,048,324
2057	1,349,048,324	51,803,456	(13,289,806)	-	1,387,561,973
2058	1,387,561,973	53,282,380	(4,849,622)	-	1,435,994,731
2059	1,435,994,731	55,142,198	(13,585,090)	-	1,477,551,839
2060	1,477,551,839	56,737,991	(14,545,805)	-	1,519,744,025

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2061	1,519,744,025	58,358,171	(14,919,213)	-	1,563,182,983
2062	1,563,182,983	60,026,227	(5,426,387)	-	1,617,782,822
2063	1,617,782,822	62,122,860	(36,281,088)	-	1,643,624,595
2064	1,643,624,595	63,115,184	(26,315,298)	-	1,680,424,481
2065	1,680,424,481	64,528,300	(16,772,279)	-	1,728,180,502
2066	1,728,180,502	66,362,131	(6,089,644)	-	1,788,452,989
2067	1,788,452,989	68,676,595	(6,270,496)	-	1,850,859,089
2068	1,850,859,089	71,072,989	(30,265,670)	-	1,891,666,407
2069	1,891,666,407	72,639,990	(24,993,497)	-	1,939,312,900
2070	1,939,312,900	74,469,615	(6,852,703)	-	2,006,929,813
2071	2,006,929,813	77,066,105	(7,060,770)	-	2,076,935,148
2072	2,076,935,148	79,754,310	(40,061,710)	-	2,116,627,747
2073	2,116,627,747	81,278,505	(7,499,607)	-	2,190,406,646
2074	2,190,406,646	84,111,615	(7,730,882)	-	2,266,787,379
2075	2,266,787,379	87,044,635	(49,756,087)	-	2,304,075,928
2076	2,304,075,928	88,476,516	(8,309,666)	-	2,384,242,778
2077	2,384,242,778	91,554,923	(8,475,501)	-	2,467,322,199
2078	2,467,322,199	94,745,172	(48,760,655)	-	2,513,306,717
2079	2,513,306,717	96,510,978	(9,017,484)	-	2,600,800,211
2080	2,600,800,211	99,870,728	(9,407,448)	-	2,691,263,491
2081	2,691,263,491	103,344,518	(9,599,152)	-	2,785,008,857
2082	2,785,008,857	106,944,340	(53,092,050)	-	2,838,861,146
2083	2,838,861,146	109,012,268	(10,223,348)	-	2,937,650,067
2084	2,937,650,067	112,805,763	(10,671,672)	-	3,039,784,158
2085	3,039,784,158	116,727,712	(10,893,231)	-	3,145,618,639
2086	3,145,618,639	120,791,756	(11,246,405)	-	3,255,163,990
2087	3,255,163,990	124,998,297	(11,612,285)	-	3,368,550,002
2088	3,368,550,002	129,352,320	(352,789,317)	-	3,145,113,004
2089	3,145,113,004	120,772,339	(12,384,140)	-	3,253,501,204
2090	3,253,501,204	124,934,446	(12,791,048)	-	3,365,644,602
2091	3,365,644,602	129,240,753	(13,212,674)	-	3,481,672,680
2092	3,481,672,680	133,696,231	(13,805,934)	-	3,601,562,978
2093	3,601,562,978	138,300,018	(14,102,159)	-	3,725,760,837
2094	3,725,760,837	143,069,216	(14,571,205)	-	3,854,258,848
2095	3,854,258,848	148,003,540	(55,404,641)	-	3,946,857,747
2096	3,946,857,747	151,559,338	(43,475,453)	-	4,054,941,632
2097	4,054,941,632	155,709,759	(44,682,113)	-	4,165,969,278
2098	4,165,969,278	159,973,220	(16,623,205)	-	4,309,319,293
2099	4,309,319,293	165,477,861	(47,596,310)	-	4,427,200,844
2100	4,427,200,844	170,004,512	(64,809,397)	-	4,532,395,959
2101	4,532,395,959	174,044,005	(66,883,444)	-	4,639,556,520
2102	4,639,556,520	178,158,970	(69,027,048)	-	4,748,688,442
2103	4,748,688,442	182,349,636	(19,635,321)	-	4,911,402,757
2104	4,911,402,757	188,597,866	(20,540,440)	-	5,079,460,183
2105	5,079,460,183	195,051,271	(75,899,520)	-	5,198,611,934
2106	5,198,611,934	199,626,698	(59,470,352)	-	5,338,768,280
2107	5,338,768,280	205,008,702	(61,405,055)	-	5,482,371,927
2108	5,482,371,927	210,523,082	(23,505,698)	-	5,669,389,311

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External Levelized	2109	5,669,389,311	217,704,550	(65,474,528)	-	5,821,619,333
	2110	5,821,619,333	223,550,182	(67,614,000)	-	5,977,555,516
	2111	5,977,555,516	229,538,132	(69,826,480)	-	6,137,267,168
	2112	6,137,267,168	235,671,059	(26,926,640)	-	6,346,011,587
	2113	6,346,011,587	243,686,845	(168,363,469)	-	6,421,334,963
	2114	6,421,334,963	246,579,263	(125,360,249)	-	6,542,553,977
	2115	6,542,553,977	251,234,073	(97,215,387)	-	6,696,572,663
	2116	6,696,572,663	257,148,390	(30,874,016)	-	6,922,847,037
	2117	6,922,847,037	265,837,326	(31,583,956)	-	7,157,100,407
	2118	7,157,100,407	274,832,656	(142,488,278)	-	7,289,444,785
	2119	7,289,444,785	279,914,680	(118,812,559)	-	7,450,546,905
	2120	7,450,546,905	286,101,001	(35,429,996)	-	7,701,217,911
	2121	7,701,217,911	295,726,768	(36,251,615)	-	7,960,693,063
	2122	7,960,693,063	305,690,614	(193,191,167)	-	8,073,192,510
	2123	8,073,192,510	310,010,592	(38,849,190)	-	8,344,353,912
	2124	8,344,353,912	320,423,190	(40,689,386)	-	8,624,087,716
	2125	8,624,087,716	331,164,968	(212,780,010)	-	8,742,472,674
	2126	8,742,472,674	335,710,951	(43,112,956)	-	9,035,070,668
	2127	9,035,070,668	346,946,714	(44,639,527)	-	9,337,377,855
	2128	9,337,377,855	358,555,310	(234,972,957)	-	9,460,960,208
	2129	9,460,960,208	363,300,872	(47,862,655)	-	9,776,398,424
	2130	9,776,398,424	375,413,699	(49,563,369)	-	10,102,248,755
	2131	10,102,248,755	387,926,352	(51,326,432)	-	10,438,848,675
	2132	10,438,848,675	400,851,789	(267,525,492)	-	10,572,174,972
	2133	10,572,174,972	405,971,519	(55,049,000)	-	10,923,097,491
	2134	10,923,097,491	419,446,944	(57,013,375)	-	11,285,531,060
	2135	11,285,531,060	433,364,393	(59,049,960)	-	11,659,845,492
	2136	11,659,845,492	447,738,067	(61,875,044)	-	12,045,708,515
	2137	12,045,708,515	462,555,207	(63,350,210)	-	12,444,913,512
	2138	12,444,913,512	477,884,679	(1,619,398,138)	-	11,303,400,053
	2139	11,303,400,053	434,050,562	(67,972,432)	-	11,669,478,183
	2140	11,669,478,183	448,107,962	(71,232,915)	-	12,046,353,230
	2141	12,046,353,230	462,579,964	(72,940,818)	-	12,435,992,376
	2142	12,435,992,376	477,542,107	(75,563,045)	-	12,837,971,438
	2143	12,837,971,438	492,978,103	(78,281,739)	-	13,252,667,803
	2144	13,252,667,803	508,902,444	(82,045,451)	-	13,679,524,795
	2145	13,679,524,795	525,293,752	(278,676,774)	-	13,926,141,773
	2146	13,926,141,773	534,763,844	(221,086,127)	-	14,239,819,490
	2147	14,239,819,490	546,809,068	(228,636,058)	-	14,557,992,501
	2148	14,557,992,501	559,026,912	(94,540,975)	-	15,022,478,438
	2149	15,022,478,438	576,863,172	(244,542,352)	-	15,354,799,258
	2150	15,354,799,258	589,624,292	(329,209,482)	-	15,615,214,068
	2151	15,615,214,068	599,624,220	(340,399,302)	-	15,874,438,986
	2152	15,874,438,986	609,578,457	(353,233,090)	-	16,130,784,353
	2153	16,130,784,353	619,422,119	(111,635,792)	-	16,638,570,680
	2154	16,638,570,680	638,921,114	(115,684,703)	-	17,161,807,092
	2155	17,161,807,092	659,013,392	(453,013,348)	-	17,367,807,136
	2156	17,367,807,136	666,923,794	(311,193,741)	-	17,723,537,190

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2157	17,723,537,190	680,583,828	(320,428,481)	-	18,083,692,537
2158	18,083,692,537	694,413,793	(133,432,189)	-	18,644,674,140
2159	18,644,674,140	715,955,487	(342,930,824)	-	19,017,698,803
2160	19,017,698,803	730,279,634	(356,445,577)	-	19,391,532,861
2161	19,391,532,861	744,634,862	(367,056,078)	-	19,769,111,644
2162	19,769,111,644	759,133,887	(153,953,122)	-	20,374,292,409
2163	20,374,292,409	782,372,828	(859,638,794)	-	20,297,026,443
2164	20,297,026,443	779,405,815	(649,629,237)	-	20,426,803,022
2165	20,426,803,022	784,389,236	(420,661,968)	-	20,790,530,290
2166	20,790,530,290	798,356,363	(177,684,266)	-	21,411,202,387
2167	21,411,202,387	822,190,172	(184,176,156)	-	22,049,216,402
2168	22,049,216,402	846,689,910	(743,459,668)	-	22,152,446,645
2169	22,152,446,645	850,653,951	(624,520,755)	-	22,378,579,841
2170	22,378,579,841	859,337,466	(205,131,199)	-	23,032,786,108
2171	23,032,786,108	884,458,987	(212,640,223)	-	23,704,604,872
2172	23,704,604,872	910,256,827	(1,008,299,599)	-	23,606,562,101
2173	23,606,562,101	906,491,985	(228,503,922)	-	24,284,550,164
2174	24,284,550,164	932,526,726	(236,879,825)	-	24,980,197,065
2175	24,980,197,065	959,239,567	(1,113,163,314)	-	24,826,273,319
2176	24,826,273,319	953,328,895	(257,511,271)	-	25,522,090,943
2177	25,522,090,943	980,048,292	(263,918,574)	-	26,238,220,662
2178	26,238,220,662	1,007,547,673	(1,232,353,532)	-	26,013,414,803
2179	26,013,414,803	998,915,128	(283,658,653)	-	26,728,671,278
2180	26,728,671,278	1,026,380,977	(297,468,625)	-	27,457,583,630
2181	27,457,583,630	1,054,371,211	(304,892,150)	-	28,207,062,692
2182	28,207,062,692	1,083,151,207	(1,411,899,401)	-	27,878,314,498
2183	27,878,314,498	1,070,527,277	(327,732,716)	-	28,621,109,059
2184	28,621,109,059	1,099,050,588	(343,701,232)	-	29,376,458,415
2185	29,376,458,415	1,128,056,003	(352,302,618)	-	30,152,211,800
2186	30,152,211,800	1,157,844,933	(365,276,772)	-	30,944,779,961
2187	30,944,779,961	1,188,279,550	(378,733,471)	-	31,754,326,040
2188	31,754,326,040	1,219,366,120	(8,437,983,596)	-	24,535,708,565
2189	24,535,708,565	942,171,209	(407,167,072)	-	25,070,712,701
2190	25,070,712,701	962,715,368	(422,182,022)	-	25,611,246,047
2191	25,611,246,047	983,471,848	(437,755,781)	-	26,156,962,114
2192	26,156,962,114	1,004,427,345	(459,114,771)	-	26,702,274,689
2193	26,702,274,689	1,025,367,348	(535,699,496)	-	27,191,942,541
2194	27,191,942,541	1,044,170,594	(656,218,728)	-	27,579,894,407
2195	27,579,894,407	1,059,067,945	(1,939,442,890)	-	26,699,519,462
2196	26,699,519,462	1,025,261,547	(1,448,895,668)	-	26,275,885,341
2197	26,275,885,341	1,008,993,997	(1,382,219,528)	-	25,902,659,810
2198	25,902,659,810	994,662,137	(833,866,156)	-	26,063,455,790
2199	26,063,455,790	1,000,836,702	(1,482,010,148)	-	25,582,282,344
2200	25,582,282,344	982,359,642	(1,895,500,807)	-	24,669,141,179
2201	24,669,141,179	947,295,021	(2,090,416,675)	-	23,526,019,526
2202	23,526,019,526	903,399,150	(2,164,242,678)	-	22,265,175,997
2203	22,265,175,997	854,982,758	(813,609,528)	-	22,306,549,227
2204	22,306,549,227	856,571,490	(898,650,405)	-	22,264,470,312

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2205	22,264,470,312	854,955,660	(2,353,196,390)	-	20,766,229,582
2206	20,766,229,582	797,423,216	(1,892,783,435)	-	19,670,869,363
2207	19,670,869,363	755,361,384	(2,012,581,147)	-	18,413,649,600
2208	18,413,649,600	707,084,145	(1,037,444,927)	-	18,083,288,817
2209	18,083,288,817	694,398,291	(2,102,666,665)	-	16,675,020,443
2210	16,675,020,443	640,320,785	(2,235,728,002)	-	15,079,613,225
2211	15,079,613,225	579,057,148	(2,315,571,146)	-	13,343,099,227
2212	13,343,099,227	512,375,010	(1,197,926,647)	-	12,657,547,591
2213	12,657,547,591	486,049,827	(4,990,712,537)	-	8,152,884,881
2214	8,152,884,881	313,070,779	(3,869,995,763)	-	4,595,959,897
2215	4,595,959,897	176,484,860	(2,665,013,618)	-	2,107,431,139
2216	2,107,431,139	80,925,356	(1,383,509,673)	-	804,846,822
2217	804,846,822	30,906,118	(2,691,826,408)	-	(1,856,073,468)
2218	(1,856,073,468)	(71,273,221)	1,927,346,689	-	(0)

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2022 ACCRUAL COMPARISON

	Present	Proposed	Difference
Monticello	$8,507,110	$23,730,503	$15,223,393
Prairie Island Unit 1	12,399,703	22,244,385	9,844,682
Prairie Island Unit 2	6,511,608	14,293,537	7,781,929
TOTAL	$27,418,421	$60,268,424	$32,850,003

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2022 MN RETAIL SUMMARY

	Remaining Life (yrs)	Operational Earnings Rate	Post-Shutdown Earnings Rate	Market Value Balance 6/30/2020	Book Value 6/30/2020	Unrealized Gain/Loss 6/30/2020	Tax-Effect Adjustment	Tax-Adjusted Fund Balance 6/30/2020	2022-2024 Decommissioning Accrual
Monticello	9.67	3.96%	3.76%	$814,968,100	$610,109,002	$204,859,098	$57,032,773	$757,935,327	**$23,730,503**
Prairie Island Unit 1	13.25	4.17%	3.77%	471,960,960	346,629,286	125,331,674	34,892,338	437,068,622	**22,244,385**
Prairie Island Unit 2	14.42	4.10%	3.78%	526,255,835	385,837,890	140,417,945	39,092,356	487,163,479	**14,293,537**
TOTAL DECOMMISSIONING ACCRUAL				**$1,813,184,895**	**$1,342,576,178**	**$470,608,717**	**$131,017,467**	**$1,682,167,428**	**$60,268,424**

INPUT DATA

Escalation Rate (Labor)	3.78%
Escalation Rate (Non-Labor)	2.58%
Escalation Rate (PIIC)	0.00%
Jurisdictional Factor	72.9219%
Tax Rate for tax-effect adjustment	27.84%

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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Monticello																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2030	$18,693,499	$0	$18,693,499	$13,631,655	1.4492	$19,754,994	$9,109,308	$0	$9,109,308	$6,642,680	1.2901	$8,569,722	$0	$0	1.0000	$0	$27,802,807	$20,274,335	$28,324,716
2031	68,992,664	-	68,992,664	50,310,762	1.5040	75,667,386	50,712,482	-	50,712,482	36,980,505	1.3234	48,940,000	0	0	1.0000	0	119,705,146	87,291,267	124,607,386
2032	44,420,428	-	44,420,428	32,392,220	1.5609	50,561,016	62,554,194	-	62,554,194	45,615,707	1.3575	61,923,322	0	0	1.0000	0	106,974,622	78,007,927	112,484,338
2033	41,095,925	-	41,095,925	29,967,929	1.6199	48,545,049	68,444,452	-	68,444,452	49,910,995	1.3926	69,506,052	0	0	1.0000	0	109,540,377	79,878,924	118,051,101
2034	31,070,192	-	31,070,192	22,656,974	1.6811	38,088,639	48,756,338	-	48,756,338	35,554,048	1.4285	50,788,958	0	0	1.0000	0	79,826,530	58,211,022	88,877,597
2035	9,293,106	-	9,293,106	6,776,709	1.7446	11,822,647	6,010,052	-	6,010,052	4,382,644	1.4653	6,421,888	0	0	1.0000	0	15,303,158	11,159,354	18,244,536
2036	10,038,417	-	10,038,417	7,320,205	1.8106	13,253,963	8,186,070	-	8,186,070	5,969,438	1.5032	8,973,259	0	0	1.0000	0	18,224,487	13,289,642	22,227,221
2037	10,372,956	-	10,372,956	7,564,157	1.8790	14,213,050	9,249,602	-	9,249,602	6,744,986	1.5419	10,400,093	0	0	1.0000	0	19,622,558	14,309,142	24,613,144
2038	9,473,081	4,593,659	4,879,422	3,558,167	1.9501	6,938,782	6,549,977	218,856	6,331,121	4,616,774	1.5817	7,302,351	0	0	1.0000	0	11,210,543	8,174,941	14,241,133
2039	10,372,956	4,593,659	5,779,297	4,214,373	2.0238	8,529,048	9,249,602	218,856	9,030,746	6,585,392	1.6225	10,684,798	0	0	1.0000	0	14,810,043	10,799,765	19,213,846
2040	10,758,317	4,593,659	6,164,658	4,495,386	2.1003	9,441,659	10,345,770	218,856	10,126,914	7,384,738	1.6644	12,291,158	0	0	1.0000	0	16,291,572	11,880,124	21,732,817
2041	9,275,119	4,593,659	4,681,460	3,413,809	2.1797	7,441,080	5,956,091	218,856	5,737,235	4,183,700	1.7073	7,142,832	0	0	1.0000	0	10,418,694	7,597,510	14,583,912
2042	9,275,119	4,593,659	4,681,460	3,413,809	2.2620	7,722,037	5,956,091	218,856	5,737,235	4,183,700	1.7514	7,327,333	0	0	1.0000	0	10,418,694	7,597,510	15,049,370
2043	9,275,119	4,593,659	4,681,460	3,413,809	2.3475	8,013,917	5,956,091	218,856	5,737,235	4,183,700	1.7966	7,516,436	0	0	1.0000	0	10,418,694	7,597,510	15,530,354
2044	9,300,530	4,593,659	4,706,871	3,432,340	2.4363	8,362,209	5,972,409	218,856	5,753,553	4,195,600	1.8429	7,732,071	0	0	1.0000	0	10,460,424	7,627,940	16,094,280
2045	9,275,119	4,593,659	4,681,460	3,413,809	2.5284	8,631,476	5,956,091	218,856	5,737,235	4,183,700	1.8905	7,909,286	0	0	1.0000	0	10,418,694	7,597,510	16,540,761
2046	9,275,119	4,593,659	4,681,460	3,413,809	2.6239	8,957,494	5,956,091	218,856	5,737,235	4,183,700	1.9392	8,113,032	0	0	1.0000	0	10,418,694	7,597,510	17,070,526
2047	9,275,119	4,593,659	4,681,460	3,413,809	2.7231	9,296,144	5,956,091	218,856	5,737,235	4,183,700	1.9893	8,322,635	0	0	1.0000	0	10,418,694	7,597,510	17,618,780
2048	10,020,016	4,593,659	5,426,357	3,957,003	2.8261	11,182,885	8,130,867	218,856	7,912,011	5,769,588	2.0406	11,773,422	0	0	1.0000	0	13,338,367	9,726,591	22,956,307
2049	9,275,119	4,593,659	4,681,460	3,413,809	2.9329	10,012,361	5,956,091	218,856	5,737,235	4,183,700	2.0932	8,757,322	0	0	1.0000	0	10,418,694	7,597,510	18,769,683
2050	9,275,119	4,593,659	4,681,460	3,413,809	3.0438	10,390,953	5,956,091	218,856	5,737,235	4,183,700	2.1472	8,983,242	0	0	1.0000	0	10,418,694	7,597,510	19,374,195
2051	9,275,119	4,593,659	4,681,460	3,413,809	3.1588	10,783,541	5,956,091	218,856	5,737,235	4,183,700	2.2026	9,215,019	0	0	1.0000	0	10,418,694	7,597,510	19,998,560
2052	9,404,318	4,593,659	4,810,658	3,508,024	3.2782	11,500,003	6,283,771	218,856	6,064,915	4,422,651	2.2595	9,992,981	0	0	1.0000	0	10,875,574	7,930,675	21,492,984
2053	9,586,481	4,593,659	4,992,822	3,640,861	3.4021	12,386,573	6,890,178	218,856	6,671,322	4,864,855	2.3178	11,275,760	0	0	1.0000	0	11,664,144	8,505,716	23,662,333
2054	9,482,694	4,593,659	4,889,035	3,565,177	3.5307	12,587,570	6,578,816	218,856	6,359,960	4,637,803	2.3776	11,026,841	0	0	1.0000	0	11,248,994	8,202,980	23,614,412
2055	9,482,694	4,593,659	4,889,035	3,565,177	3.6642	13,063,522	6,578,816	218,856	6,359,960	4,637,803	2.4389	11,311,139	0	0	1.0000	0	11,248,994	8,202,980	24,374,660
2056	9,923,255	4,593,659	5,329,596	3,886,443	3.8027	14,778,976	7,840,584	218,856	7,621,728	5,557,909	2.5018	13,904,776	0	0	1.0000	0	12,951,324	9,444,351	28,683,751
2057	9,794,056	4,593,659	5,200,397	3,792,228	3.9464	14,965,650	7,512,903	218,856	7,294,047	5,318,958	2.5664	13,650,573	0	0	1.0000	0	12,494,444	9,111,186	28,616,223
2058	9,794,056	4,593,659	5,200,397	3,792,228	4.0956	15,531,451	7,512,903	218,856	7,294,047	5,318,958	2.6326	14,002,688	0	0	1.0000	0	12,494,444	9,111,186	29,534,139
2059	9,794,056	4,593,659	5,200,397	3,792,228	4.2504	16,118,488	7,512,903	218,856	7,294,047	5,318,958	2.7005	14,363,845	0	0	1.0000	0	12,494,444	9,111,186	30,482,333
2060	9,611,893	4,593,659	5,018,233	3,659,391	4.4111	16,141,941	6,906,496	218,856	6,687,640	4,876,754	2.7702	13,509,585	0	0	1.0000	0	11,705,874	8,536,145	29,651,525
2061	9,482,694	4,593,659	4,889,035	3,565,177	4.5778	16,320,667	6,578,816	218,856	6,359,960	4,637,803	2.8416	13,178,782	0	0	1.0000	0	11,248,994	8,202,980	29,499,449
2062	9,586,481	4,593,659	4,992,822	3,640,861	4.7509	17,297,366	6,890,178	218,856	6,671,322	4,864,855	2.9150	14,181,052	0	0	1.0000	0	11,664,144	8,505,716	31,478,417
2063	9,482,694	4,593,659	4,889,035	3,565,177	4.9305	17,578,105	6,578,816	218,856	6,359,960	4,637,803	2.9902	13,867,960	0	0	1.0000	0	11,248,994	8,202,980	31,446,065
2064	9,508,105	4,593,659	4,914,446	3,583,707	5.1168	18,337,114	6,595,134	218,856	6,376,278	4,649,703	3.0673	14,262,033	0	0	1.0000	0	11,290,724	8,233,410	32,599,147
2065	9,586,481	4,593,659	4,992,822	3,640,861	5.3103	19,334,063	6,890,178	218,856	6,671,322	4,864,855	3.1465	15,307,266	0	0	1.0000	0	11,664,144	8,505,716	34,641,329
2066	9,482,694	4,593,659	4,889,035	3,565,177	5.5110	19,647,690	6,578,816	218,856	6,359,960	4,637,803	3.2276	14,968,974	0	0	1.0000	0	11,248,994	8,202,980	34,616,665
2067	9,482,694	4,593,659	4,889,035	3,565,177	5.7193	20,390,317	6,578,816	218,856	6,359,960	4,637,803	3.3109	15,355,303	0	0	1.0000	0	11,248,994	8,202,980	35,745,620
2068	9,611,893	4,593,659	5,018,233	3,659,391	5.9355	21,720,317	6,906,496	218,856	6,687,640	4,876,754	3.3963	16,562,920	0	0	1.0000	0	11,705,874	8,536,145	38,283,237
2069	9,690,269	4,593,659	5,096,610	3,716,545	6.1598	22,893,172	7,201,541	218,856	6,982,685	5,091,906	3.4840	17,740,201	0	0	1.0000	0	12,079,294	8,808,451	40,633,373
2070	9,482,694	4,593,659	4,889,035	3,565,177	6.3927	22,791,107	6,578,816	218,856	6,359,960	4,637,803	3.5738	16,574,582	0	0	1.0000	0	11,248,994	8,202,980	39,365,689
2071	9,690,269	4,593,659	5,096,610	3,716,545	6.6343	24,656,672	7,201,541	218,856	6,982,685	5,091,906	3.6660	18,666,928	0	0	1.0000	0	12,079,294	8,808,451	43,323,600
2072	9,715,680	4,593,659	5,122,021	3,735,075	6.8851	25,716,365	7,217,859	218,856	6,999,003	5,103,806	3.7606	19,193,372	0	0	1.0000	0	12,121,024	8,838,881	44,909,737
2073	4,425,178	4,593,659	(168,482)	(122,860)	7.1454	(877,884)	4,711,150	218,856	4,492,294	3,275,866	3.8576	12,636,980	0	0	1.0000	0	4,323,812	3,153,006	11,759,097
2074	4,425,178	-	4,425,178	3,226,924	7.4155	23,929,252	4,711,150	-	4,711,150	3,435,460	3.9572	13,594,802	0	0	1.0000	0	9,136,327	6,662,383	37,524,054
2075	4,425,178	-	4,425,178	3,226,924	7.6958	24,833,759	4,711,150	-	4,711,150	3,435,460	4.0593	13,945,562	0	0	1.0000	0	9,136,327	6,662,383	38,779,321
2076	4,437,301	-	4,437,301	3,235,764	7.9867	25,843,080	4,724,057	-	4,724,057	3,444,872	4.1640	14,344,447	0	0	1.0000	0	9,161,358	6,680,637	40,187,528
2077	4,425,178	-	4,425,178	3,226,924	8.2886	26,746,679	4,711,150	-	4,711,150	3,435,460	4.2714	14,674,223	0	0	1.0000	0	9,136,327	6,662,383	41,420,902
2078	4,425,178	-	4,425,178	3,226,924	8.6019	27,757,674	4,711,150	-	4,711,150	3,435,460	4.3816	15,052,811	0	0	1.0000	0	9,136,327	6,662,383	42,810,485
2079	4,425,178	-	4,425,178	3,226,924	8.9270	28,806,747	4,711,150	-	4,711,150	3,435,460	4.4947	15,441,362	0	0	1.0000	0	9,136,327	6,662,383	44,248,108
2080	4,437,301	-	4,437,301	3,235,764	9.2645	29,977,740	4,724,057	-	4,724,057	3,444,872	4.6106	15,882,927	0	0	1.0000	0	9,161,358	6,680,637	45,860,667
2081	4,425,178	-	4,425,178	3,226,924	9.6147	31,025,902	4,711,150	-	4,711,150	3,435,460	4.7296	16,248,351	0	0	1.0000	0	9,136,327	6,662,383	47,274,253
2082	4,425,178	-	4,425,178	3,226,924	9.9781	32,198,566	4,711,150	-	4,711,150	3,435,460	4.8516	16,667,477	0	0	1.0000	0	9,136,327	6,662,383	48,866,043
2083	4,425,178	-	4,425,178	3,226,924	10.3553	33,415,762	4,711,150	-	4,711,150	3,435,460	4.9768	17,097,597	0	0	1.0000	0	9,136,327	6,662,383	50,513,359
2084	4,437,301	-	4,437,301	3,235,764	10.7467	34,773,790	4,724,057	-	4,724,057	3,444,872	5.1052	17,586,761	0	0	1.0000	0	9,161,358	6,680,637	52,360,551
2085	37,435,213	-	37,435,213	27,298,469	11.1529	304,457,090	9,919,355	-	9,919,355	7,233,382	5.2369	37,880,499	0	0	1.0000	0	47,354,568	34,531,851	342,337,589
2086	54,409,470	-	54,409,470	39,676,420	11.5745	459,234,718	39,890,810	-	39,890,810	29,089,136	5.3720	156,266,840	0	0	1.0000	0	94,300,280	68,765,556	615,501,559
2087	63,935,891	-	63,935,891	46,623,266	12.0120	560,038,677	123,019,872	-	123,019,872	89,708,428	5.5106	494,347,263	0	0	1.0000	0	186,955,763	136,331,695	1,054,385,941
2088	56,511,236	-	56,511,236	41,209,067	12.4661	513,716,353	46,925,224	-	46,925,224	34,218,765	5.6528	193,431,833	0	0	1.0000	0	103,436,460	75,427,832	707,148,186
2089	54,852,444	-	54,852,444	39,999,444	12.9373	517,484,813	43,974,985	-	43,974,985	32,067,394	5.7986	185,945,992	0	0	1.0000	0	98,827,429	72,066,839	703,430,805
2090	29,404,782	-	29,404,782	21,442,526	13.4263	287,893,787	9,195,251	-	9,195,251	6,705,351	5.9482	39,884,771	0	0	1.0000	0	38,600,033	28,147,877	327,778,559
2091	18,561,392	-	18,561,392	13,535,319	13.9338	188,598,435	17,021,007	-	17,021,007	12,412,042	6.1017	75,734,555	0	0	1.0000	0	35,582,399	25,947,361	264,332,989
2092	7,780,529	-	7,780,529	5,673,709	14.4605	82,044,673	7,134,833	-	7,134,833	5,202,856	6.2591	32,565,195	0	0	1.0000	0	14,915,362	10,876,565	114,609,868
	$945,083,770	$165,371,731	$779,712,039	$568,580,834		$4,003,267,072	$855,944,164	$7,878,816	$848,065,348	$618,425,365		$2,090,722,042	$0	$0		$0	$1,627,777,388	$1,187,006,199	$6,093,989,114

Xcel Energy
Nuclear Decommissioning Accrual
42-Year Decommissioning Period
DECON Method - No Recasking

Docket No. E002/M-20-___
Schedule E.5
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 1																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2033	$19,045,472	$0	$19,045,472	$13,888,320	1.6199	$22,497,690	$4,605,809	$0	$4,605,809	$3,358,643	1.3926	$4,677,247	$1,250,000	$911,524	1.0000	$911,524	$24,901,281	$18,158,487	$28,086,460
2034	48,160,248	-	48,160,248	35,119,368	1.6811	59,039,169	31,987,372	-	31,987,372	23,325,799	1.4285	33,320,904	1,250,000	911,524	1.0000	911,524	81,397,620	59,356,691	93,271,597
2035	19,427,915	-	19,427,915	14,167,205	1.7446	24,716,105	29,968,663	-	29,968,663	21,853,718	1.4653	32,022,254	1,250,000	911,524	1.0000	911,524	50,646,578	36,932,447	57,649,883
2036	16,303,029	-	16,303,029	11,888,478	1.8106	21,525,279	30,820,647	-	30,820,647	22,475,002	1.5032	33,784,422	1,250,000	911,524	1.0000	911,524	48,373,676	35,275,004	56,221,225
2037	16,258,485	-	16,258,485	11,855,996	1.8790	22,277,417	30,733,022	-	30,733,022	22,411,104	1.5419	34,555,681	1,250,000	911,524	1.0000	911,524	48,241,507	35,178,624	57,744,621
2038	14,280,650	-	14,280,650	10,413,721	1.9501	20,307,798	26,309,383	-	26,309,383	19,185,302	1.5817	30,345,392	1,250,000	911,524	1.0000	911,524	41,840,033	30,510,547	51,564,714
2039	5,186,220	-	5,186,220	3,781,890	2.0238	7,653,789	6,127,180	-	6,127,180	4,468,056	1.6225	7,249,421	1,250,000	911,524	1.0000	911,524	12,563,400	9,161,470	15,814,734
2040	5,251,754	-	5,251,754	3,829,679	2.1003	8,043,474	6,301,366	-	6,301,366	4,595,076	1.6644	7,648,045	1,250,000	911,524	1.0000	911,524	12,803,120	9,336,279	16,603,043
2041	5,134,326	2,315,817	2,818,509	2,055,310	2.1797	4,479,960	5,971,499	109,428	5,862,071	4,274,733	1.7073	7,298,252	1,250,000	911,524	1.0000	911,524	9,930,580	7,241,567	12,689,736
2042	5,290,008	2,315,817	2,974,190	2,168,836	2.2620	4,905,907	6,438,542	109,428	6,329,114	4,615,310	1.7514	8,083,255	1,250,000	911,524	1.0000	911,524	10,553,305	7,695,670	13,900,686
2043	5,134,326	2,315,817	2,818,509	2,055,310	2.3475	4,824,841	5,971,499	109,428	5,862,071	4,274,733	1.7966	7,679,986	1,250,000	911,524	1.0000	911,524	9,930,580	7,241,567	13,416,351
2044	5,096,073	2,315,817	2,780,256	2,027,415	2.4363	4,939,392	5,834,323	109,428	5,724,895	4,174,702	1.8429	7,693,558	1,250,000	911,524	1.0000	911,524	9,755,150	7,113,641	13,544,474
2045	5,186,220	2,315,817	2,870,403	2,093,152	2.5284	5,292,326	6,127,180	109,428	6,017,752	4,388,259	1.8905	8,296,004	1,250,000	911,524	1.0000	911,524	10,138,155	7,392,935	14,499,854
2046	5,186,220	2,315,817	2,870,403	2,093,152	2.6239	5,492,223	6,127,180	109,428	6,017,752	4,388,259	1.9392	8,509,712	1,250,000	911,524	1.0000	911,524	10,138,155	7,392,935	14,913,458
2047	5,134,326	2,315,817	2,818,509	2,055,310	2.7231	5,596,816	5,971,499	109,428	5,862,071	4,274,733	1.9893	8,503,727	1,250,000	911,524	1.0000	911,524	9,930,580	7,241,567	15,012,067
2048	5,199,860	2,315,817	2,884,043	2,103,099	2.8261	5,943,568	6,145,685	109,428	6,036,257	4,401,753	2.0406	8,982,218	1,250,000	911,524	1.0000	911,524	10,170,300	7,416,376	15,837,310
2049	5,186,220	2,315,817	2,870,403	2,093,152	2.9329	6,139,007	6,127,180	109,428	6,017,752	4,388,259	2.0932	9,185,504	1,250,000	911,524	1.0000	911,524	10,138,155	7,392,935	16,236,034
2050	5,134,326	2,315,817	2,818,509	2,055,310	3.0438	6,255,954	5,971,499	109,428	5,862,071	4,274,733	2.1472	9,178,707	1,250,000	911,524	1.0000	911,524	9,930,580	7,241,567	16,346,185
2051	5,186,220	2,315,817	2,870,403	2,093,152	3.1588	6,611,850	6,127,180	109,428	6,017,752	4,388,259	2.2026	9,665,579	1,250,000	911,524	1.0000	911,524	10,138,155	7,392,935	17,188,953
2052	5,147,966	2,315,817	2,832,149	2,065,257	3.2782	6,770,326	5,990,004	109,428	5,880,576	4,288,228	2.2595	9,689,251	1,250,000	911,524	1.0000	911,524	9,962,725	7,265,009	17,371,100
2053	5,082,433	2,315,817	2,766,615	2,017,469	3.4021	6,863,630	5,815,817	109,428	5,706,389	4,161,208	2.3178	9,644,847	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	17,420,000
2054	5,082,433	2,315,817	2,766,615	2,017,469	3.5307	7,123,076	5,815,817	109,428	5,706,389	4,161,208	2.3776	9,893,687	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	17,928,287
2055	5,082,433	2,315,817	2,766,615	2,017,469	3.6642	7,392,408	5,815,817	109,428	5,706,389	4,161,208	2.4389	10,148,769	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	18,452,701
2056	4,992,285	2,315,817	2,676,468	1,951,731	3.8027	7,421,849	5,522,960	109,428	5,413,532	3,947,651	2.5018	9,876,232	1,250,000	911,524	1.0000	911,524	9,340,000	6,810,906	18,209,605
2057	4,978,645	2,315,817	2,662,828	1,941,785	3.9464	7,663,059	5,504,455	109,428	5,395,027	3,934,156	2.5664	10,096,618	1,250,000	911,524	1.0000	911,524	9,307,855	6,787,465	18,671,201
2058	4,978,645	2,315,817	2,662,828	1,941,785	4.0956	7,952,774	5,504,455	109,428	5,395,027	3,934,156	2.6326	10,357,059	1,250,000	911,524	1.0000	911,524	9,307,855	6,787,465	19,221,357
2059	4,978,645	2,315,817	2,662,828	1,941,785	4.2504	8,253,362	5,504,455	109,428	5,395,027	3,934,156	2.7005	10,624,188	1,250,000	911,524	1.0000	911,524	9,307,855	6,787,465	19,789,074
2060	5,096,073	2,315,817	2,780,256	2,027,415	4.4111	8,943,131	5,834,323	109,428	5,724,895	4,174,702	2.7702	11,564,759	1,250,000	911,524	1.0000	911,524	9,755,150	7,113,641	21,419,414
2061	5,082,433	2,315,817	2,766,615	2,017,469	4.5778	9,235,568	5,815,817	109,428	5,706,389	4,161,208	2.8416	11,824,487	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	21,971,579
2062	5,082,433	2,315,817	2,766,615	2,017,469	4.7509	9,584,791	5,815,817	109,428	5,706,389	4,161,208	2.9150	12,129,920	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	22,626,235
2063	5,082,433	2,315,817	2,766,615	2,017,469	4.9305	9,947,129	5,815,817	109,428	5,706,389	4,161,208	2.9902	12,442,843	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	23,301,495
2064	5,096,073	2,315,817	2,780,256	2,027,415	5.1168	10,373,878	5,834,323	109,428	5,724,895	4,174,702	3.0673	12,805,063	1,250,000	911,524	1.0000	911,524	9,755,150	7,113,641	24,090,465
2065	5,082,433	2,315,817	2,766,615	2,017,469	5.3103	10,713,363	5,815,817	109,428	5,706,389	4,161,208	3.1465	13,093,239	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	24,718,127
2066	5,082,433	2,315,817	2,766,615	2,017,469	5.5110	11,118,269	5,815,817	109,428	5,706,389	4,161,208	3.2276	13,430,713	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	25,460,506
2067	5,082,433	2,315,817	2,766,615	2,017,469	5.7193	11,538,508	5,815,817	109,428	5,706,389	4,161,208	3.3109	13,777,342	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	26,227,374
2068	5,096,073	2,315,817	2,780,256	2,027,415	5.9355	12,033,723	5,834,323	109,428	5,724,895	4,174,702	3.3963	14,178,540	1,250,000	911,524	1.0000	911,524	9,755,150	7,113,641	27,123,787
2069	5,082,433	2,315,817	2,766,615	2,017,469	6.1598	12,427,203	5,815,817	109,428	5,706,389	4,161,208	3.4840	14,497,647	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	27,836,374
2070	5,082,433	2,315,817	2,766,615	2,017,469	6.3927	12,897,071	5,815,817	109,428	5,706,389	4,161,208	3.5738	14,871,323	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	28,679,919
2071	5,082,433	2,315,817	2,766,615	2,017,469	6.6343	13,384,492	5,815,817	109,428	5,706,389	4,161,208	3.6660	15,254,987	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	29,551,002
2072	5,096,073	2,315,817	2,780,256	2,027,415	6.8851	13,958,956	5,834,323	109,428	5,724,895	4,174,702	3.7606	15,699,384	1,250,000	911,524	1.0000	911,524	9,755,150	7,113,641	30,569,864
2073	5,082,433	2,315,817	2,766,615	2,017,469	7.1454	14,415,620	5,815,817	109,428	5,706,389	4,161,208	3.8576	16,052,274	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	31,379,418
2074	5,082,433	2,315,817	2,766,615	2,017,469	7.4155	14,960,538	5,815,817	109,428	5,706,389	4,161,208	3.9572	16,466,730	1,250,000	911,524	1.0000	911,524	9,723,005	7,090,200	32,338,792
2075	4,281,843	2,315,817	1,966,026	1,433,663	7.6958	11,033,187	2,429,486	109,428	2,320,058	1,691,831	4.0593	6,867,648	1,250,000	911,524	1.0000	911,524	5,536,084	4,037,018	18,812,358
2076	4,293,574	2,315,817	1,977,757	1,442,218	7.9867	11,518,562	2,439,567	109,428	2,330,139	1,699,182	4.1640	7,075,392	1,250,000	911,524	1.0000	911,524	5,557,896	4,052,923	19,505,478
2077	4,281,843	-	4,281,843	3,122,401	8.2886	25,880,335	2,429,486	-	2,429,486	1,771,627	4.2714	7,567,330	1,250,000	911,524	1.0000	911,524	7,961,329	5,805,552	34,359,188
2078	4,281,843	-	4,281,843	3,122,401	8.6019	26,858,583	2,429,486	-	2,429,486	1,771,627	4.3816	7,762,563	1,250,000	911,524	1.0000	911,524	7,961,329	5,805,552	35,532,670
2079	4,281,843	-	4,281,843	3,122,401	8.9270	27,873,676	2,429,486	-	2,429,486	1,771,627	4.4947	7,962,934	1,250,000	911,524	1.0000	911,524	7,961,329	5,805,552	36,748,133
2080	4,293,574	-	4,293,574	3,130,956	9.2645	29,006,739	2,439,567	-	2,439,567	1,778,979	4.6106	8,202,159	1,250,000	911,524	1.0000	911,524	7,983,141	5,821,458	38,120,422
2081	4,281,843	-	4,281,843	3,122,401	9.6147	30,020,951	2,429,486	-	2,429,486	1,771,627	4.7296	8,379,089	1,250,000	911,524	1.0000	911,524	7,961,329	5,805,552	39,311,564
2082	4,281,843	-	4,281,843	3,122,401	9.9781	31,155,631	2,429,486	-	2,429,486	1,771,627	4.8516	8,595,228	1,250,000	911,524	1.0000	911,524	7,961,329	5,805,552	40,662,383
2083	4,281,843	-	4,281,843	3,122,401	10.3553	32,333,401	2,429,486	-	2,429,486	1,771,627	4.9768	8,817,036	1,250,000	911,524	1.0000	911,524	7,961,329	5,805,552	42,061,961
2084	4,293,574	-	4,293,574	3,130,956	10.7467	33,647,442	2,439,567	-	2,439,567	1,778,979	5.1052	9,082,042	1,250,000	911,524	1.0000	911,524	7,983,141	5,821,458	43,641,007
2085	4,281,843	-	4,281,843	3,122,401	11.1529	34,823,828	2,429,486	-	2,429,486	1,771,627	5.2369	9,277,836	1,250,000	911,524	1.0000	911,524	7,961,329	5,805,552	45,013,188
2086	4,281,843	-	4,281,843	3,122,401	11.5745	36,140,233	2,429,486	-	2,429,486	1,771,627	5.3720	9,517,183	1,250,000	911,524	1.0000	911,524	7,961,329	5,805,552	46,568,939
2087	27,710,339	-	27,710,339	20,206,906	12.0120	242,725,350	7,488,763	-	7,488,763	5,460,948	5.5106	30,093,100	1,250,000	911,524	1.0000	911,524	36,449,102	26,579,377	273,729,974
2088	49,590,360	-	49,590,360	36,162,233	12.4661	450,802,013	13,943,476	-	13,943,476	10,167,847	5.6528	57,476,808	1,250,000	911,524	1.0000	911,524	64,783,836	47,241,604	509,190,345
2089	56,167,351	-	56,167,351	40,958,300	12.9373	529,889,813	70,862,246	-	70,862,246	51,674,096	5.7986	299,637,412	1,250,000	911,524	1.0000	911,524	128,279,597	93,543,919	830,438,749
2090	42,752,751	-	42,752,751	31,176,119	13.4263	418,579,920	47,610,082	-	47,610,082	34,718,176	5.9482	206,510,657	1,250,000	911,524	1.0000	911,524	91,612,833	66,805,819	626,002,100
2091	37,335,317	-	37,335,317	27,225,622	13.9338	379,356,374	38,219,785	-	38,219,785	27,870,593	6.1017	170,058,000	1,250,000	911,524	1.0000	911,524	76,805,102	56,007,739	550,325,898
2092	7,675,003	-	7,675,003	5,596,758	14.4605	80,931,914	4,061,439	-	4,061,439	2,961,678	6.2591	18,537,441	1,250,000	911,524	1.0000	911,524	12,986,441	9,469,960	100,380,879
2093	18,856,603	-	18,856,603	13,750,593	15.0071	206,356,532	5,635,957	-	5,635,957	4,109,847	6.4206	26,387,685	1,250,000	911,524	1.0000	911,524	25,742,561	18,771,964	233,655,740
2094	13,636,457	-	13,636,457	9,943,963	15.5744	154,871,261	9,497,275	-	9,497,275	6,925,593	6.5863	45,614,034	1,250,000	911,524	1.0000	911,524	24,383,731	17,781,080	201,396,819
2095	9,863,081	-	9,863,081	7,192,346	16.1631	116,250,608	6,523,371	-	6,523,371	4,756,966	6.7562	32,139,016	1,250,000	911,524	1.0000	911,524	17,636,452	12,860,836	149,301,147
	$632,401,000	$83,369,414	$549,031,586	$400,364,264		$3,391,571,642	$599,478,238	$3,939,407	$595,538,831	$434,278,231		$1,550,660,365	$78,750,000	$57,425,996		$57,425,996	$1,223,320,417	$892,068,491	$4,999,658,003

Xcel Energy
Nuclear Decommissioning Accrual
42-Year Decommissioning Period
DECON Method - No Recasking

Docket No. E002/M-20-___
Schedule E.5
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 2																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2034	$7,647,937	$0	$7,647,937	$5,577,021	1.6811	$9,375,530	$3,153,295	$0	$3,153,295	$2,299,443	1.4285	$3,284,754	$1,250,000	$911,524	1.0000	$911,524	$12,051,232	$8,787,987	$13,571,807
2035	47,107,095	-	47,107,095	34,351,389	1.7446	59,929,433	33,895,893	-	33,895,893	24,717,529	1.4653	36,218,596	1,250,000	911,524	1.0000	911,524	82,252,988	59,980,442	97,059,552
2036	32,232,206	-	32,232,206	23,504,337	1.8106	42,556,952	36,873,288	-	36,873,288	26,888,702	1.5032	40,419,097	1,250,000	911,524	1.0000	911,524	70,355,494	51,304,563	83,887,573
2037	23,188,314	-	23,188,314	16,909,359	1.8790	31,772,686	35,958,248	-	35,958,248	26,221,438	1.5419	40,430,835	1,250,000	911,524	1.0000	911,524	60,396,562	44,042,321	73,115,045
2038	20,005,190	-	20,005,190	14,588,164	1.9501	28,448,379	30,619,504	-	30,619,504	22,328,324	1.5817	35,316,710	1,250,000	911,524	1.0000	911,524	51,874,694	37,828,012	64,676,613
2039	5,242,132	-	5,242,132	3,822,662	2.0238	7,736,303	6,133,449	-	6,133,449	4,472,628	1.6225	7,256,838	1,250,000	911,524	1.0000	911,524	12,625,581	9,206,813	15,904,665
2040	5,307,819	-	5,307,819	3,870,562	2.1003	8,129,342	6,307,653	-	6,307,653	4,599,660	1.6644	7,655,675	1,250,000	911,524	1.0000	911,524	12,865,472	9,381,746	16,696,540
2041	5,190,238	-	5,190,238	3,784,820	2.1797	8,249,772	5,977,768	-	5,977,768	4,359,102	1.7073	7,442,295	1,250,000	911,524	1.0000	911,524	12,418,006	9,055,446	16,603,591
2042	5,345,919	2,315,817	3,030,102	2,209,608	2.2620	4,998,133	6,444,812	109,428	6,335,384	4,619,882	1.7514	8,091,262	1,250,000	911,524	1.0000	911,524	10,615,486	7,741,014	14,000,919
2043	5,190,238	2,315,817	2,874,421	2,096,082	2.3475	4,920,553	5,977,768	109,428	5,868,340	4,279,305	1.7966	7,688,199	1,250,000	911,524	1.0000	911,524	9,992,761	7,286,911	13,520,276
2044	5,152,137	2,315,817	2,836,320	2,068,299	2.4363	5,038,996	5,840,609	109,428	5,731,181	4,179,286	1.8429	7,702,007	1,250,000	911,524	1.0000	911,524	9,817,502	7,159,109	13,652,526
2045	5,242,132	2,315,817	2,926,315	2,133,924	2.5284	5,395,414	6,133,449	109,428	6,024,021	4,392,831	1.8905	8,304,646	1,250,000	911,524	1.0000	911,524	10,200,336	7,438,279	14,611,584
2046	5,242,132	2,315,817	2,926,315	2,133,924	2.6239	5,599,204	6,133,449	109,428	6,024,021	4,392,831	1.9392	8,518,577	1,250,000	911,524	1.0000	911,524	10,200,336	7,438,279	15,029,305
2047	5,190,238	2,315,817	2,874,421	2,096,082	2.7231	5,707,842	5,977,768	109,428	5,868,340	4,279,305	1.9893	8,512,821	1,250,000	911,524	1.0000	911,524	9,992,761	7,286,911	15,132,187
2048	5,255,925	2,315,817	2,940,108	2,143,983	2.8261	6,059,109	6,151,972	109,428	6,042,544	4,406,338	2.0406	8,991,573	1,250,000	911,524	1.0000	911,524	10,232,652	7,461,844	15,962,205
2049	5,242,132	2,315,817	2,926,315	2,133,924	2.9329	6,258,586	6,133,449	109,428	6,024,021	4,392,831	2.0932	9,195,073	1,250,000	911,524	1.0000	911,524	10,200,336	7,438,279	16,365,183
2050	5,190,238	2,315,817	2,874,421	2,096,082	3.0438	6,380,055	5,977,768	109,428	5,868,340	4,279,305	2.1472	9,188,524	1,250,000	911,524	1.0000	911,524	9,992,761	7,286,911	16,480,103
2051	5,242,132	2,315,817	2,926,315	2,133,924	3.1588	6,740,640	6,133,449	109,428	6,024,021	4,392,831	2.2026	9,675,649	1,250,000	911,524	1.0000	911,524	10,200,336	7,438,279	17,327,812
2052	5,204,031	2,315,817	2,888,214	2,106,141	3.2782	6,904,350	5,996,290	109,428	5,886,862	4,292,812	2.2595	9,699,609	1,250,000	911,524	1.0000	911,524	10,025,077	7,310,476	17,515,483
2053	5,138,344	2,315,817	2,822,527	2,058,240	3.4021	7,002,340	5,822,087	109,428	5,712,659	4,165,779	2.3178	9,655,443	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	17,569,306
2054	5,138,344	2,315,817	2,822,527	2,058,240	3.5307	7,267,029	5,822,087	109,428	5,712,659	4,165,779	2.3776	9,904,557	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	18,083,110
2055	5,138,344	2,315,817	2,822,527	2,058,240	3.6642	7,541,804	5,822,087	109,428	5,712,659	4,165,779	2.4389	10,159,919	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	18,613,247
2056	5,048,350	2,315,817	2,732,533	1,992,615	3.8027	7,577,317	5,529,247	109,428	5,419,819	3,952,235	2.5018	9,887,701	1,250,000	911,524	1.0000	911,524	9,402,352	6,856,373	18,376,541
2057	5,034,557	2,315,817	2,718,740	1,982,557	3.9464	7,823,961	5,510,724	109,428	5,401,296	3,938,728	2.5664	10,108,351	1,250,000	911,524	1.0000	911,524	9,370,036	6,832,808	18,843,836
2058	5,034,557	2,315,817	2,718,740	1,982,557	4.0956	8,119,759	5,510,724	109,428	5,401,296	3,938,728	2.6326	10,369,095	1,250,000	911,524	1.0000	911,524	9,370,036	6,832,808	19,400,377
2059	5,034,557	2,315,817	2,718,740	1,982,557	4.2504	8,426,658	5,510,724	109,428	5,401,296	3,938,728	2.7005	10,636,534	1,250,000	911,524	1.0000	911,524	9,370,036	6,832,808	19,974,717
2060	5,152,137	2,315,817	2,836,320	2,068,299	4.4111	9,123,472	5,840,609	109,428	5,731,181	4,179,286	2.7702	11,577,459	1,250,000	911,524	1.0000	911,524	9,817,502	7,159,109	21,612,455
2061	5,138,344	2,315,817	2,822,527	2,058,240	4.5778	9,422,213	5,822,087	109,428	5,712,659	4,165,779	2.8416	11,837,478	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	22,171,215
2062	5,138,344	2,315,817	2,822,527	2,058,240	4.7509	9,778,494	5,822,087	109,428	5,712,659	4,165,779	2.9150	12,143,247	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	22,833,264
2063	5,138,344	2,315,817	2,822,527	2,058,240	4.9305	10,148,154	5,822,087	109,428	5,712,659	4,165,779	2.9902	12,456,513	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	23,516,191
2064	5,152,137	2,315,817	2,836,320	2,068,299	5.1168	10,583,071	5,840,609	109,428	5,731,181	4,179,286	3.0673	12,819,125	1,250,000	911,524	1.0000	911,524	9,817,502	7,159,109	24,313,719
2065	5,138,344	2,315,817	2,822,527	2,058,240	5.3103	10,929,874	5,822,087	109,428	5,712,659	4,165,779	3.1465	13,107,624	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	24,949,022
2066	5,138,344	2,315,817	2,822,527	2,058,240	5.5110	11,342,963	5,822,087	109,428	5,712,659	4,165,779	3.2276	13,445,469	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	25,699,956
2067	5,138,344	2,315,817	2,822,527	2,058,240	5.7193	11,771,694	5,822,087	109,428	5,712,659	4,165,779	3.3109	13,792,479	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	26,475,696
2068	5,152,137	2,315,817	2,836,320	2,068,299	5.9355	12,276,387	5,840,609	109,428	5,731,181	4,179,286	3.3963	14,194,110	1,250,000	911,524	1.0000	911,524	9,817,502	7,159,109	27,382,021
2069	5,138,344	2,315,817	2,822,527	2,058,240	6.1598	12,678,349	5,822,087	109,428	5,712,659	4,165,779	3.4840	14,513,575	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	28,103,448
2070	5,138,344	2,315,817	2,822,527	2,058,240	6.3927	13,157,713	5,822,087	109,428	5,712,659	4,165,779	3.5738	14,887,662	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	28,956,899
2071	5,138,344	2,315,817	2,822,527	2,058,240	6.6343	13,654,984	5,822,087	109,428	5,712,659	4,165,779	3.6660	15,271,747	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	29,838,255
2072	5,152,137	2,315,817	2,836,320	2,068,299	6.8851	14,240,443	5,840,609	109,428	5,731,181	4,179,286	3.7606	15,716,624	1,250,000	911,524	1.0000	911,524	9,817,502	7,159,109	30,868,591
2073	5,138,344	2,315,817	2,822,527	2,058,240	7.1454	14,706,951	5,822,087	109,428	5,712,659	4,165,779	3.8576	16,069,910	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	31,688,385
2074	5,138,344	2,315,817	2,822,527	2,058,240	7.4155	15,262,881	5,822,087	109,428	5,712,659	4,165,779	3.9572	16,484,822	1,250,000	911,524	1.0000	911,524	9,785,186	7,135,543	32,659,227
2075	825,394	2,315,817	(1,490,423)	(1,086,845)	7.6958	(8,364,141)	2,443,201	109,428	2,333,773	1,701,831	4.0593	6,908,244	1,250,000	911,524	1.0000	911,524	2,093,350	1,526,510	(544,373)
2076	827,655	2,315,817	(1,488,162)	(1,085,196)	7.9867	(8,667,133)	2,453,319	109,428	2,343,891	1,709,210	4.1640	7,117,150	1,250,000	911,524	1.0000	911,524	2,105,729	1,535,538	(638,460)
2077	825,394	-	825,394	601,893	8.2886	4,988,850	2,443,201	-	2,443,201	1,781,628	4.2714	7,610,047	1,250,000	911,524	1.0000	911,524	4,518,595	3,295,045	13,510,421
2078	825,394	-	825,394	601,893	8.6019	5,177,423	2,443,201	-	2,443,201	1,781,628	4.3816	7,806,383	1,250,000	911,524	1.0000	911,524	4,518,595	3,295,045	13,895,329
2079	825,394	-	825,394	601,893	8.9270	5,373,098	2,443,201	-	2,443,201	1,781,628	4.4947	8,007,885	1,250,000	911,524	1.0000	911,524	4,518,595	3,295,045	14,292,507
2080	827,655	-	827,655	603,542	9.2645	5,591,515	2,453,319	-	2,453,319	1,789,007	4.6106	8,248,395	1,250,000	911,524	1.0000	911,524	4,530,974	3,304,073	14,751,433
2081	825,394	-	825,394	601,893	9.6147	5,787,020	2,443,201	-	2,443,201	1,781,628	4.7296	8,426,389	1,250,000	911,524	1.0000	911,524	4,518,595	3,295,045	15,124,933
2082	825,394	-	825,394	601,893	9.9781	6,005,748	2,443,201	-	2,443,201	1,781,628	4.8516	8,643,748	1,250,000	911,524	1.0000	911,524	4,518,595	3,295,045	15,561,020
2083	825,394	-	825,394	601,893	10.3553	6,232,782	2,443,201	-	2,443,201	1,781,628	4.9768	8,866,808	1,250,000	911,524	1.0000	911,524	4,518,595	3,295,045	16,011,114
2084	827,655	-	827,655	603,542	10.7467	6,486,085	2,453,319	-	2,453,319	1,789,007	5.1052	9,133,238	1,250,000	911,524	1.0000	911,524	4,530,974	3,304,073	16,530,846
2085	825,394	-	825,394	601,893	11.1529	6,712,852	2,443,201	-	2,443,201	1,781,628	5.2369	9,330,209	1,250,000	911,524	1.0000	911,524	4,518,595	3,295,045	16,954,585
2086	825,394	-	825,394	601,893	11.5745	6,966,610	2,443,201	-	2,443,201	1,781,628	5.3720	9,570,907	1,250,000	911,524	1.0000	911,524	4,518,595	3,295,045	17,449,041
2087	825,394	-	825,394	601,893	12.0120	7,229,938	2,443,201	-	2,443,201	1,781,628	5.5106	9,817,841	1,250,000	911,524	1.0000	911,524	4,518,595	3,295,045	17,959,303
2088	23,100,812	-	23,100,812	16,845,551	12.4661	209,998,324	8,375,902	-	8,375,902	6,107,867	5.6528	34,526,550	1,250,000	911,524	1.0000	911,524	32,726,714	23,864,942	245,436,398
2089	37,590,931	-	37,590,931	27,412,021	12.9373	354,637,545	25,830,091	-	25,830,091	18,835,793	5.7986	109,221,231	1,250,000	911,524	1.0000	911,524	64,671,023	47,159,338	464,770,299
2090	56,571,425	-	56,571,425	41,252,958	13.4263	553,874,592	71,151,529	-	71,151,529	51,885,046	5.9482	308,622,634	1,250,000	911,524	1.0000	911,524	128,972,954	94,049,528	863,408,749
2091	57,871,968	-	57,871,968	42,201,339	13.9338	588,025,016	47,392,552	-	47,392,552	34,559,549	6.1017	210,872,002	1,250,000	911,524	1.0000	911,524	106,514,520	77,672,412	799,808,542
2092	53,927,256	-	53,927,256	39,324,779	14.4605	568,655,972	39,417,044	-	39,417,044	28,743,658	6.2591	179,909,427	1,250,000	911,524	1.0000	911,524	94,594,300	68,979,961	749,476,923
2093	23,982,620	-	23,982,620	17,488,582	15.0071	262,452,906	8,685,533	-	8,685,533	6,333,655	6.4206	40,665,868	1,250,000	911,524	1.0000	911,524	33,918,153	24,733,762	304,030,297
2094	16,407,250	-	16,407,250	11,964,478	15.5744	186,339,572	16,997,622	-	16,997,622	12,394,989	6.5863	81,637,117	1,250,000	911,524	1.0000	911,524	34,654,872	25,270,991	268,888,213
2095	11,867,162	-	11,867,162	8,653,760	16.1631	139,871,583	11,948,280	-	11,948,280	8,712,913	6.7562	58,866,183	1,250,000	911,524	1.0000	911,524	25,065,442	18,278,196	199,649,290
	$608,171,900	$81,053,597	$527,118,303	$384,384,682		$3,406,413,949	$614,343,468	$3,829,979	$610,513,488	$445,198,035		$1,686,440,438	$77,500,000	$56,514,473		$56,514,473	$1,215,131,791	$886,097,190	$5,149,368,860
	$2,185,656,670	$329,794,742	$1,855,861,928	$1,353,329,779		$10,801,252,662	$2,069,765,870	$15,648,203	$2,054,117,668	$1,497,901,632		$5,327,822,846	$156,250,000	$113,940,469		$113,940,469	$4,066,229,596	$2,965,171,880	$16,243,015,977

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Monticello

External Levelized

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$757,935,327	$15,073,411	$0	$6,696,113	$779,704,851
2021	779,704,851	31,044,753	-	8,507,110	819,256,714
2022	819,256,714	32,912,430	-	23,730,503	875,899,646
2023	875,899,646	35,155,490	-	23,730,503	934,785,639
2024	934,785,639	37,487,375	-	23,730,503	996,003,516
2025	996,003,516	39,911,603	-	23,730,503	1,059,645,622
2026	1,059,645,622	42,431,831	-	23,730,503	1,125,807,955
2027	1,125,807,955	45,051,859	-	23,730,503	1,194,590,317
2028	1,194,590,317	47,775,641	-	23,730,503	1,266,096,460
2029	1,266,096,460	50,607,284	-	23,730,503	1,340,434,247
2030	1,340,434,247	50,734,928	(28,324,716)	17,797,877	1,380,642,336
2031	1,380,642,336	51,912,152	(124,607,386)	-	1,307,947,101
2032	1,307,947,101	49,178,811	(112,484,338)	-	1,244,641,574
2033	1,244,641,574	46,798,523	(118,051,101)	-	1,173,388,997
2034	1,173,388,997	44,119,426	(88,877,597)	-	1,128,630,826
2035	1,128,630,826	42,436,519	(18,244,536)	-	1,152,822,809
2036	1,152,822,809	43,346,138	(22,227,221)	-	1,173,941,725
2037	1,173,941,725	44,140,209	(24,613,144)	-	1,193,468,791
2038	1,193,468,791	44,874,427	(14,241,133)	-	1,224,102,085
2039	1,224,102,085	46,026,238	(19,213,846)	-	1,250,914,477
2040	1,250,914,477	47,034,384	(21,732,817)	-	1,276,216,044
2041	1,276,216,044	47,985,723	(14,583,912)	-	1,309,617,855
2042	1,309,617,855	49,241,631	(15,049,370)	-	1,343,810,117
2043	1,343,810,117	50,527,260	(15,530,354)	-	1,378,807,024
2044	1,378,807,024	51,843,144	(16,094,280)	-	1,414,555,887
2045	1,414,555,887	53,187,301	(16,540,761)	-	1,451,202,427
2046	1,451,202,427	54,565,211	(17,070,526)	-	1,488,697,112
2047	1,488,697,112	55,975,011	(17,618,780)	-	1,527,053,344
2048	1,527,053,344	57,417,206	(22,956,307)	-	1,561,514,243
2049	1,561,514,243	58,712,936	(18,769,683)	-	1,601,457,495
2050	1,601,457,495	60,214,802	(19,374,195)	-	1,642,298,102
2051	1,642,298,102	61,750,409	(19,998,560)	-	1,684,049,951
2052	1,684,049,951	63,320,278	(21,492,984)	-	1,725,877,246
2053	1,725,877,246	64,892,984	(23,662,333)	-	1,767,107,897
2054	1,767,107,897	66,443,257	(23,614,412)	-	1,809,936,742
2055	1,809,936,742	68,053,622	(24,374,660)	-	1,853,615,704
2056	1,853,615,704	69,695,950	(28,683,751)	-	1,894,627,903
2057	1,894,627,903	71,238,009	(28,616,223)	-	1,937,249,689
2058	1,937,249,689	72,840,588	(29,534,139)	-	1,980,556,138
2059	1,980,556,138	74,468,911	(30,482,333)	-	2,024,542,716
2060	2,024,542,716	76,122,806	(29,651,525)	-	2,071,013,996

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2061	2,071,013,996	77,870,126	(29,499,449)	-	2,119,384,673
2062	2,119,384,673	79,688,864	(31,478,417)	-	2,167,595,120
2063	2,167,595,120	81,501,577	(31,446,065)	-	2,217,650,631
2064	2,217,650,631	83,383,664	(32,599,147)	-	2,268,435,148
2065	2,268,435,148	85,293,162	(34,641,329)	-	2,319,086,980
2066	2,319,086,980	87,197,670	(34,616,665)	-	2,371,667,986
2067	2,371,667,986	89,174,716	(35,745,620)	-	2,425,097,083
2068	2,425,097,083	91,183,650	(38,283,237)	-	2,477,997,496
2069	2,477,997,496	93,172,706	(40,633,373)	-	2,530,536,829
2070	2,530,536,829	95,148,185	(39,365,689)	-	2,586,319,325
2071	2,586,319,325	97,245,607	(43,323,600)	-	2,640,241,331
2072	2,640,241,331	99,273,074	(44,909,737)	-	2,694,604,668
2073	2,694,604,668	101,317,136	(11,759,097)	-	2,784,162,707
2074	2,784,162,707	104,684,518	(37,524,054)	-	2,851,323,171
2075	2,851,323,171	107,209,751	(38,779,321)	-	2,919,753,601
2076	2,919,753,601	109,782,735	(40,187,528)	-	2,989,348,809
2077	2,989,348,809	112,399,515	(41,420,902)	-	3,060,327,422
2078	3,060,327,422	115,068,311	(42,810,485)	-	3,132,585,248
2079	3,132,585,248	117,785,205	(44,248,108)	-	3,206,122,345
2080	3,206,122,345	120,550,200	(45,860,667)	-	3,280,811,878
2081	3,280,811,878	123,358,527	(47,274,253)	-	3,356,896,151
2082	3,356,896,151	126,219,295	(48,866,043)	-	3,434,249,403
2083	3,434,249,403	129,127,778	(50,513,359)	-	3,512,863,822
2084	3,512,863,822	132,083,680	(52,360,551)	-	3,592,586,951
2085	3,592,586,951	135,081,269	(342,337,589)	-	3,385,330,631
2086	3,385,330,631	127,288,432	(615,501,559)	-	2,897,117,505
2087	2,897,117,505	108,931,618	(1,054,385,941)	-	1,951,663,182
2088	1,951,663,182	73,382,536	(707,148,186)	-	1,317,897,532
2089	1,317,897,532	49,552,947	(703,430,805)	-	664,019,674
2090	664,019,674	24,967,140	(327,778,559)	-	361,208,255
2091	361,208,255	13,581,430	(264,332,989)	-	110,456,696
2092	110,456,696	4,153,172	(114,609,868)	-	(0)

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Prairie Island Unit 1

External Levelized

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$437,068,622	$9,113,138	$0	$24,632	$446,206,392
2021	446,206,392	18,865,340	-	12,399,703	477,471,435
2022	477,471,435	20,374,354	-	22,244,385	520,090,174
2023	520,090,174	22,151,556	-	22,244,385	564,486,115
2024	564,486,115	24,002,866	-	22,244,385	610,733,367
2025	610,733,367	25,931,377	-	22,244,385	658,909,129
2026	658,909,129	27,940,306	-	22,244,385	709,093,820
2027	709,093,820	30,033,008	-	22,244,385	761,371,213
2028	761,371,213	32,212,975	-	22,244,385	815,828,573
2029	815,828,573	34,483,847	-	22,244,385	872,556,806
2030	872,556,806	36,849,414	-	22,244,385	931,650,605
2031	931,650,605	39,313,626	-	22,244,385	993,208,616
2032	993,208,616	41,880,595	-	22,244,385	1,057,333,596
2033	1,057,333,596	40,142,412	(28,086,460)	14,903,738	1,084,293,286
2034	1,084,293,286	40,877,857	(93,271,597)	-	1,031,899,546
2035	1,031,899,546	38,902,613	(57,649,883)	-	1,013,152,276
2036	1,013,152,276	38,195,841	(56,221,225)	-	995,126,892
2037	995,126,892	37,516,284	(57,744,621)	-	974,898,554
2038	974,898,554	36,753,676	(51,564,714)	-	960,087,516
2039	960,087,516	36,195,299	(15,814,734)	-	980,468,081
2040	980,468,081	36,963,647	(16,603,043)	-	1,000,828,685
2041	1,000,828,685	37,731,241	(12,689,736)	-	1,025,870,191
2042	1,025,870,191	38,675,306	(13,900,686)	-	1,050,644,811
2043	1,050,644,811	39,609,309	(13,416,351)	-	1,076,837,770
2044	1,076,837,770	40,596,784	(13,544,474)	-	1,103,890,080
2045	1,103,890,080	41,616,656	(14,499,854)	-	1,131,006,882
2046	1,131,006,882	42,638,959	(14,913,458)	-	1,158,732,383
2047	1,158,732,383	43,684,211	(15,012,067)	-	1,187,404,528
2048	1,187,404,528	44,765,151	(15,837,310)	-	1,216,332,368
2049	1,216,332,368	45,855,730	(16,236,034)	-	1,245,952,065
2050	1,245,952,065	46,972,393	(16,346,185)	-	1,276,578,272
2051	1,276,578,272	48,127,001	(17,188,953)	-	1,307,516,320
2052	1,307,516,320	49,293,365	(17,371,100)	-	1,339,438,586
2053	1,339,438,586	50,496,835	(17,420,000)	-	1,372,515,420
2054	1,372,515,420	51,743,831	(17,928,287)	-	1,406,330,964
2055	1,406,330,964	53,018,677	(18,452,701)	-	1,440,896,940
2056	1,440,896,940	54,321,815	(18,209,605)	-	1,477,009,150
2057	1,477,009,150	55,683,245	(18,671,201)	-	1,514,021,194
2058	1,514,021,194	57,078,599	(19,221,357)	-	1,551,878,436
2059	1,551,878,436	58,505,817	(19,789,074)	-	1,590,595,179
2060	1,590,595,179	59,965,438	(21,419,414)	-	1,629,141,203

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2061	1,629,141,203	61,418,623	(21,971,579)	-	1,668,588,248
2062	1,668,588,248	62,905,777	(22,626,235)	-	1,708,867,790
2063	1,708,867,790	64,424,316	(23,301,495)	-	1,749,990,610
2064	1,749,990,610	65,974,646	(24,090,465)	-	1,791,874,791
2065	1,791,874,791	67,553,680	(24,718,127)	-	1,834,710,344
2066	1,834,710,344	69,168,580	(25,460,506)	-	1,878,418,417
2067	1,878,418,417	70,816,374	(26,227,374)	-	1,923,007,418
2068	1,923,007,418	72,497,380	(27,123,787)	-	1,968,381,010
2069	1,968,381,010	74,207,964	(27,836,374)	-	2,014,752,601
2070	2,014,752,601	75,956,173	(28,679,919)	-	2,062,028,855
2071	2,062,028,855	77,738,488	(29,551,002)	-	2,110,216,341
2072	2,110,216,341	79,555,156	(30,569,864)	-	2,159,201,633
2073	2,159,201,633	81,401,902	(31,379,418)	-	2,209,224,116
2074	2,209,224,116	83,287,749	(32,338,792)	-	2,260,173,073
2075	2,260,173,073	85,208,525	(18,812,358)	-	2,326,569,240
2076	2,326,569,240	87,711,660	(19,505,478)	-	2,394,775,422
2077	2,394,775,422	90,283,033	(34,359,188)	-	2,450,699,268
2078	2,450,699,268	92,391,362	(35,532,670)	-	2,507,557,960
2079	2,507,557,960	94,534,935	(36,748,133)	-	2,565,344,762
2080	2,565,344,762	96,713,498	(38,120,422)	-	2,623,937,838
2081	2,623,937,838	98,922,456	(39,311,564)	-	2,683,548,730
2082	2,683,548,730	101,169,787	(40,662,383)	-	2,744,056,134
2083	2,744,056,134	103,450,916	(42,061,961)	-	2,805,445,090
2084	2,805,445,090	105,765,280	(43,641,007)	-	2,867,569,363
2085	2,867,569,363	108,107,365	(45,013,188)	-	2,930,663,539
2086	2,930,663,539	110,486,015	(46,568,939)	-	2,994,580,616
2087	2,994,580,616	112,895,689	(273,729,974)	-	2,833,746,331
2088	2,833,746,331	106,832,237	(509,190,345)	-	2,431,388,223
2089	2,431,388,223	91,663,336	(830,438,749)	-	1,692,612,810
2090	1,692,612,810	63,811,503	(626,002,100)	-	1,130,422,213
2091	1,130,422,213	42,616,917	(550,325,898)	-	622,713,232
2092	622,713,232	23,476,289	(100,380,879)	-	545,808,641
2093	545,808,641	20,576,986	(233,655,740)	-	332,729,887
2094	332,729,887	12,543,917	(201,396,819)	-	143,876,985
2095	143,876,985	5,424,162	(149,301,147)	-	(0)

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Prairie Island Unit 2

External Levelized

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$487,163,479	$9,989,872	$0	$294,670	$497,448,022
2021	497,448,022	20,528,857	-	6,511,608	524,488,486
2022	524,488,486	21,797,045	-	14,293,537	560,579,068
2023	560,579,068	23,276,759	-	14,293,537	598,149,364
2024	598,149,364	24,817,141	-	14,293,537	637,260,042
2025	637,260,042	26,420,679	-	14,293,537	677,974,258
2026	677,974,258	28,089,962	-	14,293,537	720,357,757
2027	720,357,757	29,827,686	-	14,293,537	764,478,979
2028	764,478,979	31,636,656	-	14,293,537	810,409,171
2029	810,409,171	33,519,794	-	14,293,537	858,222,501
2030	858,222,501	35,480,140	-	14,293,537	907,996,178
2031	907,996,178	37,520,861	-	14,293,537	959,810,575
2032	959,810,575	39,645,251	-	14,293,537	1,013,749,363
2033	1,013,749,363	41,856,741	-	14,293,537	1,069,899,641
2034	1,069,899,641	40,666,429	(13,571,807)	11,863,635	1,108,857,898
2035	1,108,857,898	41,914,829	(97,059,552)	-	1,053,713,174
2036	1,053,713,174	39,830,358	(83,887,573)	-	1,009,655,959
2037	1,009,655,959	38,164,995	(73,115,045)	-	974,705,910
2038	974,705,910	36,843,883	(64,676,613)	-	946,873,180
2039	946,873,180	35,791,806	(15,904,665)	-	966,760,321
2040	966,760,321	36,543,540	(16,696,540)	-	986,607,320
2041	986,607,320	37,293,757	(16,603,591)	-	1,007,297,486
2042	1,007,297,486	38,075,845	(14,000,919)	-	1,031,372,413
2043	1,031,372,413	38,985,877	(13,520,276)	-	1,056,838,014
2044	1,056,838,014	39,948,477	(13,652,526)	-	1,083,133,964
2045	1,083,133,964	40,942,464	(14,611,584)	-	1,109,464,844
2046	1,109,464,844	41,937,771	(15,029,305)	-	1,136,373,310
2047	1,136,373,310	42,954,911	(15,132,187)	-	1,164,196,034
2048	1,164,196,034	44,006,610	(15,962,205)	-	1,192,240,439
2049	1,192,240,439	45,066,689	(16,365,183)	-	1,220,941,944
2050	1,220,941,944	46,151,606	(16,480,103)	-	1,250,613,447
2051	1,250,613,447	47,273,188	(17,327,812)	-	1,280,558,823
2052	1,280,558,823	48,405,124	(17,515,483)	-	1,311,448,464
2053	1,311,448,464	49,572,752	(17,569,306)	-	1,343,451,910
2054	1,343,451,910	50,782,482	(18,083,110)	-	1,376,151,282
2055	1,376,151,282	52,018,518	(18,613,247)	-	1,409,556,553
2056	1,409,556,553	53,281,238	(18,376,541)	-	1,444,461,250
2057	1,444,461,250	54,600,635	(18,843,836)	-	1,480,218,049
2058	1,480,218,049	55,952,242	(19,400,377)	-	1,516,769,914
2059	1,516,769,914	57,333,903	(19,974,717)	-	1,554,129,100
2060	1,554,129,100	58,746,080	(21,612,455)	-	1,591,262,726

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Proposed

EXTERNAL FUND CALCULATION

2061	1,591,262,726	60,149,731	(22,171,215)	-	1,629,241,242
2062	1,629,241,242	61,585,319	(22,833,264)	-	1,667,993,296
2063	1,667,993,296	63,050,147	(23,516,191)	-	1,707,527,252
2064	1,707,527,252	64,544,530	(24,313,719)	-	1,747,758,063
2065	1,747,758,063	66,065,255	(24,949,022)	-	1,788,874,295
2066	1,788,874,295	67,619,448	(25,699,956)	-	1,830,793,788
2067	1,830,793,788	69,204,005	(26,475,696)	-	1,873,522,097
2068	1,873,522,097	70,819,135	(27,382,021)	-	1,916,959,212
2069	1,916,959,212	72,461,058	(28,103,448)	-	1,961,316,822
2070	1,961,316,822	74,137,776	(28,956,899)	-	2,006,497,699
2071	2,006,497,699	75,845,613	(29,838,255)	-	2,052,505,058
2072	2,052,505,058	77,584,691	(30,868,591)	-	2,099,221,158
2073	2,099,221,158	79,350,560	(31,688,385)	-	2,146,883,333
2074	2,146,883,333	81,152,190	(32,659,227)	-	2,195,376,296
2075	2,195,376,296	82,985,224	544,373	-	2,278,905,893
2076	2,278,905,893	86,142,643	638,460	-	2,365,686,996
2077	2,365,686,996	89,422,968	(13,510,421)	-	2,441,599,543
2078	2,441,599,543	92,292,463	(13,895,329)	-	2,519,996,676
2079	2,519,996,676	95,255,874	(14,292,507)	-	2,600,960,044
2080	2,600,960,044	98,316,290	(14,751,433)	-	2,684,524,900
2081	2,684,524,900	101,475,041	(15,124,933)	-	2,770,875,008
2082	2,770,875,008	104,739,075	(15,561,020)	-	2,860,053,063
2083	2,860,053,063	108,110,006	(16,011,114)	-	2,952,151,955
2084	2,952,151,955	111,591,344	(16,530,846)	-	3,047,212,453
2085	3,047,212,453	115,184,631	(16,954,585)	-	3,145,442,499
2086	3,145,442,499	118,897,726	(17,449,041)	-	3,246,891,184
2087	3,246,891,184	122,732,487	(17,959,303)	-	3,351,664,368
2088	3,351,664,368	126,692,913	(245,436,398)	-	3,232,920,882
2089	3,232,920,882	122,204,409	(464,770,299)	-	2,890,354,993
2090	2,890,354,993	109,255,419	(863,408,749)	-	2,136,201,662
2091	2,136,201,662	80,748,423	(799,808,542)	-	1,417,141,543
2092	1,417,141,543	53,567,950	(749,476,923)	-	721,232,570
2093	721,232,570	27,262,591	(304,030,297)	-	444,464,864
2094	444,464,864	16,800,772	(268,888,213)	-	192,377,423
2095	192,377,423	7,271,867	(199,649,290)	-	0

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2022 ACCRUAL COMPARISON

	Present	Proposed	Difference
Monticello	$8,507,110	$26,601,947	$18,094,837
Prairie Island Unit 1	12,399,703	22,195,064	9,795,361
Prairie Island Unit 2	6,511,608	15,005,461	8,493,853
TOTAL	$27,418,421	$63,802,472	$36,384,051

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2022 MN RETAIL SUMMARY

	Remaining Life (yrs)	Operational Earnings Rate	Post-Shutdown Earnings Rate	Market Value Balance 6/30/2020	Book Value 6/30/2020	Unrealized Gain/Loss 6/30/2020	Tax-Effect Adjustment	Tax-Adjusted Fund Balance 6/30/2020	2022-2024 Decommissioning Accrual
Monticello	9.67	3.96%	3.76%	$814,968,100	$610,109,002	$204,859,098	$57,032,773	$757,935,327	**$26,601,947**
Prairie Island Unit 1	13.25	4.17%	3.77%	471,960,960	346,629,286	125,331,674	34,892,338	437,068,622	**22,195,064**
Prairie Island Unit 2	14.42	4.10%	3.78%	526,255,835	385,837,890	140,417,945	39,092,356	487,163,479	**15,005,461**
TOTAL DECOMMISSIONING ACCRUAL				**$1,813,184,895**	**$1,342,576,178**	**$470,608,717**	**$131,017,467**	**$1,682,167,428**	**$63,802,472**

INPUT DATA

Escalation Rate (Labor)	3.78%
Escalation Rate (Non-Labor)	2.58%
Escalation Rate (PIIC)	0.00%
Jurisdictional Factor	72.9219%
Tax Rate for tax-effect adjustment	27.84%

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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Monticello																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2030	$18,693,499	$0	$18,693,499	$13,631,655	1.4492	$19,754,994	$9,109,308	$0	$9,109,308	$6,642,680	1.2901	$8,569,722	$0	$0	1.0000	$0	$27,802,807	$20,274,335	$28,324,716
2031	68,992,664	-	68,992,664	50,310,762	1.5040	75,667,386	50,712,482	-	50,712,482	36,980,505	1.3234	48,940,000	0	0	1.0000	0	119,705,146	87,291,267	124,607,386
2032	44,420,428	-	44,420,428	32,392,220	1.5609	50,561,016	62,554,194	-	62,554,194	45,615,707	1.3575	61,923,322	0	0	1.0000	0	106,974,622	78,007,927	112,484,338
2033	41,095,925	-	41,095,925	29,967,929	1.6199	48,545,049	68,444,452	-	68,444,452	49,910,995	1.3926	69,506,052	0	0	1.0000	0	109,540,377	79,878,924	118,051,101
2034	31,070,191	-	31,070,191	22,656,974	1.6811	38,088,638	48,756,352	-	48,756,352	35,554,058	1.4285	50,788,972	0	0	1.0000	0	79,826,543	58,211,032	88,877,610
2035	9,293,104	-	9,293,104	6,776,708	1.7446	11,822,645	6,010,094	-	6,010,094	4,382,675	1.4653	6,421,933	0	0	1.0000	0	15,303,198	11,159,383	18,244,578
2036	9,318,516	-	9,318,516	6,795,239	1.8106	12,303,459	6,026,412	-	6,026,412	4,394,574	1.5032	6,605,924	0	0	1.0000	0	15,344,928	11,189,813	18,909,383
2037	9,293,104	-	9,293,104	6,776,708	1.8790	12,733,435	6,010,094	-	6,010,094	4,382,675	1.5419	6,757,646	0	0	1.0000	0	15,303,198	11,159,383	19,491,081
2038	9,293,104	4,593,659	4,699,446	3,426,925	1.9501	6,682,847	6,010,094	218,856	5,791,238	4,223,081	1.5817	6,679,647	0	0	1.0000	0	10,490,684	7,650,006	13,362,493
2039	9,293,104	4,593,659	4,699,446	3,426,925	2.0238	6,935,411	6,010,094	218,856	5,791,238	4,223,081	1.6225	6,851,948	0	0	1.0000	0	10,490,684	7,650,006	13,787,359
2040	9,318,516	4,593,659	4,724,857	3,445,455	2.1003	7,236,490	6,026,412	218,856	5,807,556	4,234,980	1.6644	7,048,701	0	0	1.0000	0	10,532,413	7,680,436	14,285,191
2041	9,293,104	4,593,659	4,699,446	3,426,925	2.1797	7,469,669	6,010,094	218,856	5,791,238	4,223,081	1.7073	7,210,066	0	0	1.0000	0	10,490,684	7,650,006	14,679,734
2042	9,293,104	4,593,659	4,699,446	3,426,925	2.2620	7,751,705	6,010,094	218,856	5,791,238	4,223,081	1.7514	7,396,303	0	0	1.0000	0	10,490,684	7,650,006	15,148,008
2043	9,293,104	4,593,659	4,699,446	3,426,925	2.3475	8,044,707	6,010,094	218,856	5,791,238	4,223,081	1.7966	7,587,187	0	0	1.0000	0	10,490,684	7,650,006	15,631,893
2044	9,318,516	4,593,659	4,724,857	3,445,455	2.4363	8,394,163	6,026,412	218,856	5,807,556	4,234,980	1.8429	7,804,645	0	0	1.0000	0	10,532,413	7,680,436	16,198,808
2045	9,293,104	4,593,659	4,699,446	3,426,925	2.5284	8,664,637	6,010,094	218,856	5,791,238	4,223,081	1.8905	7,983,734	0	0	1.0000	0	10,490,684	7,650,006	16,648,371
2046	9,293,104	4,593,659	4,699,446	3,426,925	2.6239	8,991,909	6,010,094	218,856	5,791,238	4,223,081	1.9392	8,189,398	0	0	1.0000	0	10,490,684	7,650,006	17,181,307
2047	9,293,104	4,593,659	4,699,446	3,426,925	2.7231	9,331,860	6,010,094	218,856	5,791,238	4,223,081	1.9893	8,400,974	0	0	1.0000	0	10,490,684	7,650,006	17,732,834
2048	10,038,002	4,593,659	5,444,343	3,970,118	2.8261	11,219,951	8,184,870	218,856	7,966,014	5,808,969	2.0406	11,853,781	0	0	1.0000	0	13,410,357	9,779,087	23,073,733
2049	9,293,104	4,593,659	4,699,446	3,426,925	2.9329	10,050,829	6,010,094	218,856	5,791,238	4,223,081	2.0932	8,839,752	0	0	1.0000	0	10,490,684	7,650,006	18,890,581
2050	10,911,948	4,593,659	6,318,289	4,607,416	3.0438	14,024,054	10,866,624	218,856	10,647,768	7,764,555	2.1472	16,672,052	0	0	1.0000	0	16,966,057	12,371,971	30,696,106
2051	10,911,948	4,593,659	6,318,289	4,607,416	3.1588	14,553,907	10,866,624	218,856	10,647,768	7,764,555	2.2026	17,102,208	0	0	1.0000	0	16,966,057	12,371,971	31,656,116
2052	11,657,259	4,593,659	7,063,600	5,150,912	3.2782	16,885,718	13,042,642	218,856	12,823,786	9,351,349	2.2595	21,129,372	0	0	1.0000	0	19,887,387	14,502,260	38,015,091
2053	12,171,773	4,593,659	7,578,114	5,526,105	3.4021	18,800,361	14,646,099	218,856	14,427,243	10,520,620	2.3178	24,384,692	0	0	1.0000	0	22,005,357	16,046,725	43,185,054
2054	11,091,923	4,593,659	6,498,264	4,738,658	3.5307	16,730,779	11,406,549	218,856	11,187,693	8,158,278	2.3776	19,397,123	0	0	1.0000	0	17,685,957	12,896,936	36,127,901
2055	11,991,798	4,593,659	7,398,139	5,394,864	3.6642	19,767,859	14,106,174	218,856	13,887,318	10,126,896	2.4389	24,698,487	0	0	1.0000	0	21,285,457	15,521,760	44,466,346
2056	12,377,159	4,593,659	7,783,500	5,675,876	3.8027	21,583,655	15,202,342	218,856	14,983,486	10,926,243	2.5018	27,335,274	0	0	1.0000	0	22,766,987	16,602,119	48,918,929
2057	9,275,117	4,593,659	4,681,459	3,413,809	3.9464	13,472,254	5,956,132	218,856	5,737,276	4,183,731	2.5664	10,737,127	0	0	1.0000	0	10,418,735	7,597,539	24,209,381
2058	9,275,117	4,593,659	4,681,459	3,413,809	4.0956	13,981,594	5,956,132	218,856	5,737,276	4,183,731	2.6326	11,014,090	0	0	1.0000	0	10,418,735	7,597,539	24,995,684
2059	9,275,117	4,593,659	4,681,459	3,413,809	4.2504	14,510,052	5,956,132	218,856	5,737,276	4,183,731	2.7005	11,298,165	0	0	1.0000	0	10,418,735	7,597,539	25,808,217
2060	9,300,528	4,593,659	4,706,870	3,432,339	4.4111	15,140,390	5,972,451	218,856	5,753,595	4,195,630	2.7702	11,622,735	0	0	1.0000	0	10,460,464	7,627,969	26,763,126
2061	9,275,117	4,593,659	4,681,459	3,413,809	4.5778	15,627,733	5,956,132	218,856	5,737,276	4,183,731	2.8416	11,888,490	0	0	1.0000	0	10,418,735	7,597,539	27,516,222
2062	9,275,117	4,593,659	4,681,459	3,413,809	4.7509	16,218,663	5,956,132	218,856	5,737,276	4,183,731	2.9150	12,195,576	0	0	1.0000	0	10,418,735	7,597,539	28,414,239
2063	9,275,117	4,593,659	4,681,459	3,413,809	4.9305	16,831,783	5,956,132	218,856	5,737,276	4,183,731	2.9902	12,510,192	0	0	1.0000	0	10,418,735	7,597,539	29,341,975
2064	9,300,528	4,593,659	4,706,870	3,432,339	5.1168	17,562,592	5,972,451	218,856	5,753,595	4,195,630	3.0673	12,869,257	0	0	1.0000	0	10,460,464	7,627,969	30,431,849
2065	9,275,117	4,593,659	4,681,459	3,413,809	5.3103	18,128,347	5,956,132	218,856	5,737,276	4,183,731	3.1465	13,164,109	0	0	1.0000	0	10,418,735	7,597,539	31,292,457
2066	9,275,117	4,593,659	4,681,459	3,413,809	5.5110	18,813,499	5,956,132	218,856	5,737,276	4,183,731	3.2276	13,503,410	0	0	1.0000	0	10,418,735	7,597,539	32,316,909
2067	9,275,117	4,593,659	4,681,459	3,413,809	5.7193	19,524,595	5,956,132	218,856	5,737,276	4,183,731	3.3109	13,851,915	0	0	1.0000	0	10,418,735	7,597,539	33,376,510
2068	9,300,528	4,593,659	4,706,870	3,432,339	5.9355	20,372,648	5,972,451	218,856	5,753,595	4,195,630	3.3963	14,249,620	0	0	1.0000	0	10,460,464	7,627,969	34,622,267
2069	9,275,117	4,593,659	4,681,459	3,413,809	6.1598	21,028,378	5,956,132	218,856	5,737,276	4,183,731	3.4840	14,576,119	0	0	1.0000	0	10,418,735	7,597,539	35,604,496
2070	9,275,117	4,593,659	4,681,459	3,413,809	6.3927	21,823,454	5,956,132	218,856	5,737,276	4,183,731	3.5738	14,951,818	0	0	1.0000	0	10,418,735	7,597,539	36,775,271
2071	9,275,117	4,593,659	4,681,459	3,413,809	6.6343	22,648,230	5,956,132	218,856	5,737,276	4,183,731	3.6660	15,337,558	0	0	1.0000	0	10,418,735	7,597,539	37,985,787
2072	9,300,528	4,593,659	4,706,870	3,432,339	6.8851	23,631,997	5,972,451	218,856	5,753,595	4,195,630	3.7606	15,778,088	0	0	1.0000	0	10,460,464	7,627,969	39,410,085
2073	9,275,117	4,593,659	4,681,459	3,413,809	7.1454	24,393,027	5,956,132	218,856	5,737,276	4,183,731	3.8576	16,139,160	0	0	1.0000	0	10,418,735	7,597,539	40,532,188
2074	9,275,117	4,593,659	4,681,459	3,413,809	7.4155	25,315,097	5,956,132	218,856	5,737,276	4,183,731	3.9572	16,555,860	0	0	1.0000	0	10,418,735	7,597,539	41,870,957
2075	9,275,117	4,593,659	4,681,459	3,413,809	7.6958	26,271,988	5,956,132	218,856	5,737,276	4,183,731	4.0593	16,983,019	0	0	1.0000	0	10,418,735	7,597,539	43,255,007
2076	9,300,528	4,593,659	4,706,870	3,432,339	7.9867	27,413,061	5,972,451	218,856	5,753,595	4,195,630	4.1640	17,470,605	0	0	1.0000	0	10,460,464	7,627,969	44,883,666
2077	9,275,117	4,593,659	4,681,459	3,413,809	8.2886	28,295,693	5,956,132	218,856	5,737,276	4,183,731	4.2714	17,870,388	0	0	1.0000	0	10,418,735	7,597,539	46,166,082
2078	9,794,055	4,593,659	5,200,396	3,792,228	8.6019	32,620,363	7,512,945	218,856	7,294,089	5,318,988	4.3816	23,305,679	0	0	1.0000	0	12,494,485	9,111,216	55,926,041
2079	9,897,842	4,593,659	5,304,184	3,867,911	8.9270	34,528,845	7,824,307	218,856	7,605,451	5,546,040	4.4947	24,927,784	0	0	1.0000	0	12,909,635	9,413,951	59,456,630
2080	9,819,466	4,593,659	5,225,807	3,810,758	9.2645	35,304,767	7,529,263	218,856	7,310,407	5,330,888	4.6106	24,578,591	0	0	1.0000	0	12,536,214	9,141,646	59,883,358
2081	9,794,055	4,593,659	5,200,396	3,792,228	9.6147	36,461,131	7,512,945	218,856	7,294,089	5,318,988	4.7296	25,156,687	0	0	1.0000	0	12,494,485	9,111,216	61,617,817
2082	9,794,055	4,593,659	5,200,396	3,792,228	9.9781	37,839,226	7,512,945	218,856	7,294,089	5,318,988	4.8516	25,805,603	0	0	1.0000	0	12,494,485	9,111,216	63,644,829
2083	9,897,842	4,593,659	5,304,184	3,867,911	10.3553	40,053,383	7,824,307	218,856	7,605,451	5,546,040	4.9768	27,601,530	0	0	1.0000	0	12,909,635	9,413,951	67,654,913
2084	9,819,466	4,593,659	5,225,807	3,810,758	10.7467	40,953,073	7,529,263	218,856	7,310,407	5,330,888	5.1052	27,215,248	0	0	1.0000	0	12,536,214	9,141,646	68,168,321
2085	39,676,591	4,593,659	35,082,933	25,583,141	11.1529	285,326,213	12,697,436	218,856	12,478,580	9,099,618	5.2369	47,653,787	0	0	1.0000	0	47,561,512	34,682,759	332,980,000
2086	55,815,103	4,593,659	51,221,444	37,351,650	11.5745	432,326,674	42,475,319	218,856	42,256,463	30,814,216	5.3720	165,533,966	0	0	1.0000	0	93,477,907	68,165,866	597,860,640
2087	66,537,269	4,593,659	61,943,610	45,170,457	12.0120	542,587,534	125,134,324	218,856	124,915,468	91,090,733	5.5106	501,964,592	0	0	1.0000	0	186,859,078	136,261,190	1,044,552,126
2088	59,339,865	4,593,659	54,746,207	39,921,974	12.4661	497,671,321	44,118,942	218,856	43,900,086	32,012,777	5.6528	180,961,824	0	0	1.0000	0	98,646,292	71,934,751	678,633,145
2089	57,778,447	4,593,659	53,184,788	38,783,358	12.9373	501,751,939	42,716,760	218,856	42,497,904	30,990,279	5.7986	179,700,234	0	0	1.0000	0	95,682,693	69,773,637	681,452,172
2090	32,387,928	4,593,659	27,794,269	20,268,109	13.4263	272,125,715	22,725,232	218,856	22,506,376	16,412,077	5.9482	97,622,316	0	0	1.0000	0	50,300,645	36,680,186	369,748,031
2091	18,561,392	4,593,659	13,967,733	10,185,536	13.9338	141,923,226	17,157,289	218,856	16,938,433	12,351,827	6.1017	75,367,145	0	0	1.0000	0	30,906,166	22,537,364	217,290,371
2092	7,780,529	-	7,780,529	5,673,709	14.4605	82,044,673	7,191,960	-	7,191,960	5,244,514	6.2591	32,825,935	0	0	1.0000	0	14,972,488	10,918,223	114,870,608
	$1,027,202,630	$248,057,566	$779,145,064	$568,167,384		$3,927,120,289	$914,712,587	$11,818,224	$902,894,363	$658,407,725		$2,260,867,138	$0	$0		$0	$1,682,039,427	$1,226,575,109	$6,187,987,426

Xcel Energy
Nuclear Decommissioning Accrual
60-Year Decommissioning Period
DECON Method - No Recasking

Docket No. E002/M-20-___
Schedule E.6
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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 1																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2033	$19,045,472	$0	$19,045,472	$13,888,320	1.6199	$22,497,690	$4,605,809	$0	$4,605,809	$3,358,643	1.3926	$4,677,247	$1,250,000	$911,524	1.0000	$911,524	$24,901,281	$18,158,487	$28,086,460
2034	48,160,248	-	48,160,248	35,119,368	1.6811	59,039,169	31,987,372	-	31,987,372	23,325,799	1.4285	33,320,904	$1,250,000	$911,524	1.0000	$911,524	81,397,620	59,356,691	93,271,597
2035	19,352,822	-	19,352,822	14,112,446	1.7446	24,620,573	29,743,385	-	29,743,385	21,689,441	1.4653	31,781,538	$1,250,000	$911,524	1.0000	$911,524	50,346,207	36,713,411	57,313,635
2036	16,219,236	-	16,219,236	11,827,375	1.8106	21,414,646	30,569,270	-	30,569,270	22,291,692	1.5032	33,508,872	$1,250,000	$911,524	1.0000	$911,524	48,038,506	35,030,591	55,835,041
2037	16,174,921	-	16,174,921	11,795,060	1.8790	22,162,918	30,482,332	-	30,482,332	22,228,296	1.5419	34,273,809	$1,250,000	$911,524	1.0000	$911,524	47,907,253	34,934,879	57,348,250
2038	14,211,739	-	14,211,739	10,363,470	1.9501	20,209,803	26,102,637	-	26,102,637	19,034,539	1.5817	30,106,930	$1,250,000	$911,524	1.0000	$911,524	41,564,376	30,309,533	51,228,257
2039	4,978,646	-	4,978,646	3,630,523	2.0238	7,347,452	5,504,385	-	5,504,385	4,013,902	1.6225	6,512,556	$1,250,000	$911,524	1.0000	$911,524	11,733,031	8,555,949	14,771,532
2040	4,992,286	-	4,992,286	3,640,470	2.1003	7,646,078	5,522,890	-	5,522,890	4,027,397	1.6644	6,703,199	$1,250,000	$911,524	1.0000	$911,524	11,765,176	8,579,390	15,260,801
2041	4,978,646	2,315,817	2,662,828	1,941,785	2.1797	4,232,509	5,504,385	109,428	5,394,957	3,934,105	1.7073	6,716,698	$1,250,000	$911,524	1.0000	$911,524	9,307,786	6,787,414	11,860,731
2042	4,978,646	2,315,817	2,662,828	1,941,785	2.2620	4,392,318	5,504,385	109,428	5,394,957	3,934,105	1.7514	6,890,192	$1,250,000	$911,524	1.0000	$911,524	9,307,786	6,787,414	12,194,034
2043	4,978,646	2,315,817	2,662,828	1,941,785	2.3475	4,558,340	5,504,385	109,428	5,394,957	3,934,105	1.7966	7,068,013	$1,250,000	$911,524	1.0000	$911,524	9,307,786	6,787,414	12,537,878
2044	4,992,286	2,315,817	2,676,469	1,951,732	2.4363	4,755,004	5,522,890	109,428	5,413,462	3,947,600	1.8429	7,275,031	$1,250,000	$911,524	1.0000	$911,524	9,339,931	6,810,855	12,941,559
2045	4,978,646	2,315,817	2,662,828	1,941,785	2.5284	4,909,609	5,504,385	109,428	5,394,957	3,934,105	1.8905	7,437,426	$1,250,000	$911,524	1.0000	$911,524	9,307,786	6,787,414	13,258,559
2046	4,978,646	2,315,817	2,662,828	1,941,785	2.6239	5,095,050	5,504,385	109,428	5,394,957	3,934,105	1.9392	7,629,017	$1,250,000	$911,524	1.0000	$911,524	9,307,786	6,787,414	13,635,590
2047	4,978,646	2,315,817	2,662,828	1,941,785	2.7231	5,287,675	5,504,385	109,428	5,394,957	3,934,105	1.9893	7,826,116	$1,250,000	$911,524	1.0000	$911,524	9,307,786	6,787,414	14,025,314
2048	4,992,286	2,315,817	2,676,469	1,951,732	2.8261	5,515,789	5,522,890	109,428	5,413,462	3,947,600	2.0406	8,055,472	$1,250,000	$911,524	1.0000	$911,524	9,339,931	6,810,855	14,482,784
2049	4,978,646	2,315,817	2,662,828	1,941,785	2.9329	5,695,061	5,504,385	109,428	5,394,957	3,934,105	2.0932	8,234,869	$1,250,000	$911,524	1.0000	$911,524	9,307,786	6,787,414	14,841,454
2050	4,978,646	2,315,817	2,662,828	1,941,785	3.0438	5,910,405	5,504,385	109,428	5,394,957	3,934,105	2.1472	8,447,311	$1,250,000	$911,524	1.0000	$911,524	9,307,786	6,787,414	15,269,240
2051	4,978,646	2,315,817	2,662,828	1,941,785	3.1588	6,133,711	5,504,385	109,428	5,394,957	3,934,105	2.2026	8,665,260	$1,250,000	$911,524	1.0000	$911,524	9,307,786	6,787,414	15,710,495
2052	5,096,073	2,315,817	2,780,256	2,027,416	3.2782	6,646,274	5,834,253	109,428	5,724,825	4,174,651	2.2595	9,432,624	$1,250,000	$911,524	1.0000	$911,524	9,755,081	7,113,590	16,990,421
2053	5,186,221	2,315,817	2,870,403	2,093,153	3.4021	7,121,115	6,127,110	109,428	6,017,682	4,388,208	2.3178	10,170,989	$1,250,000	$911,524	1.0000	$911,524	10,138,086	7,392,885	18,203,627
2054	5,186,221	2,315,817	2,870,403	2,093,153	3.5307	7,390,294	6,127,110	109,428	6,017,682	4,388,208	2.3776	10,433,404	$1,250,000	$911,524	1.0000	$911,524	10,138,086	7,392,885	18,735,222
2055	5,238,114	2,315,817	2,922,297	2,130,995	3.6642	7,808,390	6,282,791	109,428	6,173,363	4,501,734	2.4389	10,979,279	$1,250,000	$911,524	1.0000	$911,524	10,345,661	7,544,252	19,699,193
2056	5,147,967	2,315,817	2,832,150	2,065,257	3.8027	7,853,554	5,989,934	109,428	5,880,506	4,288,177	2.5018	10,728,161	$1,250,000	$911,524	1.0000	$911,524	9,962,656	7,264,958	19,493,239
2057	5,290,008	2,315,817	2,974,191	2,168,837	3.9464	8,559,096	6,438,473	109,428	6,329,045	4,615,260	2.5664	11,844,602	$1,250,000	$911,524	1.0000	$911,524	10,553,236	7,695,620	21,315,222
2058	5,134,327	2,315,817	2,818,510	2,055,311	4.0956	8,417,731	5,971,429	109,428	5,862,001	4,274,682	2.6326	11,253,529	$1,250,000	$911,524	1.0000	$911,524	9,930,511	7,241,517	20,582,784
2059	5,082,433	2,315,817	2,766,616	2,017,469	4.2504	8,575,050	5,815,748	109,428	5,706,320	4,161,157	2.7005	11,237,204	$1,250,000	$911,524	1.0000	$911,524	9,722,936	7,090,149	20,723,777
2060	5,199,861	2,315,817	2,884,044	2,103,099	4.4111	9,276,982	6,145,615	109,428	6,036,187	4,401,702	2.7702	12,193,596	$1,250,000	$911,524	1.0000	$911,524	10,170,231	7,416,326	22,382,101
2061	5,186,221	2,315,817	2,870,403	2,093,153	4.5778	9,582,034	6,127,110	109,428	6,017,682	4,388,208	2.8416	12,469,532	$1,250,000	$911,524	1.0000	$911,524	10,138,086	7,392,885	22,963,090
2062	5,134,327	2,315,817	2,818,510	2,055,311	4.7509	9,764,576	5,971,429	109,428	5,862,001	4,274,682	2.9150	12,460,699	$1,250,000	$911,524	1.0000	$911,524	9,930,511	7,241,517	23,136,799
2063	5,186,221	2,315,817	2,870,403	2,093,153	4.9305	10,320,289	6,127,110	109,428	6,017,682	4,388,208	2.9902	13,121,620	$1,250,000	$911,524	1.0000	$911,524	10,138,086	7,392,885	24,353,433
2064	5,199,861	2,315,817	2,884,044	2,103,099	5.1168	10,761,139	6,145,615	109,428	6,036,187	4,401,702	3.0673	13,501,342	$1,250,000	$911,524	1.0000	$911,524	10,170,231	7,416,326	25,174,004
2065	5,134,327	2,315,817	2,818,510	2,055,311	5.3103	10,914,317	5,971,429	109,428	5,862,001	4,274,682	3.1465	13,450,288	$1,250,000	$911,524	1.0000	$911,524	9,930,511	7,241,517	25,276,129
2066	5,186,221	2,315,817	2,870,403	2,093,153	5.5110	11,535,365	6,127,110	109,428	6,017,682	4,388,208	3.2276	14,163,381	$1,250,000	$911,524	1.0000	$911,524	10,138,086	7,392,885	26,610,269
2067	5,186,221	2,315,817	2,870,403	2,093,153	5.7193	11,971,368	6,127,110	109,428	6,017,682	4,388,208	3.3109	14,528,918	$1,250,000	$911,524	1.0000	$911,524	10,138,086	7,392,885	27,411,810
2068	5,147,967	2,315,817	2,832,150	2,065,257	5.9355	12,258,336	5,989,934	109,428	5,880,506	4,288,177	3.3963	14,563,935	$1,250,000	$911,524	1.0000	$911,524	9,962,656	7,264,958	27,733,794
2069	5,186,221	2,315,817	2,870,403	2,093,153	6.1598	12,893,402	6,127,110	109,428	6,017,682	4,388,208	3.4840	15,288,517	$1,250,000	$911,524	1.0000	$911,524	10,138,086	7,392,885	29,093,443
2070	5,186,221	2,315,817	2,870,403	2,093,153	6.3927	13,380,897	6,127,110	109,428	6,017,682	4,388,208	3.5738	15,682,578	$1,250,000	$911,524	1.0000	$911,524	10,138,086	7,392,885	29,974,999
2071	5,186,221	2,315,817	2,870,403	2,093,153	6.6343	13,886,603	6,127,110	109,428	6,017,682	4,388,208	3.6660	16,087,171	$1,250,000	$911,524	1.0000	$911,524	10,138,086	7,392,885	30,885,298
2072	5,199,861	2,315,817	2,884,044	2,103,099	6.8851	14,480,049	6,145,615	109,428	6,036,187	4,401,702	3.7606	16,553,042	$1,250,000	$911,524	1.0000	$911,524	10,170,231	7,416,326	31,944,615
2073	5,186,221	2,315,817	2,870,403	2,093,153	7.1454	14,956,413	6,127,110	109,428	6,017,682	4,388,208	3.8576	16,927,952	$1,250,000	$911,524	1.0000	$911,524	10,138,086	7,392,885	32,795,889
2074	5,545,964	2,315,817	3,230,146	2,355,484	7.4155	17,467,093	7,206,339	109,428	7,096,911	5,175,202	3.9572	20,479,311	$1,250,000	$911,524	1.0000	$911,524	11,577,057	8,442,210	38,857,927
2075	5,186,221	2,315,817	2,870,403	2,093,153	7.6958	16,108,485	6,127,110	109,428	6,017,682	4,388,208	4.0593	17,813,053	$1,250,000	$911,524	1.0000	$911,524	10,138,086	7,392,885	34,833,062
2076	5,199,861	2,315,817	2,884,044	2,103,099	7.9867	16,796,824	6,145,615	109,428	6,036,187	4,401,702	4.1640	18,328,689	$1,250,000	$911,524	1.0000	$911,524	10,170,231	7,416,326	36,037,036
2077	4,978,646	2,315,817	2,662,828	1,941,785	8.2886	16,094,680	5,504,385	109,428	5,394,957	3,934,105	4.2714	16,804,137	$1,250,000	$911,524	1.0000	$911,524	9,307,786	6,787,414	33,810,341
2078	4,281,843	2,315,817	1,966,026	1,433,663	8.6019	12,332,229	2,429,692	109,428	2,320,264	1,691,981	4.3816	7,413,583	$1,250,000	$911,524	1.0000	$911,524	5,536,290	4,037,168	20,657,335
2079	4,281,843	2,315,817	1,966,026	1,433,663	8.9270	12,798,313	2,429,692	109,428	2,320,264	1,691,981	4.4947	7,604,946	$1,250,000	$911,524	1.0000	$911,524	5,536,290	4,037,168	21,314,782
2080	4,293,574	-	4,293,574	3,130,956	9.2645	29,006,739	2,439,774	-	2,439,774	1,779,129	4.6106	8,202,853	$1,250,000	$911,524	1.0000	$911,524	7,983,348	5,821,609	38,121,116
2081	4,281,843	-	4,281,843	3,122,401	9.6147	30,020,951	2,429,692	-	2,429,692	1,771,778	4.7296	8,379,800	$1,250,000	$911,524	1.0000	$911,524	7,961,535	5,805,703	39,312,274
2082	4,281,843	-	4,281,843	3,122,401	9.9781	31,155,631	2,429,692	-	2,429,692	1,771,778	4.8516	8,595,957	$1,250,000	$911,524	1.0000	$911,524	7,961,535	5,805,703	40,663,112
2083	4,281,843	-	4,281,843	3,122,401	10.3553	32,333,401	2,429,692	-	2,429,692	1,771,778	4.9768	8,817,783	$1,250,000	$911,524	1.0000	$911,524	7,961,535	5,805,703	42,062,708
2084	4,293,574	-	4,293,574	3,130,956	10.7467	33,647,442	2,439,774	-	2,439,774	1,779,129	5.1052	9,082,811	$1,250,000	$911,524	1.0000	$911,524	7,983,348	5,821,609	43,641,776
2085	4,281,843	-	4,281,843	3,122,401	11.1529	34,823,828	2,429,692	-	2,429,692	1,771,778	5.2369	9,278,623	$1,250,000	$911,524	1.0000	$911,524	7,961,535	5,805,703	45,013,975
2086	4,281,843	-	4,281,843	3,122,401	11.5745	36,140,233	2,429,692	-	2,429,692	1,771,778	5.3720	9,517,990	$1,250,000	$911,524	1.0000	$911,524	7,961,535	5,805,703	46,569,746
2087	27,710,339	-	27,710,339	20,206,906	12.0120	242,725,350	7,488,858	-	7,488,858	5,461,018	5.5106	30,093,484	$1,250,000	$911,524	1.0000	$911,524	36,449,197	26,579,447	273,730,357
2088	49,590,360	-	49,590,360	36,162,233	12.4661	450,802,013	13,943,476	-	13,943,476	10,167,847	5.6528	57,476,808	$1,250,000	$911,524	1.0000	$911,524	64,783,836	47,241,604	509,190,345
2089	56,167,351	-	56,167,351	40,958,300	12.9373	529,889,813	70,862,246	-	70,862,246	51,674,096	5.7986	299,637,412	$1,250,000	$911,524	1.0000	$911,524	128,279,597	93,543,919	830,438,749
2090	42,752,751	-	42,752,751	31,176,119	13.4263	418,579,920	47,610,082	-	47,610,082	34,718,176	5.9482	206,510,657	$1,250,000	$911,524	1.0000	$911,524	91,612,833	66,805,819	626,002,100
2091	37,335,317	-	37,335,317	27,225,622	13.9338	379,356,374	38,219,785	-	38,219,785	27,870,593	6.1017	170,058,000	$1,250,000	$911,524	1.0000	$911,524	76,805,102	56,007,739	550,325,898
2092	7,675,003	-	7,675,003	5,596,758	14.4605	80,931,914	4,061,439	-	4,061,439	2,961,678	6.2591	18,537,441	$1,250,000	$911,524	1.0000	$911,524	12,986,441	9,469,960	100,380,879
2093	18,856,603	-	18,856,603	13,750,593	15.0071	206,356,532	5,635,957	-	5,635,957	4,109,847	6.4206	26,387,685	$1,250,000	$911,524	1.0000	$911,524	25,742,561	18,771,964	233,655,740
2094	13,636,457	-	13,636,457	9,943,963	15.5744	154,871,261	9,497,275	-	9,497,275	6,925,593	6.5863	45,614,034	$1,250,000	$911,524	1.0000	$911,524	24,383,731	17,781,080	201,396,819
2095	9,863,081	-	9,863,081	7,192,346	16.1631	116,250,608	6,523,371	-	6,523,371	4,756,966	6.7562	32,139,016	$1,250,000	$911,524	1.0000	$911,524	17,636,452	12,860,836	149,301,147
	$634,853,080	$90,316,867	$544,536,213	$397,086,153		$3,368,266,706	$609,790,023	$4,267,692	$605,522,331	$441,558,389		$1,588,976,895	$78,750,000	$57,425,996		$57,425,996	$1,228,808,545	$896,070,538	$5,014,669,597

Xcel Energy
Nuclear Decommissioning Accrual
60-Year Decommissioning Period
DECON Method - No Recasking

Docket No. E002/M-20-___
Schedule E.6
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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 2																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2034	$7,647,937	$0	$7,647,937	$5,577,021	1.6811	$9,375,530	$3,153,295	$0	$3,153,295	$2,299,443	1.4285	$3,284,754	$1,250,000	$911,524	1.0000	$911,524	$12,051,232	$8,787,987	$13,571,807
2035	47,107,095	-	47,107,095	34,351,389	1.7446	59,929,433	33,895,893	-	33,895,893	24,717,529	1.4653	36,218,596	1,250,000	911,524	1.0000	911,524	82,252,988	59,980,442	97,059,552
2036	32,147,720	-	32,147,720	23,442,728	1.8106	42,445,404	36,619,839	-	36,619,839	26,703,883	1.5032	40,141,276	1,250,000	911,524	1.0000	911,524	70,017,560	51,058,135	83,498,204
2037	23,063,971	-	23,063,971	16,818,686	1.8790	31,602,310	35,585,229	-	35,585,229	25,949,425	1.5419	40,011,419	1,250,000	911,524	1.0000	911,524	59,899,200	43,679,635	72,525,253
2038	19,902,648	-	19,902,648	14,513,389	1.9501	28,302,561	30,311,879	-	30,311,879	22,103,998	1.5817	34,961,894	1,250,000	911,524	1.0000	911,524	51,464,527	37,528,911	64,175,978
2039	5,034,555	-	5,034,555	3,671,293	2.0238	7,429,963	5,510,653	-	5,510,653	4,018,473	1.6225	6,519,972	1,250,000	911,524	1.0000	911,524	11,795,208	8,601,290	14,861,459
2040	5,048,348	-	5,048,348	3,681,351	2.1003	7,731,942	5,529,175	-	5,529,175	4,031,980	1.6644	6,710,827	1,250,000	911,524	1.0000	911,524	11,827,523	8,624,855	15,354,293
2041	5,034,555	-	5,034,555	3,671,293	2.1797	8,002,318	5,510,653	-	5,510,653	4,018,473	1.7073	6,860,738	1,250,000	911,524	1.0000	911,524	11,795,208	8,601,290	15,774,580
2042	5,034,555	2,315,817	2,718,738	1,982,555	2.2620	4,484,540	5,510,653	109,428	5,401,225	3,938,676	1.7514	6,898,197	1,250,000	911,524	1.0000	911,524	9,369,963	6,832,755	12,294,260
2043	5,034,555	2,315,817	2,718,738	1,982,555	2.3475	4,654,048	5,510,653	109,428	5,401,225	3,938,676	1.7966	7,076,225	1,250,000	911,524	1.0000	911,524	9,369,963	6,832,755	12,641,797
2044	5,048,348	2,315,817	2,732,531	1,992,614	2.4363	4,854,604	5,529,175	109,428	5,419,747	3,952,183	1.8429	7,283,477	1,250,000	911,524	1.0000	911,524	9,402,278	6,856,320	13,049,606
2045	5,034,555	2,315,817	2,718,738	1,982,555	2.5284	5,012,693	5,510,653	109,428	5,401,225	3,938,676	1.8905	7,446,066	1,250,000	911,524	1.0000	911,524	9,369,963	6,832,755	13,370,283
2046	5,034,555	2,315,817	2,718,738	1,982,555	2.6239	5,202,027	5,510,653	109,428	5,401,225	3,938,676	1.9392	7,637,880	1,250,000	911,524	1.0000	911,524	9,369,963	6,832,755	13,751,430
2047	5,034,555	2,315,817	2,718,738	1,982,555	2.7231	5,398,696	5,510,653	109,428	5,401,225	3,938,676	1.9893	7,835,208	1,250,000	911,524	1.0000	911,524	9,369,963	6,832,755	14,145,428
2048	5,048,348	2,315,817	2,732,531	1,992,614	2.8261	5,631,325	5,529,175	109,428	5,419,747	3,952,183	2.0406	8,064,824	1,250,000	911,524	1.0000	911,524	9,402,278	6,856,320	14,607,673
2049	5,034,555	2,315,817	2,718,738	1,982,555	2.9329	5,814,636	5,510,653	109,428	5,401,225	3,938,676	2.0932	8,244,436	1,250,000	911,524	1.0000	911,524	9,369,963	6,832,755	14,970,596
2050	5,034,555	2,315,817	2,718,738	1,982,555	3.0438	6,034,502	5,510,653	109,428	5,401,225	3,938,676	2.1472	8,457,125	1,250,000	911,524	1.0000	911,524	9,369,963	6,832,755	15,403,150
2051	5,034,555	2,315,817	2,718,738	1,982,555	3.1588	6,262,496	5,510,653	109,428	5,401,225	3,938,676	2.2026	8,675,327	1,250,000	911,524	1.0000	911,524	9,369,963	6,832,755	15,849,346
2052	5,048,348	2,315,817	2,732,531	1,992,614	3.2782	6,532,186	5,529,175	109,428	5,419,747	3,952,183	2.2595	8,929,957	1,250,000	911,524	1.0000	911,524	9,402,278	6,856,320	16,373,666
2053	5,138,342	2,315,817	2,822,525	2,058,239	3.4021	7,002,335	5,822,015	109,428	5,712,587	4,165,727	2.3178	9,655,322	1,250,000	911,524	1.0000	911,524	9,785,113	7,135,490	17,569,181
2054	5,242,130	2,315,817	2,926,313	2,133,923	3.5307	7,534,242	6,133,378	109,428	6,023,950	4,392,779	2.3776	10,444,271	1,250,000	911,524	1.0000	911,524	10,200,263	7,438,225	18,890,036
2055	5,242,130	2,315,817	2,926,313	2,133,923	3.6642	7,819,120	6,133,378	109,428	6,023,950	4,392,779	2.4389	10,713,548	1,250,000	911,524	1.0000	911,524	10,200,263	7,438,225	19,444,192
2056	5,307,817	2,315,817	2,992,000	2,181,823	3.8027	8,296,819	6,307,581	109,428	6,198,153	4,519,811	2.5018	11,307,664	1,250,000	911,524	1.0000	911,524	10,440,153	7,613,158	20,516,006
2057	5,190,236	2,315,817	2,874,419	2,096,081	3.9464	8,271,974	5,977,697	109,428	5,868,269	4,279,253	2.5664	10,982,275	1,250,000	911,524	1.0000	911,524	9,992,688	7,286,858	20,165,772
2058	5,345,917	2,315,817	3,030,100	2,209,607	4.0956	9,049,665	6,444,740	109,428	6,335,312	4,619,830	2.6326	12,162,165	1,250,000	911,524	1.0000	911,524	10,615,413	7,740,961	22,123,354
2059	5,190,236	2,315,817	2,874,419	2,096,081	4.2504	8,909,183	5,977,697	109,428	5,868,269	4,279,253	2.7005	11,556,123	1,250,000	911,524	1.0000	911,524	9,992,688	7,286,858	21,376,829
2060	5,152,136	2,315,817	2,836,319	2,068,297	4.4111	9,123,467	5,840,538	109,428	5,731,110	4,179,234	2.7702	11,577,314	1,250,000	911,524	1.0000	911,524	9,817,428	7,159,055	21,612,305
2061	5,242,130	2,315,817	2,926,313	2,133,923	4.5778	9,768,672	6,133,378	109,428	6,023,950	4,392,779	2.8416	12,482,520	1,250,000	911,524	1.0000	911,524	10,200,263	7,438,225	23,162,716
2062	5,242,130	2,315,817	2,926,313	2,133,923	4.7509	10,138,054	6,133,378	109,428	6,023,950	4,392,779	2.9150	12,804,950	1,250,000	911,524	1.0000	911,524	10,200,263	7,438,225	23,854,528
2063	5,190,236	2,315,817	2,874,419	2,096,081	4.9305	10,334,727	5,977,697	109,428	5,868,269	4,279,253	2.9902	12,795,822	1,250,000	911,524	1.0000	911,524	9,992,688	7,286,858	24,042,073
2064	5,255,923	2,315,817	2,940,106	2,143,981	5.1168	10,970,323	6,151,900	109,428	6,042,472	4,406,285	3.0673	13,515,399	1,250,000	911,524	1.0000	911,524	10,232,578	7,461,790	25,397,246
2065	5,242,130	2,315,817	2,926,313	2,133,923	5.3103	11,331,771	6,133,378	109,428	6,023,950	4,392,779	3.1465	13,821,878	1,250,000	911,524	1.0000	911,524	10,200,263	7,438,225	26,065,172
2066	5,190,236	2,315,817	2,874,419	2,096,081	5.5110	11,551,502	5,977,697	109,428	5,868,269	4,279,253	3.2276	13,811,717	1,250,000	911,524	1.0000	911,524	9,992,688	7,286,858	26,274,743
2067	5,242,130	2,315,817	2,926,313	2,133,923	5.7193	12,204,545	6,133,378	109,428	6,023,950	4,392,779	3.3109	14,544,051	1,250,000	911,524	1.0000	911,524	10,200,263	7,438,225	27,660,120
2068	5,255,923	2,315,817	2,940,106	2,143,981	5.9355	12,725,601	6,151,900	109,428	6,042,472	4,406,285	3.3963	14,965,067	1,250,000	911,524	1.0000	911,524	10,232,578	7,461,790	28,602,192
2069	5,190,236	2,315,817	2,874,419	2,096,081	6.1598	12,911,440	5,977,697	109,428	5,868,269	4,279,253	3.4840	14,908,917	1,250,000	911,524	1.0000	911,524	9,992,688	7,286,858	28,731,880
2070	5,242,130	2,315,817	2,926,313	2,133,923	6.3927	13,641,529	6,133,378	109,428	6,023,950	4,392,779	3.5738	15,698,912	1,250,000	911,524	1.0000	911,524	10,200,263	7,438,225	30,251,965
2071	5,242,130	2,315,817	2,926,313	2,133,923	6.6343	14,157,085	6,133,378	109,428	6,023,950	4,392,779	3.6660	16,103,927	1,250,000	911,524	1.0000	911,524	10,200,263	7,438,225	31,172,535
2072	5,255,923	2,315,817	2,940,106	2,143,981	6.8851	14,761,525	6,151,900	109,428	6,042,472	4,406,285	3.7606	16,570,277	1,250,000	911,524	1.0000	911,524	10,232,578	7,461,790	32,243,326
2073	5,242,130	2,315,817	2,926,313	2,133,923	7.1454	15,247,733	6,133,378	109,428	6,023,950	4,392,779	3.8576	16,945,583	1,250,000	911,524	1.0000	911,524	10,200,263	7,438,225	33,104,839
2074	5,242,130	2,315,817	2,926,313	2,133,923	7.4155	15,824,105	6,133,378	109,428	6,023,950	4,392,779	3.9572	17,383,104	1,250,000	911,524	1.0000	911,524	10,200,263	7,438,225	34,118,733
2075	5,601,873	2,315,817	3,286,056	2,396,254	7.6958	18,441,094	7,212,607	109,428	7,103,179	5,179,773	4.0593	21,026,252	1,250,000	911,524	1.0000	911,524	11,639,235	8,487,551	40,378,870
2076	5,255,923	2,315,817	2,940,106	2,143,981	7.9867	17,123,335	6,151,900	109,428	6,042,472	4,406,285	4.1640	18,347,773	1,250,000	911,524	1.0000	911,524	10,232,578	7,461,790	36,382,631
2077	5,242,130	2,315,817	2,926,313	2,133,923	8.2886	17,687,233	6,133,378	109,428	6,023,950	4,392,779	4.2714	18,763,315	1,250,000	911,524	1.0000	911,524	10,200,263	7,438,225	37,362,072
2078	825,394	2,315,817	(1,490,424)	(1,086,845)	8.6019	(9,348,933)	2,443,380	109,428	2,333,952	1,701,962	4.3816	7,457,318	1,250,000	911,524	1.0000	911,524	2,093,529	1,526,641	(980,091)
2079	825,394	2,315,817	(1,490,424)	(1,086,845)	8.9270	(9,702,267)	2,443,380	109,428	2,333,952	1,701,962	4.4947	7,649,810	1,250,000	911,524	1.0000	911,524	2,093,529	1,526,641	(1,140,932)
2080	827,655	-	827,655	603,542	9.2645	5,591,512	2,453,499	-	2,453,499	1,789,138	4.6106	8,249,001	1,250,000	911,524	1.0000	911,524	4,531,154	3,304,204	14,752,037
2081	825,394	-	825,394	601,893	9.6147	5,787,018	2,443,380	-	2,443,380	1,781,759	4.7296	8,427,009	1,250,000	911,524	1.0000	911,524	4,518,774	3,295,176	15,125,550
2082	825,394	-	825,394	601,893	9.9781	6,005,745	2,443,380	-	2,443,380	1,781,759	4.8516	8,644,384	1,250,000	911,524	1.0000	911,524	4,518,774	3,295,176	15,561,653
2083	825,394	-	825,394	601,893	10.3553	6,232,779	2,443,380	-	2,443,380	1,781,759	4.9768	8,867,460	1,250,000	911,524	1.0000	911,524	4,518,774	3,295,176	16,011,763
2084	827,655	-	827,655	603,542	10.7467	6,486,082	2,453,499	-	2,453,499	1,789,138	5.1052	9,133,908	1,250,000	911,524	1.0000	911,524	4,531,154	3,304,204	16,531,514
2085	825,394	-	825,394	601,893	11.1529	6,712,849	2,443,380	-	2,443,380	1,781,759	5.2369	9,330,896	1,250,000	911,524	1.0000	911,524	4,518,774	3,295,176	16,955,268
2086	825,394	-	825,394	601,893	11.5745	6,966,607	2,443,380	-	2,443,380	1,781,759	5.3720	9,571,611	1,250,000	911,524	1.0000	911,524	4,518,774	3,295,176	17,449,742
2087	825,394	-	825,394	601,893	12.0120	7,229,935	2,443,380	-	2,443,380	1,781,759	5.5106	9,818,563	1,250,000	911,524	1.0000	911,524	4,518,774	3,295,176	17,960,022
2088	23,100,812	-	23,100,812	16,845,551	12.4661	209,998,323	8,375,947	-	8,375,947	6,107,900	5.6528	34,526,737	1,250,000	911,524	1.0000	911,524	32,726,759	23,864,975	245,436,584
2089	37,590,931	-	37,590,931	27,412,021	12.9373	354,637,545	25,830,091	-	25,830,091	18,835,793	5.7986	109,221,231	1,250,000	911,524	1.0000	911,524	64,671,023	47,159,338	464,770,299
2090	56,571,425	-	56,571,425	41,252,958	13.4263	553,874,592	71,151,529	-	71,151,529	51,885,046	5.9482	308,622,634	1,250,000	911,524	1.0000	911,524	128,972,954	94,049,528	863,408,749
2091	57,871,968	-	57,871,968	42,201,339	13.9338	588,025,016	47,392,552	-	47,392,552	34,559,549	6.1017	210,872,002	1,250,000	911,524	1.0000	911,524	106,514,520	77,672,412	799,808,542
2092	53,927,256	-	53,927,256	39,324,779	14.4605	568,655,972	39,417,044	-	39,417,044	28,743,658	6.2591	179,909,427	1,250,000	911,524	1.0000	911,524	94,594,300	68,979,961	749,476,923
2093	23,982,620	-	23,982,620	17,488,582	15.0071	262,452,906	8,685,533	-	8,685,533	6,333,655	6.4206	40,665,868	1,250,000	911,524	1.0000	911,524	33,918,153	24,733,762	304,030,297
2094	16,407,250	-	16,407,250	11,964,478	15.5744	186,339,572	16,997,622	-	16,997,622	12,394,989	6.5863	81,637,117	1,250,000	911,524	1.0000	911,524	34,654,872	25,270,991	268,888,213
2095	11,867,162	-	11,867,162	8,653,760	16.1631	139,871,583	11,948,280	-	11,948,280	8,712,913	6.7562	58,866,183	1,250,000	911,524	1.0000	911,524	25,065,442	18,278,196	199,649,290
	$621,170,583	$88,001,050	$533,169,533	$388,797,354		$3,445,345,126	$624,632,724	$4,158,264	$620,474,460	$452,461,765		$1,725,617,500	$77,500,000	$56,514,473		$56,514,473	$1,231,143,993	$897,773,592	$5,227,477,099
	$2,283,226,293	$426,375,483	$1,856,850,810	$1,354,050,891		$10,740,732,121	$2,149,135,334	$20,244,179	$2,128,891,155	$1,552,427,879		$5,575,461,533	$156,250,000	$113,940,469		$113,940,469	$4,141,991,965	$3,020,419,239	$16,430,134,122

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Monticello

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$757,935,327	$15,073,411	$0	$6,696,113	$779,704,851
2021	779,704,851	31,044,753	-	8,507,110	819,256,714
2022	819,256,714	32,969,284	-	26,601,947	878,827,945
2023	878,827,945	35,328,305	-	26,601,947	940,758,196
2024	940,758,196	37,780,743	-	26,601,947	1,005,140,886
2025	1,005,140,886	40,330,298	-	26,601,947	1,072,073,130
2026	1,072,073,130	42,980,815	-	26,601,947	1,141,655,891
2027	1,141,655,891	45,736,292	-	26,601,947	1,213,994,130
2028	1,213,994,130	48,600,886	-	26,601,947	1,289,196,963
2029	1,289,196,963	51,578,918	-	26,601,947	1,367,377,827
2030	1,367,377,827	51,788,494	(28,324,716)	19,951,460	1,410,793,065
2031	1,410,793,065	53,045,819	(124,607,386)	-	1,339,231,499
2032	1,339,231,499	50,355,104	(112,484,338)	-	1,277,102,265
2033	1,277,102,265	48,019,045	(118,051,101)	-	1,207,070,210
2034	1,207,070,210	45,385,840	(88,877,610)	-	1,163,578,439
2035	1,163,578,439	43,750,549	(18,244,578)	-	1,189,084,410
2036	1,189,084,410	44,709,574	(18,909,383)	-	1,214,884,601
2037	1,214,884,601	45,679,661	(19,491,081)	-	1,241,073,182
2038	1,241,073,182	46,664,352	(13,362,493)	-	1,274,375,040
2039	1,274,375,040	47,916,501	(13,787,359)	-	1,308,504,182
2040	1,308,504,182	49,199,757	(14,285,191)	-	1,343,418,748
2041	1,343,418,748	50,512,545	(14,679,734)	-	1,379,251,559
2042	1,379,251,559	51,859,859	(15,148,008)	-	1,415,963,409
2043	1,415,963,409	53,240,224	(15,631,893)	-	1,453,571,740
2044	1,453,571,740	54,654,297	(16,198,808)	-	1,492,027,230
2045	1,492,027,230	56,100,224	(16,648,371)	-	1,531,479,082
2046	1,531,479,082	57,583,613	(17,181,307)	-	1,571,881,389
2047	1,571,881,389	59,102,740	(17,732,834)	-	1,613,251,295
2048	1,613,251,295	60,658,249	(23,073,733)	-	1,650,835,811
2049	1,650,835,811	62,071,426	(18,890,581)	-	1,694,016,656
2050	1,694,016,656	63,695,026	(30,696,106)	-	1,727,015,576
2051	1,727,015,576	64,935,786	(31,656,116)	-	1,760,295,246
2052	1,760,295,246	66,187,101	(38,015,091)	-	1,788,467,257
2053	1,788,467,257	67,246,369	(43,185,054)	-	1,812,528,572
2054	1,812,528,572	68,151,074	(36,127,901)	-	1,844,551,746
2055	1,844,551,746	69,355,146	(44,466,346)	-	1,869,440,545
2056	1,869,440,545	70,290,964	(48,918,929)	-	1,890,812,580
2057	1,890,812,580	71,094,553	(24,209,381)	-	1,937,697,752

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2058	1,937,697,752	72,857,435	(24,995,684)	-	1,985,559,503
2059	1,985,559,503	74,657,037	(25,808,217)	-	2,034,408,323
2060	2,034,408,323	76,493,753	(26,763,126)	-	2,084,138,951
2061	2,084,138,951	78,363,625	(27,516,222)	-	2,134,986,353
2062	2,134,986,353	80,275,487	(28,414,239)	-	2,186,847,601
2063	2,186,847,601	82,225,470	(29,341,975)	-	2,239,731,096
2064	2,239,731,096	84,213,889	(30,431,849)	-	2,293,513,136
2065	2,293,513,136	86,236,094	(31,292,457)	-	2,348,456,773
2066	2,348,456,773	88,301,975	(32,316,909)	-	2,404,441,839
2067	2,404,441,839	90,407,013	(33,376,510)	-	2,461,472,342
2068	2,461,472,342	92,551,360	(34,622,267)	-	2,519,401,435
2069	2,519,401,435	94,729,494	(35,604,496)	-	2,578,526,432
2070	2,578,526,432	96,952,594	(36,775,271)	-	2,638,703,755
2071	2,638,703,755	99,215,261	(37,985,787)	-	2,699,933,229
2072	2,699,933,229	101,517,489	(39,410,085)	-	2,762,040,634
2073	2,762,040,634	103,852,728	(40,532,188)	-	2,825,361,174
2074	2,825,361,174	106,233,580	(41,870,957)	-	2,889,723,797
2075	2,889,723,797	108,653,615	(43,255,007)	-	2,955,122,405
2076	2,955,122,405	111,112,602	(44,883,666)	-	3,021,351,341
2077	3,021,351,341	113,602,810	(46,166,082)	-	3,088,788,070
2078	3,088,788,070	116,138,431	(55,926,041)	-	3,149,000,460
2079	3,149,000,460	118,402,417	(59,456,630)	-	3,207,946,247
2080	3,207,946,247	120,618,779	(59,883,358)	-	3,268,681,668
2081	3,268,681,668	122,902,431	(61,617,817)	-	3,329,966,281
2082	3,329,966,281	125,206,732	(63,644,829)	-	3,391,528,184
2083	3,391,528,184	127,521,460	(67,654,913)	-	3,451,394,731
2084	3,451,394,731	129,772,442	(68,168,321)	-	3,512,998,852
2085	3,512,998,852	132,088,757	(332,980,000)	-	3,312,107,608
2086	3,312,107,608	124,535,246	(597,860,640)	-	2,838,782,215
2087	2,838,782,215	106,738,211	(1,044,552,126)	-	1,900,968,300
2088	1,900,968,300	71,476,408	(678,633,145)	-	1,293,811,563
2089	1,293,811,563	48,647,315	(681,452,172)	-	661,006,706
2090	661,006,706	24,853,852	(369,748,031)	-	316,112,527
2091	316,112,527	11,885,831	(217,290,371)	-	110,707,987
2092	110,707,987	4,162,620	(114,870,608)	-	0

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Prairie Island Unit 1

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	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$437,068,622	$9,113,138	$0	$24,632	$446,206,392
2021	446,206,392	18,865,340	-	12,399,703	477,471,435
2022	477,471,435	20,373,326	-	22,195,064	520,039,825
2023	520,039,825	22,148,428	-	22,195,064	564,383,317
2024	564,383,317	23,997,551	-	22,195,064	610,575,933
2025	610,575,933	25,923,783	-	22,195,064	658,694,780
2026	658,694,780	27,930,339	-	22,195,064	708,820,184
2027	708,820,184	30,020,569	-	22,195,064	761,035,817
2028	761,035,817	32,197,961	-	22,195,064	815,428,842
2029	815,428,842	34,466,150	-	22,195,064	872,090,055
2030	872,090,055	36,828,922	-	22,195,064	931,114,042
2031	931,114,042	39,290,223	-	22,195,064	992,599,329
2032	992,599,329	41,854,159	-	22,195,064	1,056,648,552
2033	1,056,648,552	40,115,963	(28,086,460)	14,870,693	1,083,548,748
2034	1,083,548,748	40,849,788	(93,271,597)	-	1,031,126,939
2035	1,031,126,939	38,873,486	(57,313,635)	-	1,012,686,790
2036	1,012,686,790	38,178,292	(55,835,041)	-	995,030,041
2037	995,030,041	37,512,633	(57,348,250)	-	975,194,423
2038	975,194,423	36,764,830	(51,228,257)	-	960,730,996
2039	960,730,996	36,219,559	(14,771,532)	-	982,179,022
2040	982,179,022	37,028,149	(15,260,801)	-	1,003,946,370
2041	1,003,946,370	37,848,778	(11,860,731)	-	1,029,934,418
2042	1,029,934,418	38,828,528	(12,194,034)	-	1,056,568,912
2043	1,056,568,912	39,832,648	(12,537,878)	-	1,083,863,682
2044	1,083,863,682	40,861,661	(12,941,559)	-	1,111,783,784
2045	1,111,783,784	41,914,249	(13,258,559)	-	1,140,439,474
2046	1,140,439,474	42,994,568	(13,635,590)	-	1,169,798,452
2047	1,169,798,452	44,101,402	(14,025,314)	-	1,199,874,539
2048	1,199,874,539	45,235,270	(14,482,784)	-	1,230,627,025
2049	1,230,627,025	46,394,639	(14,841,454)	-	1,262,180,209
2050	1,262,180,209	47,584,194	(15,269,240)	-	1,294,495,163
2051	1,294,495,163	48,802,468	(15,710,495)	-	1,327,587,136
2052	1,327,587,136	50,050,035	(16,990,421)	-	1,360,646,750
2053	1,360,646,750	51,296,382	(18,203,627)	-	1,393,739,505
2054	1,393,739,505	52,543,979	(18,735,222)	-	1,427,548,263
2055	1,427,548,263	53,818,569	(19,699,193)	-	1,461,667,639
2056	1,461,667,639	55,104,870	(19,493,239)	-	1,497,279,270
2057	1,497,279,270	56,447,428	(21,315,222)	-	1,532,411,476
2058	1,532,411,476	57,771,913	(20,582,784)	-	1,569,600,605

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2059	1,569,600,605	59,173,943	(20,723,777)	-	1,608,050,771
2060	1,608,050,771	60,623,514	(22,382,101)	-	1,646,292,184
2061	1,646,292,184	62,065,215	(22,963,090)	-	1,685,394,308
2062	1,685,394,308	63,539,365	(23,136,799)	-	1,725,796,875
2063	1,725,796,875	65,062,542	(24,353,433)	-	1,766,505,984
2064	1,766,505,984	66,597,276	(25,174,004)	-	1,807,929,255
2065	1,807,929,255	68,158,933	(25,276,129)	-	1,850,812,059
2066	1,850,812,059	69,775,615	(26,610,269)	-	1,893,977,405
2067	1,893,977,405	71,402,948	(27,411,810)	-	1,937,968,542
2068	1,937,968,542	73,061,414	(27,733,794)	-	1,983,296,163
2069	1,983,296,163	74,770,265	(29,093,443)	-	2,028,972,985
2070	2,028,972,985	76,492,282	(29,974,999)	-	2,075,490,267
2071	2,075,490,267	78,245,983	(30,885,298)	-	2,122,850,952
2072	2,122,850,952	80,031,481	(31,944,615)	-	2,170,937,818
2073	2,170,937,818	81,844,356	(32,795,889)	-	2,219,986,285
2074	2,219,986,285	83,693,483	(38,857,927)	-	2,264,821,840
2075	2,264,821,840	85,383,783	(34,833,062)	-	2,315,372,562
2076	2,315,372,562	87,289,546	(36,037,036)	-	2,366,625,071
2077	2,366,625,071	89,221,765	(33,810,341)	-	2,422,036,496
2078	2,422,036,496	91,310,776	(20,657,335)	-	2,492,689,936
2079	2,492,689,936	93,974,411	(21,314,782)	-	2,565,349,564
2080	2,565,349,564	96,713,679	(38,121,116)	-	2,623,942,127
2081	2,623,942,127	98,922,618	(39,312,274)	-	2,683,552,471
2082	2,683,552,471	101,169,928	(40,663,112)	-	2,744,059,287
2083	2,744,059,287	103,451,035	(42,062,708)	-	2,805,447,614
2084	2,805,447,614	105,765,375	(43,641,776)	-	2,867,571,213
2085	2,867,571,213	108,107,435	(45,013,975)	-	2,930,664,673
2086	2,930,664,673	110,486,058	(46,569,746)	-	2,994,580,985
2087	2,994,580,985	112,895,703	(273,730,357)	-	2,833,746,331
2088	2,833,746,331	106,832,237	(509,190,345)	-	2,431,388,223
2089	2,431,388,223	91,663,336	(830,438,749)	-	1,692,612,810
2090	1,692,612,810	63,811,503	(626,002,100)	-	1,130,422,213
2091	1,130,422,213	42,616,917	(550,325,898)	-	622,713,232
2092	622,713,232	23,476,289	(100,380,879)	-	545,808,641
2093	545,808,641	20,576,986	(233,655,740)	-	332,729,887
2094	332,729,887	12,543,917	(201,396,819)	-	143,876,985
2095	143,876,985	5,424,162	(149,301,147)	-	(0)

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Prairie Island Unit 2

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$487,163,479	$9,989,872	$0	$294,670	$497,448,022
2021	497,448,022	20,528,857	-	6,511,608	524,488,486
2022	524,488,486	21,811,640	-	15,005,461	561,305,588
2023	561,305,588	23,321,141	-	15,005,461	599,632,190
2024	599,632,190	24,892,532	-	15,005,461	639,530,183
2025	639,530,183	26,528,349	-	15,005,461	681,063,994
2026	681,063,994	28,231,236	-	15,005,461	724,300,690
2027	724,300,690	30,003,940	-	15,005,461	769,310,092
2028	769,310,092	31,849,326	-	15,005,461	816,164,879
2029	816,164,879	33,770,372	-	15,005,461	864,940,712
2030	864,940,712	35,770,181	-	15,005,461	915,716,355
2031	915,716,355	37,851,982	-	15,005,461	968,573,798
2032	968,573,798	40,019,138	-	15,005,461	1,023,598,397
2033	1,023,598,397	42,275,146	-	15,005,461	1,080,879,005
2034	1,080,879,005	41,092,617	(13,571,807)	12,454,533	1,120,854,347
2035	1,120,854,347	42,368,294	(97,059,552)	-	1,066,163,089
2036	1,066,163,089	40,300,965	(83,498,204)	-	1,022,965,850
2037	1,022,965,850	38,668,109	(72,525,253)	-	989,108,706
2038	989,108,706	37,388,309	(64,175,978)	-	962,321,037
2039	962,321,037	36,375,735	(14,861,459)	-	983,835,314
2040	983,835,314	37,188,975	(15,354,293)	-	1,005,669,996
2041	1,005,669,996	38,014,326	(15,774,580)	-	1,027,909,742
2042	1,027,909,742	38,854,988	(12,294,260)	-	1,054,470,470
2043	1,054,470,470	39,858,984	(12,641,797)	-	1,081,687,656
2044	1,081,687,656	40,887,793	(13,049,606)	-	1,109,525,844
2045	1,109,525,844	41,940,077	(13,370,283)	-	1,138,095,638
2046	1,138,095,638	43,020,015	(13,751,430)	-	1,167,364,223
2047	1,167,364,223	44,126,368	(14,145,428)	-	1,197,345,163
2048	1,197,345,163	45,259,647	(14,607,673)	-	1,227,997,137
2049	1,227,997,137	46,418,292	(14,970,596)	-	1,259,444,833
2050	1,259,444,833	47,607,015	(15,403,150)	-	1,291,648,698
2051	1,291,648,698	48,824,321	(15,849,346)	-	1,324,623,672
2052	1,324,623,672	50,070,775	(16,373,666)	-	1,358,320,781
2053	1,358,320,781	51,344,526	(17,569,181)	-	1,392,096,125
2054	1,392,096,125	52,621,234	(18,890,036)	-	1,425,827,323
2055	1,425,827,323	53,896,273	(19,444,192)	-	1,460,279,404
2056	1,460,279,404	55,198,561	(20,516,006)	-	1,494,961,959
2057	1,494,961,959	56,509,562	(20,165,772)	-	1,531,305,749

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Exter	2058	1,531,305,749	57,883,357	(22,123,354)	-	1,567,065,752
	2059	1,567,065,752	59,235,085	(21,376,829)	-	1,604,924,009
	2060	1,604,924,009	60,666,128	(21,612,305)	-	1,643,977,832
	2061	1,643,977,832	62,142,362	(23,162,716)	-	1,682,957,478
	2062	1,682,957,478	63,615,793	(23,854,528)	-	1,722,718,743
	2063	1,722,718,743	65,118,768	(24,042,073)	-	1,763,795,439
	2064	1,763,795,439	66,671,468	(25,397,246)	-	1,805,069,660
	2065	1,805,069,660	68,231,633	(26,065,172)	-	1,847,236,121
	2066	1,847,236,121	69,825,525	(26,274,743)	-	1,890,786,903
	2067	1,890,786,903	71,471,745	(27,660,120)	-	1,934,598,529
	2068	1,934,598,529	73,127,824	(28,602,192)	-	1,979,124,161
	2069	1,979,124,161	74,810,893	(28,731,880)	-	2,025,203,174
	2070	2,025,203,174	76,552,680	(30,251,965)	-	2,071,503,889
	2071	2,071,503,889	78,302,847	(31,172,535)	-	2,118,634,202
	2072	2,118,634,202	80,084,373	(32,243,326)	-	2,166,475,248
	2073	2,166,475,248	81,892,764	(33,104,839)	-	2,215,263,174
	2074	2,215,263,174	83,736,948	(34,118,733)	-	2,264,881,389
	2075	2,264,881,389	85,612,517	(40,378,870)	-	2,310,115,036
	2076	2,310,115,036	87,322,348	(36,382,631)	-	2,361,054,753
	2077	2,361,054,753	89,247,870	(37,362,072)	-	2,412,940,551
	2078	2,412,940,551	91,209,153	980,091	-	2,505,129,795
	2079	2,505,129,795	94,693,906	1,140,932	-	2,600,964,633
	2080	2,600,964,633	98,316,463	(14,752,037)	-	2,684,529,060
	2081	2,684,529,060	101,475,198	(15,125,550)	-	2,770,878,708
	2082	2,770,878,708	104,739,215	(15,561,653)	-	2,860,056,270
	2083	2,860,056,270	108,110,127	(16,011,763)	-	2,952,154,634
	2084	2,952,154,634	111,591,445	(16,531,514)	-	3,047,214,565
	2085	3,047,214,565	115,184,711	(16,955,268)	-	3,145,444,008
	2086	3,145,444,008	118,897,783	(17,449,742)	-	3,246,892,049
	2087	3,246,892,049	122,732,519	(17,960,022)	-	3,351,664,547
	2088	3,351,664,547	126,692,920	(245,436,584)	-	3,232,920,882
	2089	3,232,920,882	122,204,409	(464,770,299)	-	2,890,354,993
	2090	2,890,354,993	109,255,419	(863,408,749)	-	2,136,201,662
	2091	2,136,201,662	80,748,423	(799,808,542)	-	1,417,141,543
	2092	1,417,141,543	53,567,950	(749,476,923)	-	721,232,570
	2093	721,232,570	27,262,591	(304,030,297)	-	444,464,864
	2094	444,464,864	16,800,772	(268,888,213)	-	192,377,423
	2095	192,377,423	7,271,867	(199,649,290)	-	0

Xcel Energy
Nuclear Decommissioning Accrual
100-Year Decommissioning Period
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Proposed

2022 ACCRUAL COMPARISON

	Present	Proposed	Difference
Monticello	$8,507,110	$71,581,539	$63,074,429
Prairie Island Unit 1	12,399,703	40,963,527	28,563,824
Prairie Island Unit 2	6,511,608	34,615,754	28,104,146
TOTAL	$27,418,421	$147,160,819	$119,742,398

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2022 MN RETAIL SUMMARY

	Remaining Life (yrs)	Operational Earnings Rate	Post-Shutdown Earnings Rate	Market Value Balance 6/30/2020	Book Value 6/30/2020	Unrealized Gain/Loss 6/30/2020	Tax-Effect Adjustment	Tax-Adjusted Fund Balance 6/30/2020	2022-2024 Decommissioning Accrual
Monticello	9.67	3.98%	3.81%	$814,968,100	$610,109,002	$204,859,098	$57,032,773	$757,935,327	**$71,581,539**
Prairie Island Unit 1	13.25	4.03%	3.80%	471,960,960	346,629,286	125,331,674	34,892,338	437,068,622	**40,963,527**
Prairie Island Unit 2	14.42	4.04%	3.81%	526,255,835	385,837,890	140,417,945	39,092,356	487,163,479	**34,615,754**
TOTAL DECOMMISSIONING ACCRUAL				**$1,813,184,895**	**$1,342,576,178**	**$470,608,717**	**$131,017,467**	**$1,682,167,428**	**$147,160,819**

INPUT DATA

Escalation Rate (Labor)	3.78%
Escalation Rate (Non-Labor)	2.58%
Escalation Rate (PIIC)	0.00%
Jurisdictional Factor	72.9219%
Tax Rate for tax-effect adjustment	27.84%

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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Monticello																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2030	$19,195,236	$0	$19,195,236	$13,997,531	1.4492	$20,285,222	$9,427,073	$0	$9,427,073	$6,874,401	1.2901	$8,868,665	$0	$0	1.0000	$0	$28,622,310	$20,871,932	$29,153,887
2031	69,383,883	-	69,383,883	50,596,046	1.5040	76,096,453	50,357,902	-	50,357,902	36,721,939	1.3234	48,597,814	0	0	1.0000	0	119,741,785	87,317,985	124,694,267
2032	35,972,723	-	35,972,723	26,231,993	1.5609	40,945,518	37,211,074	-	37,211,074	27,135,022	1.3575	36,835,792	0	0	1.0000	0	73,183,796	53,367,015	77,781,310
2033	32,005,491	-	32,005,491	23,339,012	1.6199	37,806,866	41,173,140	-	41,173,140	30,024,236	1.3926	41,811,751	0	0	1.0000	0	73,178,631	53,363,248	79,618,616
2034	52,288,906	-	52,288,906	38,130,064	1.6811	64,100,450	112,412,485	-	112,412,485	81,973,320	1.4285	117,098,887	0	0	1.0000	0	164,701,391	120,103,383	181,199,337
2035	9,293,107	-	9,293,107	6,776,710	1.7446	11,822,648	6,010,095	-	6,010,095	4,382,675	1.4653	6,421,934	0	0	1.0000	0	15,303,201	11,159,385	18,244,582
2036	9,318,517	-	9,318,517	6,795,240	1.8106	12,303,461	6,026,414	-	6,026,414	4,394,576	1.5032	6,605,926	0	0	1.0000	0	15,344,931	11,189,815	18,909,387
2037	9,293,107	-	9,293,107	6,776,710	1.8790	12,733,438	6,010,095	-	6,010,095	4,382,675	1.5419	6,757,647	0	0	1.0000	0	15,303,201	11,159,385	19,491,085
2038	9,293,107	4,593,659	4,699,448	3,426,927	1.9501	6,682,850	6,010,095	218,856	5,791,239	4,223,081	1.5817	6,679,648	0	0	1.0000	0	10,490,687	7,650,008	13,362,498
2039	9,293,107	4,593,659	4,699,448	3,426,927	2.0238	6,935,415	6,010,095	218,856	5,791,239	4,223,081	1.6225	6,851,949	0	0	1.0000	0	10,490,687	7,650,008	13,787,364
2040	9,318,517	4,593,659	4,724,859	3,445,457	2.1003	7,236,493	6,026,414	218,856	5,807,558	4,234,982	1.6644	7,048,703	0	0	1.0000	0	10,532,417	7,680,438	14,285,196
2041	9,293,107	4,593,659	4,699,448	3,426,927	2.1797	7,469,672	6,010,095	218,856	5,791,239	4,223,081	1.7073	7,210,067	0	0	1.0000	0	10,490,687	7,650,008	14,679,739
2042	9,293,107	4,593,659	4,699,448	3,426,927	2.2620	7,751,709	6,010,095	218,856	5,791,239	4,223,081	1.7514	7,396,304	0	0	1.0000	0	10,490,687	7,650,008	15,148,013
2043	9,293,107	4,593,659	4,699,448	3,426,927	2.3475	8,044,711	6,010,095	218,856	5,791,239	4,223,081	1.7966	7,587,188	0	0	1.0000	0	10,490,687	7,650,008	15,631,898
2044	9,318,517	4,593,659	4,724,859	3,445,457	2.4363	8,394,166	6,026,414	218,856	5,807,558	4,234,982	1.8429	7,804,648	0	0	1.0000	0	10,532,417	7,680,438	16,198,814
2045	9,293,107	4,593,659	4,699,448	3,426,927	2.5284	8,664,642	6,010,095	218,856	5,791,239	4,223,081	1.8905	7,983,735	0	0	1.0000	0	10,490,687	7,650,008	16,648,377
2046	9,293,107	4,593,659	4,699,448	3,426,927	2.6239	8,991,913	6,010,095	218,856	5,791,239	4,223,081	1.9392	8,189,399	0	0	1.0000	0	10,490,687	7,650,008	17,181,312
2047	9,293,107	4,593,659	4,699,448	3,426,927	2.7231	9,331,865	6,010,095	218,856	5,791,239	4,223,081	1.9893	8,400,975	0	0	1.0000	0	10,490,687	7,650,008	17,732,840
2048	10,038,003	4,593,659	5,444,345	3,970,120	2.8261	11,219,955	8,184,872	218,856	7,966,016	5,808,970	2.0406	11,853,785	0	0	1.0000	0	13,410,361	9,779,090	23,073,739
2049	9,293,107	4,593,659	4,699,448	3,426,927	2.9329	10,050,834	6,010,095	218,856	5,791,239	4,223,081	2.0932	8,839,754	0	0	1.0000	0	10,490,687	7,650,008	18,890,587
2050	10,911,950	4,593,659	6,318,292	4,607,418	3.0438	14,024,060	10,866,625	218,856	10,647,769	7,764,555	2.1472	16,672,053	0	0	1.0000	0	16,966,060	12,371,974	30,696,113
2051	10,911,950	4,593,659	6,318,292	4,607,418	3.1588	14,553,913	10,866,625	218,856	10,647,769	7,764,555	2.2026	17,102,210	0	0	1.0000	0	16,966,060	12,371,974	31,656,122
2052	10,937,361	4,593,659	6,343,702	4,625,948	3.2782	15,164,783	10,882,944	218,856	10,664,088	7,776,456	2.2595	17,570,902	0	0	1.0000	0	17,007,790	12,402,404	32,735,685
2053	10,911,950	4,593,659	6,318,292	4,607,418	3.4021	15,674,898	10,866,625	218,856	10,647,769	7,764,555	2.3178	17,996,686	0	0	1.0000	0	16,966,060	12,371,974	33,671,584
2054	10,911,950	4,593,659	6,318,292	4,607,418	3.5307	16,267,412	10,866,625	218,856	10,647,769	7,764,555	2.3776	18,461,007	0	0	1.0000	0	16,966,060	12,371,974	34,728,418
2055	10,911,950	4,593,659	6,318,292	4,607,418	3.6642	16,882,502	10,866,625	218,856	10,647,769	7,764,555	2.4389	18,936,974	0	0	1.0000	0	16,966,060	12,371,974	35,819,476
2056	10,937,361	4,593,659	6,343,702	4,625,948	3.8027	17,591,093	10,882,944	218,856	10,664,088	7,776,456	2.5018	19,455,137	0	0	1.0000	0	17,007,790	12,402,404	37,046,230
2057	10,911,950	4,593,659	6,318,292	4,607,418	3.9464	18,182,715	10,866,625	218,856	10,647,769	7,764,555	2.5664	19,926,955	0	0	1.0000	0	16,966,060	12,371,974	38,109,670
2058	18,099,790	4,593,659	13,506,131	9,848,928	4.0956	40,337,268	32,430,144	218,856	32,211,288	23,489,083	2.6326	61,837,360	0	0	1.0000	0	45,717,419	33,338,011	102,174,628
2059	10,911,950	4,593,659	6,318,292	4,607,418	4.2504	19,583,370	10,866,625	218,856	10,647,769	7,764,555	2.7005	20,968,182	0	0	1.0000	0	16,966,060	12,371,974	40,551,552
2060	10,937,361	4,593,659	6,343,702	4,625,948	4.4111	20,405,519	10,882,944	218,856	10,664,088	7,776,456	2.7702	21,542,338	0	0	1.0000	0	17,007,790	12,402,404	41,947,857
2061	10,911,950	4,593,659	6,318,292	4,607,418	4.5778	21,091,839	10,866,625	218,856	10,647,769	7,764,555	2.8416	22,063,760	0	0	1.0000	0	16,966,060	12,371,974	43,155,600
2062	10,911,950	4,593,659	6,318,292	4,607,418	4.7509	21,889,383	10,866,625	218,856	10,647,769	7,764,555	2.9150	22,633,679	0	0	1.0000	0	16,966,060	12,371,974	44,523,062
2063	14,505,870	4,593,659	9,912,211	7,228,173	4.9305	35,638,506	21,648,384	218,856	21,429,528	15,626,819	2.9902	46,727,315	0	0	1.0000	0	31,341,740	22,854,992	82,365,821
2064	10,937,361	4,593,659	6,343,702	4,625,948	5.1168	23,670,051	10,882,944	218,856	10,664,088	7,776,456	3.0673	23,852,723	0	0	1.0000	0	17,007,790	12,402,404	47,522,774
2065	10,911,950	4,593,659	6,318,292	4,607,418	5.3103	24,466,773	10,866,625	218,856	10,647,769	7,764,555	3.1465	24,431,173	0	0	1.0000	0	16,966,060	12,371,974	48,897,946
2066	11,630,734	4,593,659	7,037,076	5,131,569	5.5110	28,280,078	13,022,977	218,856	12,804,121	9,337,008	3.2276	30,136,127	0	0	1.0000	0	19,841,196	14,468,577	58,416,205
2067	10,911,950	4,593,659	6,318,292	4,607,418	5.7193	26,351,207	10,866,625	218,856	10,647,769	7,764,555	3.3109	25,707,666	0	0	1.0000	0	16,966,060	12,371,974	52,058,873
2068	21,000,336	4,593,659	16,406,678	11,964,061	5.9355	71,012,684	41,071,871	218,856	40,853,015	29,790,795	3.3963	101,178,477	0	0	1.0000	0	57,259,693	41,754,856	172,191,161
2069	10,911,950	4,593,659	6,318,292	4,607,418	6.1598	28,380,775	10,866,625	218,856	10,647,769	7,764,555	3.4840	27,051,711	0	0	1.0000	0	16,966,060	12,371,974	55,432,486
2070	10,911,950	4,593,659	6,318,292	4,607,418	6.3927	29,453,843	10,866,625	218,856	10,647,769	7,764,555	3.5738	27,748,968	0	0	1.0000	0	16,966,060	12,371,974	57,202,810
2071	10,911,950	4,593,659	6,318,292	4,607,418	6.6343	30,566,995	10,866,625	218,856	10,647,769	7,764,555	3.6660	28,464,860	0	0	1.0000	0	16,966,060	12,371,974	59,031,855
2072	10,937,361	4,593,659	6,343,702	4,625,948	6.8851	31,850,115	10,882,944	218,856	10,664,088	7,776,456	3.7606	29,244,140	0	0	1.0000	0	17,007,790	12,402,404	61,094,255
2073	10,911,950	4,593,659	6,318,292	4,607,418	7.1454	32,921,846	10,866,625	218,856	10,647,769	7,764,555	3.8576	29,952,549	0	0	1.0000	0	16,966,060	12,371,974	62,874,395
2074	10,911,950	4,593,659	6,318,292	4,607,418	7.4155	34,166,310	10,866,625	218,856	10,647,769	7,764,555	3.9572	30,725,898	0	0	1.0000	0	16,966,060	12,371,974	64,892,208
2075	10,911,950	4,593,659	6,318,292	4,607,418	7.6958	35,457,769	10,866,625	218,856	10,647,769	7,764,555	4.0593	31,518,659	0	0	1.0000	0	16,966,060	12,371,974	66,976,429
2076	10,937,361	4,593,659	6,343,702	4,625,948	7.9867	36,946,059	10,882,944	218,856	10,664,088	7,776,456	4.1640	32,381,162	0	0	1.0000	0	17,007,790	12,402,404	69,327,221
2077	10,911,950	4,593,659	6,318,292	4,607,418	8.2886	38,189,047	10,866,625	218,856	10,647,769	7,764,555	4.2714	33,165,522	0	0	1.0000	0	16,966,060	12,371,974	71,354,568
2078	10,911,950	4,593,659	6,318,292	4,607,418	8.6019	39,632,551	10,866,625	218,856	10,647,769	7,764,555	4.3816	34,021,176	0	0	1.0000	0	16,966,060	12,371,974	73,653,727
2079	10,911,950	4,593,659	6,318,292	4,607,418	8.9270	41,130,423	10,866,625	218,856	10,647,769	7,764,555	4.4947	34,899,347	0	0	1.0000	0	16,966,060	12,371,974	76,029,769
2080	10,937,361	4,593,659	6,343,702	4,625,948	9.2645	42,857,096	10,882,944	218,856	10,664,088	7,776,456	4.6106	35,854,127	0	0	1.0000	0	17,007,790	12,402,404	78,711,223
2081	10,911,950	4,593,659	6,318,292	4,607,418	9.6147	44,298,944	10,866,625	218,856	10,647,769	7,764,555	4.7296	36,723,241	0	0	1.0000	0	16,966,060	12,371,974	81,022,185
2082	10,911,950	4,593,659	6,318,292	4,607,418	9.9781	45,973,280	10,866,625	218,856	10,647,769	7,764,555	4.8516	37,670,517	0	0	1.0000	0	16,966,060	12,371,974	83,643,797
2083	10,911,950	4,593,659	6,318,292	4,607,418	10.3553	47,711,198	10,866,625	218,856	10,647,769	7,764,555	4.9768	38,642,639	0	0	1.0000	0	16,966,060	12,371,974	86,353,837
2084	36,094,800	4,593,659	31,501,141	22,971,231	10.7467	246,864,924	86,355,261	218,856	86,136,405	62,812,303	5.1052	320,669,371	0	0	1.0000	0	117,637,546	85,783,534	567,534,295
2085	39,882,393	4,593,659	35,288,734	25,733,216	11.1529	286,999,979	16,091,897	218,856	15,873,041	11,574,923	5.2369	60,616,715	0	0	1.0000	0	51,161,775	37,308,139	347,616,694
2086	56,569,982	4,593,659	51,976,324	37,902,123	11.5745	438,698,121	45,607,342	218,856	45,388,486	33,098,146	5.3720	177,803,243	0	0	1.0000	0	97,364,810	71,000,269	616,501,363
2087	67,543,773	4,593,659	62,950,114	45,904,419	12.0120	551,403,887	127,337,925	218,856	127,119,069	92,697,640	5.5106	510,819,617	0	0	1.0000	0	190,069,184	138,602,060	1,062,223,504
2088	60,817,230	4,593,659	56,223,572	40,999,297	12.4661	511,101,332	48,607,470	218,856	48,388,614	35,285,897	5.6528	199,464,117	0	0	1.0000	0	104,612,186	76,285,193	710,565,449
2089	58,571,147	4,593,659	53,977,489	39,361,410	12.9373	509,230,372	43,998,850	218,856	43,779,994	31,925,203	5.7986	185,121,484	0	0	1.0000	0	97,757,482	71,286,613	694,351,856
2090	35,101,278	4,593,659	30,507,619	22,246,736	13.4263	298,691,346	15,445,245	218,856	15,226,389	11,103,372	5.9482	66,045,078	0	0	1.0000	0	45,734,008	33,350,108	364,736,424
2091	24,491,563	4,593,659	19,897,904	14,509,930	13.9338	202,178,461	22,456,350	218,856	22,237,494	16,216,003	6.1017	98,945,188	0	0	1.0000	0	42,135,399	30,725,933	301,123,649
2092	16,194,380	4,593,659	11,600,721	8,459,466	14.4605	122,328,113	15,879,899	218,856	15,661,043	11,420,330	6.2591	71,480,986	0	0	1.0000	0	27,261,764	19,879,796	193,809,099
2093	10,192,280	4,593,659	5,598,622	4,082,621	15.0071	61,268,306	11,183,049	218,856	10,964,193	7,995,298	6.4206	51,334,612	0	0	1.0000	0	16,562,815	12,077,919	112,602,917
2094	9,112,430	4,593,659	4,518,772	3,295,174	15.5744	51,320,360	7,943,499	218,856	7,724,643	5,632,957	6.5863	37,100,343	0	0	1.0000	0	12,243,415	8,928,131	88,420,703
2095	10,070,451	4,593,659	5,476,793	3,993,781	16.1631	64,551,886	19,129,025	218,856	18,910,169	13,789,655	6.7562	93,165,666	0	0	1.0000	0	24,386,962	17,783,436	157,717,552
2096	10,392,243	4,593,659	5,798,585	4,228,438	16.7741	70,928,243	11,729,805	218,856	11,510,949	8,394,003	6.9305	58,174,635	0	0	1.0000	0	17,309,533	12,622,441	129,102,878
2097	7,295,625	4,593,659	2,701,966	1,970,325	17.4081	34,299,614	2,493,083	218,856	2,274,227	1,658,409	7.1093	11,790,130	0	0	1.0000	0	4,976,193	3,628,734	46,089,744
2098	7,295,625	4,593,659	2,701,966	1,970,325	18.0662	35,596,285	2,493,083	218,856	2,274,227	1,658,409	7.2927	12,094,282	0	0	1.0000	0	4,976,193	3,628,734	47,690,567
2099	7,295,625	4,593,659	2,701,966	1,970,325	18.7491	36,941,820	2,493,083	218,856	2,274,227	1,658,409	7.4809	12,406,395	0	0	1.0000	0	4,976,193	3,628,734	49,348,215
2100	7,295,625	4,593,659	2,701,966	1,970,325	19.4578	38,338,190	2,493,083	218,856	2,274,227	1,658,409	7.6739	12,726,468	0	0	1.0000	0	4,976,193	3,628,734	51,064,657

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	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2101	7,295,625	4,593,659	2,701,966	1,970,325	20.1933	39,787,364	2,493,083	218,856	2,274,227	1,658,409	7.8719	13,054,833	0	0	1.0000	0	4,976,193	3,628,734	52,842,196
2102	7,295,625	4,593,659	2,701,966	1,970,325	20.9566	41,291,313	2,493,083	218,856	2,274,227	1,658,409	8.0750	13,391,656	0	0	1.0000	0	4,976,193	3,628,734	54,682,968
2103	7,295,625	4,593,659	2,701,966	1,970,325	21.7488	42,852,204	2,493,083	218,856	2,274,227	1,658,409	8.2833	13,737,102	0	0	1.0000	0	4,976,193	3,628,734	56,589,307
2104	7,315,613	4,593,659	2,721,954	1,984,901	22.5709	44,800,994	2,499,913	218,856	2,281,057	1,663,390	8.4970	14,133,827	0	0	1.0000	0	5,003,011	3,648,291	58,934,820
2105	7,295,625	4,593,659	2,701,966	1,970,325	23.4240	46,152,893	2,493,083	218,856	2,274,227	1,658,409	8.7162	14,455,028	0	0	1.0000	0	4,976,193	3,628,734	60,607,920
2106	7,295,625	4,593,659	2,701,966	1,970,325	24.3095	47,897,615	2,493,083	218,856	2,274,227	1,658,409	8.9411	14,828,004	0	0	1.0000	0	4,976,193	3,628,734	62,725,619
2107	7,295,625	4,593,659	2,701,966	1,970,325	25.2284	49,708,147	2,493,083	218,856	2,274,227	1,658,409	9.1718	15,210,599	0	0	1.0000	0	4,976,193	3,628,734	64,918,746
2108	14,503,452	4,593,659	9,909,794	7,226,410	26.1820	189,201,865	24,063,432	218,856	23,844,576	17,387,918	9.4084	163,592,489	0	0	1.0000	0	33,754,370	24,614,328	352,794,353
2109	7,295,625	4,593,659	2,701,966	1,970,325	27.1717	53,537,080	2,493,083	218,856	2,274,227	1,658,409	9.6512	16,005,641	0	0	1.0000	0	4,976,193	3,628,734	69,542,720
2110	7,295,625	4,593,659	2,701,966	1,970,325	28.1988	55,560,800	2,493,083	218,856	2,274,227	1,658,409	9.9002	16,418,585	0	0	1.0000	0	4,976,193	3,628,734	71,979,385
2111	7,295,625	4,593,659	2,701,966	1,970,325	29.2647	57,660,970	2,493,083	218,856	2,274,227	1,658,409	10.1556	16,842,142	0	0	1.0000	0	4,976,193	3,628,734	74,503,112
2112	7,315,613	4,593,659	2,721,954	1,984,901	30.3709	60,283,218	2,499,913	218,856	2,281,057	1,663,390	10.4176	17,328,534	0	0	1.0000	0	5,003,011	3,648,291	77,611,752
2113	10,889,545	4,593,659	6,295,886	4,591,080	31.5189	144,705,780	13,274,842	218,856	13,055,986	9,520,673	10.6864	101,741,723	0	0	1.0000	0	19,351,872	14,111,753	246,447,503
2114	7,295,625	4,593,659	2,701,966	1,970,325	32.7103	64,449,922	2,493,083	218,856	2,274,227	1,658,409	10.9621	18,179,649	0	0	1.0000	0	4,976,193	3,628,734	82,629,571
2115	7,295,625	4,593,659	2,701,966	1,970,325	33.9468	66,886,228	2,493,083	218,856	2,274,227	1,658,409	11.2449	18,648,648	0	0	1.0000	0	4,976,193	3,628,734	85,534,876
2116	8,034,397	4,593,659	3,440,738	2,509,052	35.2299	88,393,635	4,656,265	218,856	4,437,409	3,235,843	11.5350	37,325,449	0	0	1.0000	0	7,878,147	5,744,895	125,719,084
2117	7,295,625	4,593,659	2,701,966	1,970,325	36.5616	72,038,234	2,493,083	218,856	2,274,227	1,658,409	11.8326	19,623,295	0	0	1.0000	0	4,976,193	3,628,734	91,661,529
2118	17,877,538	4,593,659	13,283,879	9,686,857	37.9437	367,555,199	34,238,822	218,856	34,019,966	24,808,006	12.1379	301,117,092	0	0	1.0000	0	47,303,845	34,494,863	668,672,291
2119	7,918,350	4,593,659	3,324,691	2,424,428	39.3779	95,468,879	4,361,258	218,856	4,142,402	3,020,718	12.4511	37,611,263	0	0	1.0000	0	7,467,093	5,445,146	133,080,142
2120	7,834,550	4,593,659	3,240,892	2,363,320	40.8664	96,580,369	4,056,726	218,856	3,837,870	2,798,647	12.7723	35,745,165	0	0	1.0000	0	7,078,761	5,161,967	132,325,534
2121	7,814,562	4,593,659	3,220,904	2,348,744	42.4112	99,613,055	4,049,895	218,856	3,831,039	2,793,667	13.1018	36,602,061	0	0	1.0000	0	7,051,943	5,142,411	136,215,116
2122	7,814,562	4,593,659	3,220,904	2,348,744	44.0143	103,378,326	4,049,895	218,856	3,831,039	2,793,667	13.4399	37,546,600	0	0	1.0000	0	7,051,943	5,142,411	140,924,926
2123	7,918,350	4,593,659	3,324,691	2,424,428	45.6781	110,743,260	4,361,258	218,856	4,142,402	3,020,718	13.7866	41,645,432	0	0	1.0000	0	7,467,093	5,445,146	152,388,692
2124	7,834,550	4,593,659	3,240,892	2,363,320	47.4047	112,032,462	4,056,726	218,856	3,837,870	2,798,647	14.1423	39,579,312	0	0	1.0000	0	7,078,761	5,161,967	151,611,774
2125	7,814,562	4,593,659	3,220,904	2,348,744	49.1966	115,550,223	4,049,895	218,856	3,831,039	2,793,667	14.5072	40,528,281	0	0	1.0000	0	7,051,943	5,142,411	156,078,503
2126	7,814,562	4,593,659	3,220,904	2,348,744	51.0562	119,917,947	4,049,895	218,856	3,831,039	2,793,667	14.8815	41,573,950	0	0	1.0000	0	7,051,943	5,142,411	161,491,897
2127	7,918,350	4,593,659	3,324,691	2,424,428	52.9861	128,460,979	4,361,258	218,856	4,142,402	3,020,718	15.2654	46,112,470	0	0	1.0000	0	7,467,093	5,445,146	174,573,449
2128	8,554,036	4,593,659	3,960,378	2,887,983	54.9890	158,807,272	6,215,184	218,856	5,996,328	4,372,636	15.6593	68,472,418	0	0	1.0000	0	9,956,705	7,260,619	227,279,691
2129	7,814,562	4,593,659	3,220,904	2,348,744	57.0676	134,037,187	4,049,895	218,856	3,831,039	2,793,667	16.0633	44,875,505	0	0	1.0000	0	7,051,943	5,142,411	178,912,693
2130	7,450,719	4,593,659	2,857,060	2,083,422	59.2248	123,390,272	9,422,288	218,856	9,203,432	6,711,318	16.4777	110,587,078	0	0	1.0000	0	12,060,492	8,794,740	233,977,350
2131	1,940,943	4,593,659	(2,652,716)	(1,934,411)	61.4635	(118,895,647)	5,236,109	218,856	5,017,253	3,658,676	16.9028	61,841,866	0	0	1.0000	0	2,364,537	1,724,265	(57,053,781)
	$1,455,979,838	$431,803,911	$1,024,175,927	$746,848,545		$7,770,061,866	$1,432,451,597	$20,572,464	$1,411,879,133	$1,029,569,090		$4,852,223,834	$0	$0		$0	$2,436,055,060	$1,776,417,635	$12,622,285,701

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	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 1																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2033	$19,544,542	$0	$19,544,542	$14,252,251	1.6199	$23,087,222	$4,605,809	$0	$4,605,809	$3,358,644	1.3926	$4,677,247	$1,250,000	$911,524	1.0000	$911,524	$25,400,351	$18,522,419	$28,675,993
2034	48,889,567	-	48,889,567	35,651,201	1.6811	59,933,234	31,903,703	-	31,903,703	23,264,786	1.4285	33,233,747	1,250,000	911,524	1.0000	911,524	82,043,270	59,827,511	94,078,505
2035	15,648,396	-	15,648,396	11,411,108	1.7446	19,907,819	18,630,107	-	18,630,107	13,585,428	1.4653	19,906,728	1,250,000	911,524	1.0000	911,524	35,528,504	25,908,060	40,726,070
2036	11,693,506	-	11,693,506	8,527,127	1.8106	15,439,216	16,992,077	-	16,992,077	12,390,945	1.5032	18,626,069	1,250,000	911,524	1.0000	911,524	29,935,583	21,829,596	34,976,809
2037	16,619,039	-	16,619,039	12,118,919	1.8790	22,771,449	31,814,682	-	31,814,682	23,199,870	1.5419	35,771,880	1,250,000	911,524	1.0000	911,524	49,683,721	36,230,313	59,454,853
2038	23,865,956	-	23,865,956	17,403,509	1.9501	33,938,583	55,065,305	-	55,065,305	40,154,666	1.5817	63,512,636	1,250,000	911,524	1.0000	911,524	80,181,261	58,469,699	98,362,742
2039	4,978,647	-	4,978,647	3,630,524	2.0238	7,347,454	5,504,477	-	5,504,477	4,013,969	1.6225	6,512,665	1,250,000	911,524	1.0000	911,524	11,733,124	8,556,017	14,771,643
2040	4,992,286	-	4,992,286	3,640,470	2.1003	7,646,079	5,522,983	-	5,522,983	4,027,464	1.6644	6,703,312	1,250,000	911,524	1.0000	911,524	11,765,270	8,579,458	15,260,915
2041	4,978,647	2,315,817	2,662,829	1,941,786	2.1797	4,232,510	5,504,477	109,428	5,395,049	3,934,172	1.7073	6,716,813	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	11,860,847
2042	4,978,647	2,315,817	2,662,829	1,941,786	2.2620	4,392,319	5,504,477	109,428	5,395,049	3,934,172	1.7514	6,890,310	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	12,194,153
2043	4,978,647	2,315,817	2,662,829	1,941,786	2.3475	4,558,342	5,504,477	109,428	5,395,049	3,934,172	1.7966	7,068,134	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	12,538,000
2044	4,992,286	2,315,817	2,676,469	1,951,732	2.4363	4,755,004	5,522,983	109,428	5,413,555	3,947,667	1.8429	7,275,156	1,250,000	911,524	1.0000	911,524	9,340,024	6,810,923	12,941,684
2045	6,492,785	2,315,817	4,176,967	3,045,924	2.5284	7,701,314	10,046,890	109,428	9,937,462	7,246,586	1.8905	13,699,672	1,250,000	911,524	1.0000	911,524	15,364,430	11,204,034	22,312,509
2046	5,988,072	2,315,817	3,672,254	2,677,878	2.6239	7,026,483	8,532,752	109,428	8,423,324	6,142,448	1.9392	11,911,436	1,250,000	911,524	1.0000	911,524	13,345,579	9,731,850	19,849,443
2047	5,988,072	2,315,817	3,672,254	2,677,878	2.7231	7,292,129	8,532,752	109,428	8,423,324	6,142,448	1.9893	12,219,172	1,250,000	911,524	1.0000	911,524	13,345,579	9,731,850	20,422,825
2048	4,992,286	2,315,817	2,676,469	1,951,732	2.8261	5,515,790	5,522,983	109,428	5,413,555	3,947,667	2.0406	8,055,610	1,250,000	911,524	1.0000	911,524	9,340,024	6,810,923	14,482,923
2049	5,988,072	2,315,817	3,672,254	2,677,878	2.9329	7,853,948	8,532,752	109,428	8,423,324	6,142,448	2.0932	12,857,373	1,250,000	911,524	1.0000	911,524	13,345,579	9,731,850	21,622,844
2050	6,492,785	2,315,817	4,176,967	3,045,924	3.0438	9,271,183	10,046,890	109,428	9,937,462	7,246,586	2.1472	15,559,870	1,250,000	911,524	1.0000	911,524	15,364,430	11,204,034	25,742,577
2051	6,438,009	2,315,817	4,122,192	3,005,981	3.1588	9,495,292	9,882,565	109,428	9,773,137	7,126,757	2.2026	15,697,395	1,250,000	911,524	1.0000	911,524	15,145,329	11,044,262	26,104,211
2052	6,506,424	2,315,817	4,190,607	3,055,870	3.2782	10,017,753	10,065,396	109,428	9,955,968	7,260,081	2.2595	16,404,154	1,250,000	911,524	1.0000	911,524	15,396,575	11,227,475	27,333,431
2053	4,978,647	2,315,817	2,662,829	1,941,786	3.4021	6,606,149	5,504,477	109,428	5,395,049	3,934,172	2.3178	9,118,625	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	16,636,298
2054	4,978,647	2,315,817	2,662,829	1,941,786	3.5307	6,855,863	5,504,477	109,428	5,395,049	3,934,172	2.3776	9,353,888	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	17,121,275
2055	6,492,785	2,315,817	4,176,967	3,045,924	3.6642	11,160,874	10,046,890	109,428	9,937,462	7,246,586	2.4389	17,673,700	1,250,000	911,524	1.0000	911,524	15,364,430	11,204,034	29,746,097
2056	6,001,712	2,315,817	3,685,894	2,687,824	3.8027	10,220,988	8,551,259	109,428	8,441,831	6,155,943	2.5018	15,400,939	1,250,000	911,524	1.0000	911,524	13,377,725	9,755,291	26,533,451
2057	5,988,072	2,315,817	3,672,254	2,677,878	3.9464	10,567,977	8,532,752	109,428	8,423,324	6,142,448	2.5664	15,763,979	1,250,000	911,524	1.0000	911,524	13,345,579	9,731,850	27,243,480
2058	4,978,647	2,315,817	2,662,829	1,941,786	4.0956	7,952,777	5,504,477	109,428	5,395,049	3,934,172	2.6326	10,357,102	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	19,221,403
2059	5,933,297	2,315,817	3,617,479	2,637,935	4.2504	11,212,278	8,368,427	109,428	8,258,999	6,022,619	2.7005	16,264,083	1,250,000	911,524	1.0000	911,524	13,126,478	9,572,077	28,387,884
2060	6,001,712	2,315,817	3,685,894	2,687,824	4.4111	11,856,260	8,551,259	109,428	8,441,831	6,155,943	2.7702	17,053,194	1,250,000	911,524	1.0000	911,524	13,377,725	9,755,291	29,820,978
2061	5,988,072	2,315,817	3,672,254	2,677,878	4.5778	12,258,789	8,532,752	109,428	8,423,324	6,142,448	2.8416	17,454,381	1,250,000	911,524	1.0000	911,524	13,345,579	9,731,850	30,624,693
2062	4,978,647	2,315,817	2,662,829	1,941,786	4.7509	9,225,229	5,504,477	109,428	5,395,049	3,934,172	2.9150	11,468,113	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	21,604,866
2063	8,006,922	2,315,817	5,691,105	4,150,062	4.9305	20,461,880	14,589,304	109,428	14,479,876	10,559,001	2.9902	31,573,524	1,250,000	911,524	1.0000	911,524	21,420,981	15,620,587	52,946,928
2064	6,956,362	2,315,817	4,640,544	3,383,973	5.1168	17,315,113	11,415,209	109,428	11,305,781	8,244,390	3.0673	25,288,018	1,250,000	911,524	1.0000	911,524	17,196,325	12,539,887	43,514,655
2065	5,988,072	2,315,817	3,672,254	2,677,878	5.3103	14,220,334	8,532,752	109,428	8,423,324	6,142,448	3.1465	19,327,213	1,250,000	911,524	1.0000	911,524	13,345,579	9,731,850	34,459,071
2066	4,978,647	2,315,817	2,662,829	1,941,786	5.5110	10,701,181	5,504,477	109,428	5,395,049	3,934,172	3.2276	12,697,935	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	24,310,639
2067	4,978,647	2,315,817	2,662,829	1,941,786	5.7193	11,105,655	5,504,477	109,428	5,395,049	3,934,172	3.3109	13,025,652	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	25,042,830
2068	7,011,137	2,315,817	4,695,319	3,423,916	5.9355	20,322,654	11,579,534	109,428	11,470,106	8,364,220	3.3963	28,407,399	1,250,000	911,524	1.0000	911,524	17,415,426	12,699,659	49,641,577
2069	6,492,785	2,315,817	4,176,967	3,045,924	6.1598	18,762,281	10,046,890	109,428	9,937,462	7,246,586	3.4840	25,247,107	1,250,000	911,524	1.0000	911,524	15,364,430	11,204,034	44,920,912
2070	4,978,647	2,315,817	2,662,829	1,941,786	6.3927	12,413,253	5,504,477	109,428	5,395,049	3,934,172	3.5738	14,059,945	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	27,384,722
2071	4,978,647	2,315,817	2,662,829	1,941,786	6.6343	12,882,389	5,504,477	109,428	5,395,049	3,934,172	3.6660	14,422,676	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	28,216,588
2072	7,461,074	2,315,817	5,145,257	3,752,019	6.8851	25,833,027	12,929,347	109,428	12,819,919	9,348,528	3.7606	35,156,076	1,250,000	911,524	1.0000	911,524	19,215,176	14,012,071	61,900,626
2073	4,978,647	2,315,817	2,662,829	1,941,786	7.1454	13,874,835	5,504,477	109,428	5,395,049	3,934,172	3.8576	15,176,464	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	29,962,823
2074	4,978,647	2,315,817	2,662,829	1,941,786	7.4155	14,399,312	5,504,477	109,428	5,395,049	3,934,172	3.9572	15,568,307	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	30,879,142
2075	7,861,953	2,315,817	5,546,135	4,044,347	7.6958	31,124,488	14,154,395	109,428	14,044,967	10,241,857	4.0593	41,574,770	1,250,000	911,524	1.0000	911,524	20,841,103	15,197,728	73,610,782
2076	4,992,286	2,315,817	2,676,469	1,951,732	7.9867	15,587,897	5,522,983	109,428	5,413,555	3,947,667	4.1640	16,438,087	1,250,000	911,524	1.0000	911,524	9,340,024	6,810,923	32,937,508
2077	4,978,647	2,315,817	2,662,829	1,941,786	8.2886	16,094,685	5,504,477	109,428	5,395,049	3,934,172	4.2714	16,804,424	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	33,810,632
2078	7,502,210	2,315,817	5,186,392	3,782,016	8.6019	32,532,522	13,075,166	109,428	12,965,738	9,454,863	4.3816	41,427,426	1,250,000	911,524	1.0000	911,524	19,402,131	14,148,402	74,871,473
2079	4,978,647	2,315,817	2,662,829	1,941,786	8.9270	17,334,321	5,504,477	109,428	5,395,049	3,934,172	4.4947	17,682,925	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	35,928,769
2080	4,992,286	2,315,817	2,676,469	1,951,732	9.2645	18,081,820	5,522,983	109,428	5,413,555	3,947,667	4.6106	18,201,115	1,250,000	911,524	1.0000	911,524	9,340,024	6,810,923	37,194,459
2081	4,978,647	2,315,817	2,662,829	1,941,786	9.6147	18,669,687	5,504,477	109,428	5,395,049	3,934,172	4.7296	18,607,062	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	38,188,272
2082	7,392,660	2,315,817	5,076,842	3,702,130	9.9781	36,940,221	12,746,515	109,428	12,637,087	9,215,204	4.8516	44,708,485	1,250,000	911,524	1.0000	911,524	18,963,930	13,828,858	82,560,229
2083	4,978,647	2,315,817	2,662,829	1,941,786	10.3553	20,107,773	5,504,477	109,428	5,395,049	3,934,172	4.9768	19,579,589	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	40,598,886
2084	4,992,286	2,315,817	2,676,469	1,951,732	10.7467	20,974,677	5,522,983	109,428	5,413,555	3,947,667	5.1052	20,153,632	1,250,000	911,524	1.0000	911,524	9,340,024	6,810,923	42,039,833
2085	4,978,647	2,315,817	2,662,829	1,941,786	11.1529	21,656,541	5,504,477	109,428	5,395,049	3,934,172	5.2369	20,602,868	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	43,170,933
2086	4,978,647	2,315,817	2,662,829	1,941,786	11.5745	22,475,198	5,504,477	109,428	5,395,049	3,934,172	5.3720	21,134,374	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	44,521,096
2087	27,646,324	2,315,817	25,330,507	18,471,487	12.0120	221,879,500	10,620,674	109,428	10,511,246	7,665,000	5.5106	42,238,751	1,250,000	911,524	1.0000	911,524	37,091,753	27,048,011	265,029,775
2088	64,790,288	2,315,817	62,474,470	45,557,571	12.4661	567,925,234	65,908,383	109,428	65,798,955	47,981,848	5.6528	271,231,793	1,250,000	911,524	1.0000	911,524	129,523,426	94,450,943	840,068,551
2089	57,854,410	2,315,817	55,538,593	40,499,797	12.9373	523,958,025	68,191,688	109,428	68,082,260	49,646,877	5.7986	287,882,383	1,250,000	911,524	1.0000	911,524	124,870,853	91,058,198	812,751,932
2090	43,227,498	2,315,817	40,911,680	29,833,575	13.4263	400,554,523	46,723,087	109,428	46,613,659	33,991,566	5.9482	202,188,632	1,250,000	911,524	1.0000	911,524	88,775,339	64,736,664	603,654,678
2091	37,320,475	2,315,817	35,004,658	25,526,062	13.9338	355,675,038	38,053,076	109,428	37,943,648	27,669,229	6.1017	168,829,334	1,250,000	911,524	1.0000	911,524	74,198,306	54,106,814	525,415,896
2092	7,957,364	2,315,817	5,641,547	4,113,923	14.4605	59,489,384	7,306,567	109,428	7,197,139	5,248,290	6.2591	32,849,574	1,250,000	911,524	1.0000	911,524	14,088,685	10,273,737	93,250,482
2093	21,014,040	2,315,817	18,698,222	13,635,099	15.0071	204,623,292	9,192,084	109,428	9,082,656	6,623,246	6.4206	42,525,211	1,250,000	911,524	1.0000	911,524	29,030,879	21,169,868	248,060,027
2094	16,104,455	2,315,817	13,788,637	10,054,936	15.5744	156,599,599	13,147,246	109,428	13,037,818	9,507,425	6.5863	62,618,751	1,250,000	911,524	1.0000	911,524	28,076,455	20,473,885	220,129,874
2095	14,254,504	2,315,817	11,938,687	8,705,917	16.1631	140,714,608	14,886,409	109,428	14,776,981	10,775,655	6.7562	72,802,483	1,250,000	911,524	1.0000	911,524	27,965,668	20,393,096	214,428,614
2096	5,004,965	2,315,817	2,689,147	1,960,977	16.7741	32,893,629	6,169,510	109,428	6,060,082	4,419,127	6.9305	30,626,759	1,250,000	911,524	1.0000	911,524	9,999,229	7,291,628	64,431,911
2097	4,839,226	2,315,817	2,523,408	1,840,117	17.4081	32,032,945	5,693,045	109,428	5,583,617	4,071,680	7.1093	28,946,794	1,250,000	911,524	1.0000	911,524	9,357,026	6,823,321	61,891,263
2098	4,034,318	2,315,817	1,718,500	1,253,163	18.0662	22,639,893	3,278,321	109,428	3,168,893	2,310,817	7.2927	16,852,095	1,250,000	911,524	1.0000	911,524	6,137,393	4,475,504	40,403,512
2099	4,839,226	2,315,817	2,523,408	1,840,117	18.7491	34,500,543	5,693,045	109,428	5,583,617	4,071,680	7.4809	30,459,830	1,250,000	911,524	1.0000	911,524	9,357,026	6,823,321	65,871,897
2100	5,293,574	2,315,817	2,977,756	2,171,436	19.4578	42,251,374	7,056,089	109,428	6,946,661	5,065,637	7.6739	38,873,192	1,250,000	911,524	1.0000	911,524	11,174,417	8,148,597	82,036,090
2101	5,449,255	2,315,817	3,133,437	2,284,962	20.1933	46,140,924	7,523,133	109,428	7,413,705	5,406,214	7.8719	42,557,178	1,250,000	911,524	1.0000	911,524	11,797,142	8,602,700	89,609,626
2102	5,449,255	2,315,817	3,133,437	2,284,962	20.9566	47,885,036	7,523,133	109,428	7,413,705	5,406,214	8.0750	43,655,180	1,250,000	911,524	1.0000	911,524	11,797,142	8,602,700	92,451,740
2103	3,826,743	2,315,817	1,510,925	1,101,795	21.7488	23,962,726	2,655,596	109,428	2,546,168	1,856,714	8.2833	15,379,720	1,250,000	911,524	1.0000	911,524	5,307,093	3,870,033	40,253,970

Xcel Energy
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	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2104	3,888,694	2,315,817	1,572,877	1,146,972	22.5709	25,888,179	2,820,698	109,428	2,711,270	1,977,110	8.4970	16,799,500	1,250,000	911,524	1.0000	911,524	5,534,147	4,035,605	43,599,203
2105	5,397,361	2,315,817	3,081,544	2,247,120	23.4240	52,636,542	7,367,451	109,428	7,258,023	5,292,689	8.7162	46,132,132	1,250,000	911,524	1.0000	911,524	11,589,567	8,451,332	99,680,198
2106	4,839,226	2,315,817	2,523,408	1,840,117	24.3095	44,732,331	5,693,045	109,428	5,583,617	4,071,680	8.9411	36,405,297	1,250,000	911,524	1.0000	911,524	9,357,026	6,823,321	82,049,152
2107	4,891,119	2,315,817	2,575,302	1,877,959	25.2284	47,377,905	5,848,727	109,428	5,739,299	4,185,206	9.1718	38,385,869	1,250,000	911,524	1.0000	911,524	9,564,601	6,974,689	86,675,298
2108	3,888,694	2,315,817	1,572,877	1,146,972	26.1820	30,030,008	2,820,698	109,428	2,711,270	1,977,110	9.4084	18,601,438	1,250,000	911,524	1.0000	911,524	5,534,147	4,035,605	49,542,970
2109	4,839,226	2,315,817	2,523,408	1,840,117	27.1717	49,999,114	5,693,045	109,428	5,583,617	4,071,680	9.6512	39,296,597	1,250,000	911,524	1.0000	911,524	9,357,026	6,823,321	90,207,235
2110	4,891,119	2,315,817	2,575,302	1,877,959	28.1988	52,956,195	5,848,727	109,428	5,739,299	4,185,206	9.9002	41,434,373	1,250,000	911,524	1.0000	911,524	9,564,601	6,974,689	95,302,092
2111	4,891,119	2,315,817	2,575,302	1,877,959	29.2647	54,957,912	5,848,727	109,428	5,739,299	4,185,206	10.1556	42,503,275	1,250,000	911,524	1.0000	911,524	9,564,601	6,974,689	98,372,710
2112	3,888,694	2,315,817	1,572,877	1,146,972	30.3709	34,834,557	2,820,698	109,428	2,711,270	1,977,110	10.4176	20,596,737	1,250,000	911,524	1.0000	911,524	5,534,147	4,035,605	56,342,818
2113	6,916,086	2,315,817	4,600,268	3,354,603	31.5189	105,733,397	11,923,625	109,428	11,814,197	8,615,137	10.6864	92,064,802	1,250,000	911,524	1.0000	911,524	17,664,466	12,881,264	198,709,724
2114	5,903,603	2,315,817	3,587,785	2,616,281	32.7103	85,579,340	8,886,176	109,428	8,776,748	6,400,171	10.9621	70,159,319	1,250,000	911,524	1.0000	911,524	13,614,533	9,927,976	156,650,183
2115	5,250,862	2,315,817	2,935,045	2,140,291	33.9468	72,656,017	6,927,956	109,428	6,818,528	4,972,200	11.2449	55,911,891	1,250,000	911,524	1.0000	911,524	11,003,573	8,024,014	129,479,431
2116	3,888,694	2,315,817	1,572,877	1,146,972	35.2299	40,407,692	2,820,698	109,428	2,711,270	1,977,110	11.5350	22,805,959	1,250,000	911,524	1.0000	911,524	5,534,147	4,035,605	64,125,175
2117	3,852,646	2,315,817	1,536,828	1,120,684	36.5616	40,974,009	14,592,996	109,428	14,483,568	10,561,693	11.8326	124,972,286	1,250,000	911,524	1.0000	911,524	17,270,396	12,593,901	166,857,819
2118	1,123,816	2,315,817	(1,192,001)	(869,230)	37.9437	(32,981,808)	1,790,582	109,428	1,681,154	1,225,929	12.1379	14,880,210	1,250,000	911,524	1.0000	911,524	1,739,153	1,268,223	(17,190,074)
	$808,017,575	$180,633,760	$627,383,815	$457,500,198		$4,453,479,711	$940,856,518	$8,535,385	$932,321,133	$679,866,285		$3,121,539,805	$107,500,000	$78,391,043		$78,391,043	$1,667,204,948	$1,215,757,525	$7,653,410,559

Xcel Energy
Nuclear Decommissioning Accrual
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	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 2																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2034	$7,675,087	$0	$7,675,087	$5,596,819	1.6811	$9,408,813	$2,952,172	$0	$2,952,172	$2,152,780	1.4285	$3,075,246	$1,250,000	$911,524	1.0000	$911,524	$11,877,259	$8,661,123	$13,395,583
2035	47,507,649	-	47,507,649	34,643,480	1.7446	60,439,016	34,141,374	-	34,141,374	24,896,539	1.4653	36,480,898	1,250,000	911,524	1.0000	911,524	82,899,023	60,451,543	97,831,438
2036	27,599,665	-	27,599,665	20,126,200	1.8106	36,440,498	23,132,961	-	23,132,961	16,868,995	1.5032	25,357,473	1,250,000	911,524	1.0000	911,524	51,982,626	37,906,719	62,709,495
2037	21,434,928	-	21,434,928	15,630,757	1.8790	29,370,192	30,698,087	-	30,698,087	22,385,629	1.5419	34,516,401	1,250,000	911,524	1.0000	911,524	53,383,015	38,927,909	64,798,117
2038	27,847,219	-	27,847,219	20,306,721	1.9501	39,600,137	54,145,593	-	54,145,593	39,483,995	1.5817	62,451,836	1,250,000	911,524	1.0000	911,524	83,242,813	60,702,241	102,963,497
2039	5,034,556	-	5,034,556	3,671,294	2.0238	7,429,964	5,510,734	-	5,510,734	4,018,532	1.6225	6,520,068	1,250,000	911,524	1.0000	911,524	11,795,290	8,601,350	14,861,556
2040	5,048,349	-	5,048,349	3,681,352	2.1003	7,731,944	5,529,256	-	5,529,256	4,032,039	1.6644	6,710,925	1,250,000	911,524	1.0000	911,524	11,827,606	8,624,915	15,354,393
2041	5,034,556	-	5,034,556	3,671,294	2.1797	8,002,319	5,510,734	-	5,510,734	4,018,532	1.7073	6,860,840	1,250,000	911,524	1.0000	911,524	11,795,290	8,601,350	15,774,683
2042	5,034,556	2,315,818	2,718,738	1,982,555	2.2620	4,484,540	5,510,734	109,428	5,401,306	3,938,735	1.7514	6,898,301	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	12,294,365
2043	5,034,556	2,315,818	2,718,738	1,982,555	2.3475	4,654,049	5,510,734	109,428	5,401,306	3,938,735	1.7966	7,076,332	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	12,641,904
2044	5,048,349	2,315,818	2,732,532	1,992,614	2.4363	4,854,605	5,529,256	109,428	5,419,828	3,952,242	1.8429	7,283,586	1,250,000	911,524	1.0000	911,524	9,402,360	6,856,379	13,049,715
2045	6,548,694	2,315,818	4,232,876	3,086,693	2.5284	7,804,396	10,053,148	109,428	9,943,720	7,251,149	1.8905	13,708,298	1,250,000	911,524	1.0000	911,524	15,426,596	11,249,367	22,424,217
2046	6,043,981	2,315,818	3,728,163	2,718,647	2.6239	7,133,459	8,539,010	109,428	8,429,582	6,147,011	1.9392	11,920,284	1,250,000	911,524	1.0000	911,524	13,407,745	9,777,182	19,965,267
2047	6,043,981	2,315,818	3,728,163	2,718,647	2.7231	7,403,149	8,539,010	109,428	8,429,582	6,147,011	1.9893	12,228,249	1,250,000	911,524	1.0000	911,524	13,407,745	9,777,182	20,542,922
2048	5,048,349	2,315,818	2,732,532	1,992,614	2.8261	5,631,326	5,529,256	109,428	5,419,828	3,952,242	2.0406	8,064,945	1,250,000	911,524	1.0000	911,524	9,402,360	6,856,379	14,607,795
2049	6,043,981	2,315,818	3,728,163	2,718,647	2.9329	7,973,521	8,539,010	109,428	8,429,582	6,147,011	2.0932	12,866,924	1,250,000	911,524	1.0000	911,524	13,407,745	9,777,182	21,751,969
2050	6,548,694	2,315,818	4,232,876	3,086,693	3.0438	9,395,278	10,053,148	109,428	9,943,720	7,251,149	2.1472	15,569,668	1,250,000	911,524	1.0000	911,524	15,426,596	11,249,367	25,876,469
2051	6,493,919	2,315,818	4,178,101	3,046,750	3.1588	9,624,075	9,888,822	109,428	9,779,394	7,131,320	2.2026	15,707,446	1,250,000	911,524	1.0000	911,524	15,207,495	11,089,594	26,243,045
2052	6,562,487	2,315,818	4,246,669	3,096,752	3.2782	10,151,773	10,071,670	109,428	9,962,242	7,264,656	2.2595	16,414,490	1,250,000	911,524	1.0000	911,524	15,458,911	11,272,932	27,477,786
2053	5,034,556	2,315,818	2,718,738	1,982,555	3.4021	6,744,852	5,510,734	109,428	5,401,306	3,938,735	2.3178	9,129,200	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	16,785,576
2054	5,034,556	2,315,818	2,718,738	1,982,555	3.5307	6,999,808	5,510,734	109,428	5,401,306	3,938,735	2.3776	9,364,737	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	17,276,069
2055	6,548,694	2,315,818	4,232,876	3,086,693	3.6642	11,310,262	10,053,148	109,428	9,943,720	7,251,149	2.4389	17,684,828	1,250,000	911,524	1.0000	911,524	15,426,596	11,249,367	29,906,614
2056	6,057,775	2,315,818	3,741,957	2,728,706	3.8027	10,376,450	8,557,532	109,428	8,448,104	6,160,518	2.5018	15,412,383	1,250,000	911,524	1.0000	911,524	13,440,061	9,800,748	26,700,358
2057	6,043,981	2,315,818	3,728,163	2,718,647	3.9464	10,728,870	8,539,010	109,428	8,429,582	6,147,011	2.5664	15,775,690	1,250,000	911,524	1.0000	911,524	13,407,745	9,777,182	27,416,084
2058	5,034,556	2,315,818	2,718,738	1,982,555	4.0956	8,119,754	5,510,734	109,428	5,401,306	3,938,735	2.6326	10,369,114	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	19,400,392
2059	5,989,206	2,315,818	3,673,388	2,678,704	4.2504	11,385,565	8,374,684	109,428	8,265,256	6,027,182	2.7005	16,276,405	1,250,000	911,524	1.0000	911,524	13,188,644	9,617,410	28,573,494
2060	6,057,775	2,315,818	3,741,957	2,728,706	4.4111	12,036,595	8,557,532	109,428	8,448,104	6,160,518	2.7702	17,065,866	1,250,000	911,524	1.0000	911,524	13,440,061	9,800,748	30,013,985
2061	6,043,981	2,315,818	3,728,163	2,718,647	4.5778	12,445,424	8,539,010	109,428	8,429,582	6,147,011	2.8416	17,467,347	1,250,000	911,524	1.0000	911,524	13,407,745	9,777,182	30,824,295
2062	5,034,556	2,315,818	2,718,738	1,982,555	4.7509	9,418,922	5,510,734	109,428	5,401,306	3,938,735	2.9150	11,481,413	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	21,811,859
2063	8,062,832	2,315,818	5,747,014	4,190,832	4.9305	20,662,895	14,595,561	109,428	14,486,133	10,563,564	2.9902	31,587,168	1,250,000	911,524	1.0000	911,524	21,483,147	15,665,919	53,161,588
2064	7,012,425	2,315,818	4,696,607	3,424,855	5.1168	17,524,298	11,421,482	109,428	11,312,054	8,248,965	3.0673	25,302,050	1,250,000	911,524	1.0000	911,524	17,258,661	12,585,344	43,737,872
2065	6,043,981	2,315,818	3,728,163	2,718,647	5.3103	14,436,834	8,539,010	109,428	8,429,582	6,147,011	3.1465	19,341,571	1,250,000	911,524	1.0000	911,524	13,407,745	9,777,182	34,689,928
2066	5,034,556	2,315,818	2,718,738	1,982,555	5.5110	10,925,863	5,510,734	109,428	5,401,306	3,938,735	3.2276	12,712,662	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	24,550,048
2067	5,034,556	2,315,818	2,718,738	1,982,555	5.7193	11,338,829	5,510,734	109,428	5,401,306	3,938,735	3.3109	13,040,758	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	25,291,111
2068	7,067,200	2,315,818	4,751,382	3,464,798	5.9355	20,565,309	11,585,808	109,428	11,476,380	8,368,794	3.3963	28,422,935	1,250,000	911,524	1.0000	911,524	17,477,762	12,745,116	49,899,768
2069	6,548,694	2,315,818	4,232,876	3,086,693	6.1598	19,013,415	10,053,148	109,428	9,943,720	7,251,149	3.4840	25,263,004	1,250,000	911,524	1.0000	911,524	15,426,596	11,249,367	45,187,943
2070	5,034,556	2,315,818	2,718,738	1,982,555	6.3927	12,673,882	5,510,734	109,428	5,401,306	3,938,735	3.5738	14,076,252	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	27,661,657
2071	5,034,556	2,315,818	2,718,738	1,982,555	6.6343	13,152,867	5,510,734	109,428	5,401,306	3,938,735	3.6660	14,439,403	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	28,503,794
2072	7,517,137	2,315,818	5,201,320	3,792,901	6.8851	26,114,503	12,935,620	109,428	12,826,192	9,353,103	3.7606	35,173,279	1,250,000	911,524	1.0000	911,524	19,277,512	14,057,528	62,199,306
2073	5,034,556	2,315,818	2,718,738	1,982,555	7.1454	14,166,151	5,510,734	109,428	5,401,306	3,938,735	3.8576	15,194,065	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	30,271,740
2074	5,034,556	2,315,818	2,718,738	1,982,555	7.4155	14,701,639	5,510,734	109,428	5,401,306	3,938,735	3.9572	15,586,363	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	31,199,526
2075	7,917,862	2,315,818	5,602,044	4,085,117	7.6958	31,438,243	14,160,652	109,428	14,051,224	10,246,420	4.0593	41,593,292	1,250,000	911,524	1.0000	911,524	20,903,269	15,243,061	73,943,059
2076	5,048,349	2,315,818	2,732,532	1,992,614	7.9867	15,914,410	5,529,256	109,428	5,419,828	3,952,242	4.1640	16,457,135	1,250,000	911,524	1.0000	911,524	9,402,360	6,856,379	33,283,068
2077	5,034,556	2,315,818	2,718,738	1,982,555	8.2886	16,432,608	5,510,734	109,428	5,401,306	3,938,735	4.2714	16,823,913	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	34,168,045
2078	7,558,119	2,315,818	5,242,301	3,822,786	8.6019	32,883,219	13,081,424	109,428	12,971,996	9,459,426	4.3816	41,447,419	1,250,000	911,524	1.0000	911,524	19,464,297	14,193,735	75,242,162
2079	5,034,556	2,315,818	2,718,738	1,982,555	8.9270	17,698,272	5,510,734	109,428	5,401,306	3,938,735	4.4947	17,703,433	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	36,313,228
2080	5,048,349	2,315,818	2,732,532	1,992,614	9.2645	18,460,572	5,529,256	109,428	5,419,828	3,952,242	4.6106	18,222,206	1,250,000	911,524	1.0000	911,524	9,402,360	6,856,379	37,594,301
2081	5,034,556	2,315,818	2,718,738	1,982,555	9.6147	19,061,675	5,510,734	109,428	5,401,306	3,938,735	4.7296	18,628,642	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	38,601,841
2082	7,448,569	2,315,818	5,132,751	3,742,899	9.9781	37,347,025	12,752,773	109,428	12,643,345	9,219,767	4.8516	44,730,622	1,250,000	911,524	1.0000	911,524	19,026,096	13,874,190	82,989,171
2083	5,034,556	2,315,818	2,718,738	1,982,555	10.3553	20,529,955	5,510,734	109,428	5,401,306	3,938,735	4.9768	19,602,297	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	41,043,776
2084	5,048,349	2,315,818	2,732,532	1,992,614	10.7467	21,414,024	5,529,256	109,428	5,419,828	3,952,242	5.1052	20,176,985	1,250,000	911,524	1.0000	911,524	9,402,360	6,856,379	42,502,532
2085	5,034,556	2,315,818	2,718,738	1,982,555	11.1529	22,111,242	5,510,734	109,428	5,401,306	3,938,735	5.2369	20,626,762	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	43,649,528
2086	5,034,556	2,315,818	2,718,738	1,982,555	11.5745	22,947,087	5,510,734	109,428	5,401,306	3,938,735	5.3720	21,158,885	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	45,017,496
2087	5,034,556	2,315,818	2,718,738	1,982,555	12.0120	23,814,455	5,510,734	109,428	5,401,306	3,938,735	5.5106	21,704,794	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	46,430,773
2088	38,955,083	2,315,818	36,639,266	26,718,049	12.4661	333,069,866	60,664,225	109,428	60,554,797	44,157,708	5.6528	249,614,693	1,250,000	911,524	1.0000	911,524	98,444,062	71,787,281	583,596,083
2089	37,814,391	2,315,818	35,498,573	25,886,234	12.9373	334,897,974	27,423,371	109,428	27,313,943	19,917,846	5.7986	115,495,624	1,250,000	911,524	1.0000	911,524	64,062,516	46,715,604	451,305,122
2090	57,989,340	2,315,818	55,673,522	40,598,190	13.4263	545,083,480	68,480,901	109,428	68,371,473	49,857,777	5.9482	296,564,032	1,250,000	911,524	1.0000	911,524	125,294,995	91,367,491	842,559,035
2091	59,765,744	2,315,818	57,449,927	41,893,578	13.9338	583,736,737	47,033,440	109,428	46,924,012	34,217,881	6.1017	208,787,245	1,250,000	911,524	1.0000	911,524	105,623,939	77,022,983	793,435,506
2092	55,868,516	2,315,818	53,552,699	39,051,645	14.4605	564,706,317	39,780,661	109,428	39,671,233	28,929,017	6.2591	181,069,608	1,250,000	911,524	1.0000	911,524	94,473,931	68,892,186	746,687,449
2093	26,140,056	2,315,818	23,824,238	17,373,087	15.0071	260,719,653	12,241,662	109,428	12,132,234	8,847,055	6.4206	56,803,404	1,250,000	911,524	1.0000	911,524	37,206,472	27,131,666	318,434,582
2094	18,875,245	2,315,818	16,559,427	12,075,449	15.5744	188,067,870	20,647,599	109,428	20,538,171	14,976,825	6.5863	98,641,862	1,250,000	911,524	1.0000	911,524	38,347,599	27,963,797	287,621,256
2095	16,258,583	2,315,818	13,942,765	10,167,329	16.1631	164,335,556	20,311,322	109,428	20,201,894	14,731,605	6.7562	99,529,670	1,250,000	911,524	1.0000	911,524	35,394,659	25,810,458	264,776,750
2096	5,004,965	2,315,818	2,689,147	1,960,977	16.7741	32,893,624	6,169,510	109,428	6,060,082	4,419,127	6.9305	30,626,759	1,250,000	911,524	1.0000	911,524	9,999,229	7,291,628	64,431,907
2097	4,839,226	2,315,818	2,523,408	1,840,117	17.4081	32,032,941	5,693,045	109,428	5,583,617	4,071,680	7.1093	28,946,794	1,250,000	911,524	1.0000	911,524	9,357,025	6,823,321	61,891,259
2098	4,034,318	2,315,818	1,718,500	1,253,163	18.0662	22,639,888	3,278,321	109,428	3,168,893	2,310,817	7.2927	16,852,095	1,250,000	911,524	1.0000	911,524	6,137,393	4,475,504	40,403,507
2099	4,839,226	2,315,818	2,523,408	1,840,117	18.7491	34,500,538	5,693,045	109,428	5,583,617	4,071,680	7.4809	30,459,830	1,250,000	911,524	1.0000	911,524	9,357,025	6,823,321	65,871,892
2100	5,293,574	2,315,818	2,977,756	2,171,436	19.4578	42,251,369	7,056,089	109,428	6,946,661	5,065,637	7.6739	38,873,193	1,250,000	911,524	1.0000	911,524	11,174,417	8,148,597	82,036,085
2101	5,449,255	2,315,818	3,133,437	2,284,962	20.1933	46,140,919	7,523,133	109,428	7,413,705	5,406,214	7.8719	42,557,178	1,250,000	911,524	1.0000	911,524	11,797,142	8,602,700	89,609,621
2102	5,449,255	2,315,818	3,133,437	2,284,962	20.9566	47,885,030	7,523,133	109,428	7,413,705	5,406,214	8.0750	43,655,180	1,250,000	911,524	1.0000	911,524	11,797,142	8,602,700	92,451,734
2103	3,826,743	2,315,818	1,510,925	1,101,795	21.7488	23,962,721	2,655,596	109,428	2,546,168	1,856,714	8.2833	15,379,720	1,250,000	911,524	1.0000	911,524	5,307,093	3,870,033	40,253,965
2104	3,888,694	2,315,818	1,572,876	1,146,971	22.5709	25,888,173	2,820,698	109,428	2,711,270	1,977,110	8.4970	16,799,500	1,250,000	911,524	1.0000	911,524	5,534,146	4,035,605	43,599,198

Xcel Energy
Nuclear Decommissioning Accrual
100-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.7
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2105	5,397,361	2,315,818	3,081,543	2,247,120	23.4240	52,636,536	7,367,451	109,428	7,258,023	5,292,689	8.7162	46,132,132	1,250,000	911,524	1.0000	911,524	11,589,567	8,451,332	99,680,192
2106	4,839,226	2,315,818	2,523,408	1,840,117	24.3095	44,732,324	5,693,045	109,428	5,583,617	4,071,680	8.9411	36,405,297	1,250,000	911,524	1.0000	911,524	9,357,025	6,823,321	82,049,146
2107	4,891,119	2,315,818	2,575,302	1,877,959	25.2284	47,377,899	5,848,727	109,428	5,739,299	4,185,206	9.1718	38,385,869	1,250,000	911,524	1.0000	911,524	9,564,600	6,974,688	86,675,292
2108	3,888,694	2,315,818	1,572,876	1,146,971	26.1820	30,030,001	2,820,698	109,428	2,711,270	1,977,110	9.4084	18,601,438	1,250,000	911,524	1.0000	911,524	5,534,146	4,035,605	49,542,963
2109	4,839,226	2,315,818	2,523,408	1,840,117	27.1717	49,999,107	5,693,045	109,428	5,583,617	4,071,680	9.6512	39,296,597	1,250,000	911,524	1.0000	911,524	9,357,025	6,823,321	90,207,228
2110	4,891,119	2,315,818	2,575,302	1,877,959	28.1988	52,956,188	5,848,727	109,428	5,739,299	4,185,206	9.9002	41,434,373	1,250,000	911,524	1.0000	911,524	9,564,600	6,974,688	95,302,085
2111	4,891,119	2,315,818	2,575,302	1,877,959	29.2647	54,957,904	5,848,727	109,428	5,739,299	4,185,206	10.1556	42,503,275	1,250,000	911,524	1.0000	911,524	9,564,600	6,974,688	98,372,703
2112	3,888,694	2,315,818	1,572,876	1,146,971	30.3709	34,834,549	2,820,698	109,428	2,711,270	1,977,110	10.4176	20,596,737	1,250,000	911,524	1.0000	911,524	5,534,146	4,035,605	56,342,810
2113	6,916,086	2,315,818	4,600,268	3,354,603	31.5189	105,733,389	11,923,625	109,428	11,814,197	8,615,137	10.6864	92,064,802	1,250,000	911,524	1.0000	911,524	17,664,465	12,881,264	198,709,715
2114	5,903,603	2,315,818	3,587,785	2,616,281	32.7103	85,579,331	8,886,176	109,428	8,776,748	6,400,171	10.9621	70,159,319	1,250,000	911,524	1.0000	911,524	13,614,533	9,927,976	156,650,174
2115	5,250,862	2,315,818	2,935,045	2,140,290	33.9468	72,656,008	6,927,956	109,428	6,818,528	4,972,200	11.2449	55,911,891	1,250,000	911,524	1.0000	911,524	11,003,572	8,024,014	129,479,422
2116	3,888,694	2,315,818	1,572,876	1,146,971	35.2299	40,407,683	2,820,698	109,428	2,711,270	1,977,110	11.5350	22,805,959	1,250,000	911,524	1.0000	911,524	5,534,146	4,035,605	64,125,166
2117	3,852,646	2,315,818	1,536,828	1,120,684	36.5616	40,973,999	14,592,996	109,428	14,483,568	10,561,693	11.8326	124,972,286	1,250,000	911,524	1.0000	911,524	17,270,396	12,593,901	166,857,810
2118	1,123,816	2,315,818	(1,192,002)	(869,230)	37.9437	(32,981,817)	1,790,582	109,428	1,681,154	1,225,929	12.1379	14,880,210	1,250,000	911,524	1.0000	911,524	1,739,152	1,268,223	(17,190,084)
	$833,038,756	$178,317,970	$654,720,786	$477,434,837		$4,835,134,587	$955,280,259	$8,425,956	$946,854,303	$690,464,148		$3,253,561,666	$106,250,000	$77,479,519		$77,479,519	$1,707,825,089	$1,245,378,503	$8,166,175,771
	$3,097,036,169	$790,755,642	$2,306,280,527	$1,681,783,580		$17,058,676,165	$3,328,588,374	$37,533,805	$3,291,054,569	$2,399,899,522		$11,227,325,305	$213,750,000	$155,870,561		$155,870,561	$5,811,085,097	$4,237,553,663	$28,441,872,031

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Monticello

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$757,935,327	$15,149,539	$0	$6,696,113	$779,780,979
2021	779,780,979	31,204,574	-	8,507,110	819,492,663
2022	819,492,663	34,040,281	-	71,581,539	925,114,483
2023	925,114,483	38,244,029	-	71,581,539	1,034,940,050
2024	1,034,940,050	42,615,087	-	71,581,539	1,149,136,675
2025	1,149,136,675	47,160,112	-	71,581,539	1,267,878,326
2026	1,267,878,326	51,886,030	-	71,581,539	1,391,345,894
2027	1,391,345,894	56,800,039	-	71,581,539	1,519,727,472
2028	1,519,727,472	61,909,626	-	71,581,539	1,653,218,637
2029	1,653,218,637	67,222,574	-	71,581,539	1,792,022,750
2030	1,792,022,750	69,298,788	(29,153,887)	53,686,154	1,885,853,805
2031	1,885,853,805	71,851,030	(124,694,267)	-	1,833,010,567
2032	1,833,010,567	69,837,703	(77,781,310)	-	1,825,066,960
2033	1,825,066,960	69,535,051	(79,618,616)	-	1,814,983,395
2034	1,814,983,395	69,150,867	(181,199,337)	-	1,702,934,925
2035	1,702,934,925	64,881,821	(18,244,582)	-	1,749,572,164
2036	1,749,572,164	66,658,699	(18,909,387)	-	1,797,321,476
2037	1,797,321,476	68,477,948	(19,491,085)	-	1,846,308,339
2038	1,846,308,339	70,344,348	(13,362,498)	-	1,903,290,189
2039	1,903,290,189	72,515,356	(13,787,364)	-	1,962,018,182
2040	1,962,018,182	74,752,893	(14,285,196)	-	2,022,485,878
2041	2,022,485,878	77,056,712	(14,679,739)	-	2,084,862,851
2042	2,084,862,851	79,433,275	(15,148,013)	-	2,149,148,113
2043	2,149,148,113	81,882,543	(15,631,898)	-	2,215,398,757
2044	2,215,398,757	84,406,693	(16,198,814)	-	2,283,606,636
2045	2,283,606,636	87,005,413	(16,648,377)	-	2,353,963,672
2046	2,353,963,672	89,686,016	(17,181,312)	-	2,426,468,376
2047	2,426,468,376	92,448,445	(17,732,840)	-	2,501,183,981
2048	2,501,183,981	95,295,110	(23,073,739)	-	2,573,405,351
2049	2,573,405,351	98,046,744	(18,890,587)	-	2,652,561,508
2050	2,652,561,508	101,062,593	(30,696,113)	-	2,722,927,989
2051	2,722,927,989	103,743,556	(31,656,122)	-	2,795,015,423
2052	2,795,015,423	106,490,088	(32,735,685)	-	2,868,769,825
2053	2,868,769,825	109,300,130	(33,671,584)	-	2,944,398,372
2054	2,944,398,372	112,181,578	(34,728,418)	-	3,021,851,531
2055	3,021,851,531	115,132,543	(35,819,476)	-	3,101,164,599
2056	3,101,164,599	118,154,371	(37,046,230)	-	3,182,272,740
2057	3,182,272,740	121,244,591	(38,109,670)	-	3,265,407,662
2058	3,265,407,662	124,412,032	(102,174,628)	-	3,287,645,066
2059	3,287,645,066	125,259,277	(40,551,552)	-	3,372,352,790
2060	3,372,352,790	128,486,641	(41,947,857)	-	3,458,891,574

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External Levelized	2061	3,458,891,574	131,783,769	(43,155,600)	-	3,547,519,744
	2062	3,547,519,744	135,160,502	(44,523,062)	-	3,638,157,184
	2063	3,638,157,184	138,613,789	(82,365,821)	-	3,694,405,151
	2064	3,694,405,151	140,756,836	(47,522,774)	-	3,787,639,214
	2065	3,787,639,214	144,309,054	(48,897,946)	-	3,883,050,321
	2066	3,883,050,321	147,944,217	(58,416,205)	-	3,972,578,334
	2067	3,972,578,334	151,355,235	(52,058,873)	-	4,071,874,695
	2068	4,071,874,695	155,138,426	(172,191,161)	-	4,054,821,960
	2069	4,054,821,960	154,488,717	(55,432,486)	-	4,153,878,191
	2070	4,153,878,191	158,262,759	(57,202,810)	-	4,254,938,139
	2071	4,254,938,139	162,113,143	(59,031,855)	-	4,358,019,428
	2072	4,358,019,428	166,040,540	(61,094,255)	-	4,462,965,713
	2073	4,462,965,713	170,038,994	(62,874,395)	-	4,570,130,312
	2074	4,570,130,312	174,121,965	(64,892,208)	-	4,679,360,069
	2075	4,679,360,069	178,283,619	(66,976,429)	-	4,790,667,259
	2076	4,790,667,259	182,524,423	(69,327,221)	-	4,903,864,460
	2077	4,903,864,460	186,837,236	(71,354,568)	-	5,019,347,128
	2078	5,019,347,128	191,237,126	(73,653,727)	-	5,136,930,527
	2079	5,136,930,527	195,717,053	(76,029,769)	-	5,256,617,810
	2080	5,256,617,810	200,277,139	(78,711,223)	-	5,378,183,726
	2081	5,378,183,726	204,908,800	(81,022,185)	-	5,502,070,341
	2082	5,502,070,341	209,628,880	(83,643,797)	-	5,628,055,424
	2083	5,628,055,424	214,428,912	(86,353,837)	-	5,756,130,499
	2084	5,756,130,499	219,308,572	(567,534,295)	-	5,407,904,776
	2085	5,407,904,776	206,041,172	(347,616,694)	-	5,266,329,254
	2086	5,266,329,254	200,647,145	(616,501,363)	-	4,850,475,035
	2087	4,850,475,035	184,803,099	(1,062,223,504)	-	3,973,054,629
	2088	3,973,054,629	151,373,381	(710,565,449)	-	3,413,862,562
	2089	3,413,862,562	130,068,164	(694,351,856)	-	2,849,578,869
	2090	2,849,578,869	108,568,955	(364,736,424)	-	2,593,411,400
	2091	2,593,411,400	98,808,974	(301,123,649)	-	2,391,096,726
	2092	2,391,096,726	91,100,785	(193,809,099)	-	2,288,388,411
	2093	2,288,388,411	87,187,598	(112,602,917)	-	2,262,973,093
	2094	2,262,973,093	86,219,275	(88,420,703)	-	2,260,771,664
	2095	2,260,771,664	86,135,400	(157,717,552)	-	2,189,189,513
	2096	2,189,189,513	83,408,120	(129,102,878)	-	2,143,494,755
	2097	2,143,494,755	81,667,150	(46,089,744)	-	2,179,072,161
	2098	2,179,072,161	83,022,649	(47,690,567)	-	2,214,404,243
	2099	2,214,404,243	84,368,802	(49,348,215)	-	2,249,424,829
	2100	2,249,424,829	85,703,086	(51,064,657)	-	2,284,063,258
	2101	2,284,063,258	87,022,810	(52,842,196)	-	2,318,243,872
	2102	2,318,243,872	88,325,092	(54,682,968)	-	2,351,885,995
	2103	2,351,885,995	89,606,856	(56,589,307)	-	2,384,903,545
	2104	2,384,903,545	90,864,825	(58,934,820)	-	2,416,833,549
	2105	2,416,833,549	92,081,358	(60,607,920)	-	2,448,306,987
	2106	2,448,306,987	93,280,496	(62,725,619)	-	2,478,861,864
	2107	2,478,861,864	94,444,637	(64,918,746)	-	2,508,387,755

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2108	2,508,387,755	95,569,573	(352,794,353)	-	2,251,162,975
2109	2,251,162,975	85,769,309	(69,542,720)	-	2,267,389,565
2110	2,267,389,565	86,387,542	(71,979,385)	-	2,281,797,722
2111	2,281,797,722	86,936,493	(74,503,112)	-	2,294,231,103
2112	2,294,231,103	87,410,205	(77,611,752)	-	2,304,029,556
2113	2,304,029,556	87,783,526	(246,447,503)	-	2,145,365,579
2114	2,145,365,579	81,738,429	(82,629,571)	-	2,144,474,436
2115	2,144,474,436	81,704,476	(85,534,876)	-	2,140,644,037
2116	2,140,644,037	81,558,538	(125,719,084)	-	2,096,483,490
2117	2,096,483,490	79,876,021	(91,661,529)	-	2,084,697,982
2118	2,084,697,982	79,426,993	(668,672,291)	-	1,495,452,684
2119	1,495,452,684	56,976,747	(133,080,142)	-	1,419,349,289
2120	1,419,349,289	54,077,208	(132,325,534)	-	1,341,100,963
2121	1,341,100,963	51,095,947	(136,215,116)	-	1,255,981,794
2122	1,255,981,794	47,852,906	(140,924,926)	-	1,162,909,774
2123	1,162,909,774	44,306,862	(152,388,692)	-	1,054,827,944
2124	1,054,827,944	40,188,945	(151,611,774)	-	943,405,115
2125	943,405,115	35,943,735	(156,078,503)	-	823,270,347
2126	823,270,347	31,366,600	(161,491,897)	-	693,145,050
2127	693,145,050	26,408,826	(174,573,449)	-	544,980,428
2128	544,980,428	20,763,754	(227,279,691)	-	338,464,491
2129	338,464,491	12,895,497	(178,912,693)	-	172,447,296
2130	172,447,296	6,570,242	(233,977,350)	-	(54,959,812)
2131	(54,959,812)	(2,093,969)	57,053,781	-	0

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EXTERNAL FUND CALCULATION

Prairie Island Unit 1

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$437,068,622	$8,807,181	$0	$24,632	$445,900,435
2021	445,900,435	18,219,642	-	12,399,703	476,519,779
2022	476,519,779	20,029,162	-	40,963,527	537,512,468
2023	537,512,468	22,487,168	-	40,963,527	600,963,162
2024	600,963,162	25,044,231	-	40,963,527	666,970,919
2025	666,970,919	27,704,343	-	40,963,527	735,638,789
2026	735,638,789	30,471,658	-	40,963,527	807,073,974
2027	807,073,974	33,350,496	-	40,963,527	881,387,997
2028	881,387,997	36,345,351	-	40,963,527	958,696,875
2029	958,696,875	39,460,899	-	40,963,527	1,039,121,300
2030	1,039,121,300	42,702,003	-	40,963,527	1,122,786,830
2031	1,122,786,830	46,073,724	-	40,963,527	1,209,824,081
2032	1,209,824,081	49,581,326	-	40,963,527	1,300,368,933
2033	1,300,368,933	49,935,485	(28,675,993)	27,445,563	1,349,073,988
2034	1,349,073,988	51,264,812	(94,078,505)	-	1,306,260,295
2035	1,306,260,295	49,637,891	(40,726,070)	-	1,315,172,115
2036	1,315,172,115	49,976,540	(34,976,809)	-	1,330,171,847
2037	1,330,171,847	50,546,530	(59,454,853)	-	1,321,263,524
2038	1,321,263,524	50,208,014	(98,362,742)	-	1,273,108,796
2039	1,273,108,796	48,378,134	(14,771,643)	-	1,306,715,287
2040	1,306,715,287	49,655,181	(15,260,915)	-	1,341,109,554
2041	1,341,109,554	50,962,163	(11,860,847)	-	1,380,210,870
2042	1,380,210,870	52,448,013	(12,194,153)	-	1,420,464,731
2043	1,420,464,731	53,977,660	(12,538,000)	-	1,461,904,391
2044	1,461,904,391	55,552,367	(12,941,684)	-	1,504,515,073
2045	1,504,515,073	57,171,573	(22,312,509)	-	1,539,374,137
2046	1,539,374,137	58,496,217	(19,849,443)	-	1,578,020,911
2047	1,578,020,911	59,964,795	(20,422,825)	-	1,617,562,881
2048	1,617,562,881	61,467,389	(14,482,923)	-	1,664,547,347
2049	1,664,547,347	63,252,799	(21,622,844)	-	1,706,177,302
2050	1,706,177,302	64,834,737	(25,742,577)	-	1,745,269,462
2051	1,745,269,462	66,320,240	(26,104,211)	-	1,785,485,491
2052	1,785,485,491	67,848,449	(27,333,431)	-	1,826,000,509
2053	1,826,000,509	69,388,019	(16,636,298)	-	1,878,752,231
2054	1,878,752,231	71,392,585	(17,121,275)	-	1,933,023,541
2055	1,933,023,541	73,454,895	(29,746,097)	-	1,976,732,338
2056	1,976,732,338	75,115,829	(26,533,451)	-	2,025,314,716
2057	2,025,314,716	76,961,959	(27,243,480)	-	2,075,033,195
2058	2,075,033,195	78,851,261	(19,221,403)	-	2,134,663,053
2059	2,134,663,053	81,117,196	(28,387,884)	-	2,187,392,365
2060	2,187,392,365	83,120,910	(29,820,978)	-	2,240,692,297

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External Levelized	2061	2,240,692,297	85,146,307	(30,624,693)	-	2,295,213,911
	2062	2,295,213,911	87,218,129	(21,604,866)	-	2,360,827,174
	2063	2,360,827,174	89,711,433	(52,946,928)	-	2,397,591,678
	2064	2,397,591,678	91,108,484	(43,514,655)	-	2,445,185,506
	2065	2,445,185,506	92,917,049	(34,459,071)	-	2,503,643,484
	2066	2,503,643,484	95,138,452	(24,310,639)	-	2,574,471,297
	2067	2,574,471,297	97,829,909	(25,042,830)	-	2,647,258,376
	2068	2,647,258,376	100,595,818	(49,641,577)	-	2,698,212,618
	2069	2,698,212,618	102,532,079	(44,920,912)	-	2,755,823,785
	2070	2,755,823,785	104,721,304	(27,384,722)	-	2,833,160,367
	2071	2,833,160,367	107,660,094	(28,216,588)	-	2,912,603,872
	2072	2,912,603,872	110,678,947	(61,900,626)	-	2,961,382,193
	2073	2,961,382,193	112,532,523	(29,962,823)	-	3,043,951,894
	2074	3,043,951,894	115,670,172	(30,879,142)	-	3,128,742,924
	2075	3,128,742,924	118,892,231	(73,610,782)	-	3,174,024,373
	2076	3,174,024,373	120,612,926	(32,937,508)	-	3,261,699,791
	2077	3,261,699,791	123,944,592	(33,810,632)	-	3,351,833,751
	2078	3,351,833,751	127,369,683	(74,871,473)	-	3,404,331,961
	2079	3,404,331,961	129,364,615	(35,928,769)	-	3,497,767,806
	2080	3,497,767,806	132,915,177	(37,194,459)	-	3,593,488,523
	2081	3,593,488,523	136,552,564	(38,188,272)	-	3,691,852,815
	2082	3,691,852,815	140,290,407	(82,560,229)	-	3,749,582,992
	2083	3,749,582,992	142,484,154	(40,598,886)	-	3,851,468,260
	2084	3,851,468,260	146,355,794	(42,039,833)	-	3,955,784,221
	2085	3,955,784,221	150,319,800	(43,170,933)	-	4,062,933,089
	2086	4,062,933,089	154,391,457	(44,521,096)	-	4,172,803,450
	2087	4,172,803,450	158,566,531	(265,029,775)	-	4,066,340,207
	2088	4,066,340,207	154,520,928	(840,068,551)	-	3,380,792,584
	2089	3,380,792,584	128,470,118	(812,751,932)	-	2,696,510,770
	2090	2,696,510,770	102,467,409	(603,654,678)	-	2,195,323,501
	2091	2,195,323,501	83,422,293	(525,415,896)	-	1,753,329,898
	2092	1,753,329,898	66,626,536	(93,250,482)	-	1,726,705,952
	2093	1,726,705,952	65,614,826	(248,060,027)	-	1,544,260,752
	2094	1,544,260,752	58,681,909	(220,129,874)	-	1,382,812,787
	2095	1,382,812,787	52,546,886	(214,428,614)	-	1,220,931,058
	2096	1,220,931,058	46,395,380	(64,431,911)	-	1,202,894,528
	2097	1,202,894,528	45,709,992	(61,891,263)	-	1,186,713,257
	2098	1,186,713,257	45,095,104	(40,403,512)	-	1,191,404,848
	2099	1,191,404,848	45,273,384	(65,871,897)	-	1,170,806,336
	2100	1,170,806,336	44,490,641	(82,036,090)	-	1,133,260,887
	2101	1,133,260,887	43,063,914	(89,609,626)	-	1,086,715,175
	2102	1,086,715,175	41,295,177	(92,451,740)	-	1,035,558,612
	2103	1,035,558,612	39,351,227	(40,253,970)	-	1,034,655,868
	2104	1,034,655,868	39,316,923	(43,599,203)	-	1,030,373,588
	2105	1,030,373,588	39,154,196	(99,680,198)	-	969,847,587
	2106	969,847,587	36,854,208	(82,049,152)	-	924,652,643
	2107	924,652,643	35,136,800	(86,675,298)	-	873,114,146

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2108	873,114,146	33,178,338	(49,542,970)	-	856,749,513
2109	856,749,513	32,556,481	(90,207,235)	-	799,098,759
2110	799,098,759	30,365,753	(95,302,092)	-	734,162,420
2111	734,162,420	27,898,172	(98,372,710)	-	663,687,882
2112	663,687,882	25,220,140	(56,342,818)	-	632,565,204
2113	632,565,204	24,037,478	(198,709,724)	-	457,892,958
2114	457,892,958	17,399,932	(156,650,183)	-	318,642,708
2115	318,642,708	12,108,423	(129,479,431)	-	201,271,700
2116	201,271,700	7,648,325	(64,125,175)	-	144,794,849
2117	144,794,849	5,502,204	(166,857,819)	-	(16,560,765)
2118	(16,560,765)	(629,309)	17,190,074	-	0

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Prairie Island Unit 2

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$487,163,479	$9,843,678	$0	$294,670	$497,301,828
2021	497,301,828	20,222,528	-	6,511,608	524,035,965
2022	524,035,965	21,870,291	-	34,615,754	580,522,010
2023	580,522,010	24,152,327	-	34,615,754	639,290,092
2024	639,290,092	26,526,558	-	34,615,754	700,432,404
2025	700,432,404	28,996,707	-	34,615,754	764,044,865
2026	764,044,865	31,566,651	-	34,615,754	830,227,270
2027	830,227,270	34,240,420	-	34,615,754	899,083,444
2028	899,083,444	37,022,209	-	34,615,754	970,721,408
2029	970,721,408	39,916,383	-	34,615,754	1,045,253,545
2030	1,045,253,545	42,927,481	-	34,615,754	1,122,796,780
2031	1,122,796,780	46,060,228	-	34,615,754	1,203,472,763
2032	1,203,472,763	49,319,538	-	34,615,754	1,287,408,055
2033	1,287,408,055	52,710,524	-	34,615,754	1,374,734,333
2034	1,374,734,333	52,924,705	(13,395,583)	28,731,076	1,442,994,531
2035	1,442,994,531	54,978,092	(97,831,438)	-	1,400,141,185
2036	1,400,141,185	53,345,379	(62,709,495)	-	1,390,777,069
2037	1,390,777,069	52,988,606	(64,798,117)	-	1,378,967,559
2038	1,378,967,559	52,538,664	(102,963,497)	-	1,328,542,726
2039	1,328,542,726	50,617,478	(14,861,556)	-	1,364,298,647
2040	1,364,298,647	51,979,778	(15,354,393)	-	1,400,924,033
2041	1,400,924,033	53,375,206	(15,774,683)	-	1,438,524,556
2042	1,438,524,556	54,807,786	(12,294,365)	-	1,481,037,977
2043	1,481,037,977	56,427,547	(12,641,904)	-	1,524,823,619
2044	1,524,823,619	58,095,780	(13,049,715)	-	1,569,869,684
2045	1,569,869,684	59,812,035	(22,424,217)	-	1,607,257,502
2046	1,607,257,502	61,236,511	(19,965,267)	-	1,648,528,745
2047	1,648,528,745	62,808,945	(20,542,922)	-	1,690,794,769
2048	1,690,794,769	64,419,281	(14,607,795)	-	1,740,606,255
2049	1,740,606,255	66,317,098	(21,751,969)	-	1,785,171,384
2050	1,785,171,384	68,015,030	(25,876,469)	-	1,827,309,945
2051	1,827,309,945	69,620,509	(26,243,045)	-	1,870,687,409
2052	1,870,687,409	71,273,190	(27,477,786)	-	1,914,482,813
2053	1,914,482,813	72,941,795	(16,785,576)	-	1,970,639,033
2054	1,970,639,033	75,081,347	(17,276,069)	-	2,028,444,311
2055	2,028,444,311	77,283,728	(29,906,614)	-	2,075,821,425
2056	2,075,821,425	79,088,796	(26,700,358)	-	2,128,209,864
2057	2,128,209,864	81,084,796	(27,416,084)	-	2,181,878,576
2058	2,181,878,576	83,129,574	(19,400,392)	-	2,245,607,758
2059	2,245,607,758	85,557,656	(28,573,494)	-	2,302,591,920
2060	2,302,591,920	87,728,752	(30,013,985)	-	2,360,306,687

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External Levelized	2061	2,360,306,687	89,927,685	(30,824,295)	-	2,419,410,077
	2062	2,419,410,077	92,179,524	(21,811,859)	-	2,489,777,742
	2063	2,489,777,742	94,860,532	(53,161,588)	-	2,531,476,686
	2064	2,531,476,686	96,449,262	(43,737,872)	-	2,584,188,076
	2065	2,584,188,076	98,457,566	(34,689,928)	-	2,647,955,714
	2066	2,647,955,714	100,887,113	(24,550,048)	-	2,724,292,778
	2067	2,724,292,778	103,795,555	(25,291,111)	-	2,802,797,222
	2068	2,802,797,222	106,786,574	(49,899,768)	-	2,859,684,028
	2069	2,859,684,028	108,953,961	(45,187,943)	-	2,923,450,047
	2070	2,923,450,047	111,383,447	(27,661,657)	-	3,007,171,837
	2071	3,007,171,837	114,573,247	(28,503,794)	-	3,093,241,290
	2072	3,093,241,290	117,852,493	(62,199,306)	-	3,148,894,477
	2073	3,148,894,477	119,972,880	(30,271,740)	-	3,238,595,617
	2074	3,238,595,617	123,390,493	(31,199,526)	-	3,330,786,584
	2075	3,330,786,584	126,902,969	(73,943,059)	-	3,383,746,494
	2076	3,383,746,494	128,920,741	(33,283,068)	-	3,479,384,167
	2077	3,479,384,167	132,564,537	(34,168,045)	-	3,577,780,658
	2078	3,577,780,658	136,313,443	(75,242,162)	-	3,638,851,939
	2079	3,638,851,939	138,640,259	(36,313,228)	-	3,741,178,969
	2080	3,741,178,969	142,538,919	(37,594,301)	-	3,846,123,587
	2081	3,846,123,587	146,537,309	(38,601,841)	-	3,954,059,055
	2082	3,954,059,055	150,649,650	(82,989,171)	-	4,021,719,534
	2083	4,021,719,534	153,227,514	(41,043,776)	-	4,133,903,272
	2084	4,133,903,272	157,501,715	(42,502,532)	-	4,248,902,454
	2085	4,248,902,454	161,883,183	(43,649,528)	-	4,367,136,110
	2086	4,367,136,110	166,387,886	(45,017,496)	-	4,488,506,500
	2087	4,488,506,500	171,012,098	(46,430,773)	-	4,613,087,825
	2088	4,613,087,825	175,758,646	(583,596,083)	-	4,205,250,388
	2089	4,205,250,388	160,220,040	(451,305,122)	-	3,914,165,306
	2090	3,914,165,306	149,129,698	(842,559,035)	-	3,220,735,968
	2091	3,220,735,968	122,710,040	(793,435,506)	-	2,550,010,503
	2092	2,550,010,503	97,155,400	(746,687,449)	-	1,900,478,454
	2093	1,900,478,454	72,408,229	(318,434,582)	-	1,654,452,102
	2094	1,654,452,102	63,034,625	(287,621,256)	-	1,429,865,471
	2095	1,429,865,471	54,477,874	(264,776,750)	-	1,219,566,596
	2096	1,219,566,596	46,465,487	(64,431,907)	-	1,201,600,176
	2097	1,201,600,176	45,780,967	(61,891,259)	-	1,185,489,884
	2098	1,185,489,884	45,167,165	(40,403,507)	-	1,190,253,541
	2099	1,190,253,541	45,348,660	(65,871,892)	-	1,169,730,309
	2100	1,169,730,309	44,566,725	(82,036,085)	-	1,132,260,949
	2101	1,132,260,949	43,139,142	(89,609,621)	-	1,085,790,471
	2102	1,085,790,471	41,368,617	(92,451,734)	-	1,034,707,354
	2103	1,034,707,354	39,422,350	(40,253,965)	-	1,033,875,739
	2104	1,033,875,739	39,390,666	(43,599,198)	-	1,029,667,207
	2105	1,029,667,207	39,230,321	(99,680,192)	-	969,217,336
	2106	969,217,336	36,927,180	(82,049,146)	-	924,095,371
	2107	924,095,371	35,208,034	(86,675,292)	-	872,628,113

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2108	872,628,113	33,247,131	(49,542,963)	-	856,332,280
2109	856,332,280	32,626,260	(90,207,228)	-	798,751,312
2110	798,751,312	30,432,425	(95,302,085)	-	733,881,652
2111	733,881,652	27,960,891	(98,372,703)	-	663,469,841
2112	663,469,841	25,278,201	(56,342,810)	-	632,405,231
2113	632,405,231	24,094,639	(198,709,715)	-	457,790,155
2114	457,790,155	17,441,805	(156,650,174)	-	318,581,786
2115	318,581,786	12,137,966	(129,479,422)	-	201,240,329
2116	201,240,329	7,667,257	(64,125,166)	-	144,782,420
2117	144,782,420	5,516,210	(166,857,810)	-	(16,559,179)
2118	(16,559,179)	(630,905)	17,190,084	-	(0)

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2022 ACCRUAL COMPARISON

	Present	Proposed	Difference
Monticello	$8,507,110	$123,326,180	$114,819,070
Prairie Island Unit 1	12,399,703	59,801,929	47,402,226
Prairie Island Unit 2	6,511,608	51,818,766	45,307,158
TOTAL	$27,418,421	$234,946,875	$207,528,454

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2022 MN RETAIL SUMMARY

	Remaining Life (yrs)	Operational Earnings Rate	Post-Shutdown Earnings Rate	Market Value Balance 6/30/2020	Book Value 6/30/2020	Unrealized Gain/Loss 6/30/2020	Tax-Effect Adjustment	Tax-Adjusted Fund Balance 6/30/2020	2022-2024 Decommissioning Accrual
Monticello	9.67	4.00%	3.93%	$814,968,100	$610,109,002	$204,859,098	$57,032,773	$757,935,327	**$123,326,180**
Prairie Island Unit 1	13.25	4.04%	3.90%	471,960,960	346,629,286	125,331,674	34,892,338	437,068,622	**59,801,929**
Prairie Island Unit 2	14.42	4.04%	3.91%	526,255,835	385,837,890	140,417,945	39,092,356	487,163,479	**51,818,766**
TOTAL DECOMMISSIONING ACCRUAL				**$1,813,184,895**	**$1,342,576,178**	**$470,608,717**	**$131,017,467**	**$1,682,167,428**	**$234,946,875**

INPUT DATA

Escalation Rate (Labor)	3.78%
Escalation Rate (Non-Labor)	2.58%
Escalation Rate (PIIC)	0.00%
Jurisdictional Factor	72.9219%
Tax Rate for tax-effect adjustment	27.84%

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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Monticello																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2030	$19,195,236	$0	$19,195,236	$13,997,531	1.4492	$20,285,222	$9,427,073	$0	$9,427,073	$6,874,401	1.2901	$8,868,665	$0	$0	1.0000	$0	$28,622,310	$20,871,932	$29,153,887
2031	69,383,883	-	69,383,883	50,596,046	1.5040	76,096,453	50,357,902	-	50,357,902	36,721,939	1.3234	48,597,814	0	0	1.0000	0	119,741,785	87,317,985	124,694,267
2032	35,972,723	-	35,972,723	26,231,993	1.5609	40,945,518	37,211,074	-	37,211,074	27,135,022	1.3575	36,835,792	0	0	1.0000	0	73,183,796	53,367,015	77,781,310
2033	32,005,491	-	32,005,491	23,339,012	1.6199	37,806,866	41,173,140	-	41,173,140	30,024,236	1.3926	41,811,751	0	0	1.0000	0	73,178,631	53,363,248	79,618,616
2034	52,288,906	-	52,288,906	38,130,064	1.6811	64,100,450	112,412,485	-	112,412,485	81,973,320	1.4285	117,098,887	0	0	1.0000	0	164,701,391	120,103,383	181,199,337
2035	9,293,107	-	9,293,107	6,776,710	1.7446	11,822,648	6,010,095	-	6,010,095	4,382,675	1.4653	6,421,934	0	0	1.0000	0	15,303,201	11,159,385	18,244,582
2036	9,318,517	-	9,318,517	6,795,240	1.8106	12,303,461	6,026,414	-	6,026,414	4,394,576	1.5032	6,605,926	0	0	1.0000	0	15,344,931	11,189,815	18,909,387
2037	9,293,107	-	9,293,107	6,776,710	1.8790	12,733,438	6,010,095	-	6,010,095	4,382,675	1.5419	6,757,647	0	0	1.0000	0	15,303,201	11,159,385	19,491,085
2038	9,293,107	4,593,659	4,699,448	3,426,927	1.9501	6,682,850	6,010,095	218,856	5,791,239	4,223,081	1.5817	6,679,648	0	0	1.0000	0	10,490,687	7,650,008	13,362,498
2039	9,293,107	4,593,659	4,699,448	3,426,927	2.0238	6,935,415	6,010,095	218,856	5,791,239	4,223,081	1.6225	6,851,949	0	0	1.0000	0	10,490,687	7,650,008	13,787,364
2040	9,318,517	4,593,659	4,724,859	3,445,457	2.1003	7,236,493	6,026,414	218,856	5,807,558	4,234,982	1.6644	7,048,703	0	0	1.0000	0	10,532,417	7,680,438	14,285,196
2041	9,293,107	4,593,659	4,699,448	3,426,927	2.1797	7,469,672	6,010,095	218,856	5,791,239	4,223,081	1.7073	7,210,067	0	0	1.0000	0	10,490,687	7,650,008	14,679,739
2042	9,293,107	4,593,659	4,699,448	3,426,927	2.2620	7,751,709	6,010,095	218,856	5,791,239	4,223,081	1.7514	7,396,304	0	0	1.0000	0	10,490,687	7,650,008	15,148,013
2043	9,293,107	4,593,659	4,699,448	3,426,927	2.3475	8,044,711	6,010,095	218,856	5,791,239	4,223,081	1.7966	7,587,188	0	0	1.0000	0	10,490,687	7,650,008	15,631,898
2044	9,318,517	4,593,659	4,724,859	3,445,457	2.4363	8,394,166	6,026,414	218,856	5,807,558	4,234,982	1.8429	7,804,648	0	0	1.0000	0	10,532,417	7,680,438	16,198,814
2045	9,293,107	4,593,659	4,699,448	3,426,927	2.5284	8,664,642	6,010,095	218,856	5,791,239	4,223,081	1.8905	7,983,735	0	0	1.0000	0	10,490,687	7,650,008	16,648,377
2046	9,293,107	4,593,659	4,699,448	3,426,927	2.6239	8,991,913	6,010,095	218,856	5,791,239	4,223,081	1.9392	8,189,399	0	0	1.0000	0	10,490,687	7,650,008	17,181,312
2047	9,293,107	4,593,659	4,699,448	3,426,927	2.7231	9,331,865	6,010,095	218,856	5,791,239	4,223,081	1.9893	8,400,975	0	0	1.0000	0	10,490,687	7,650,008	17,732,840
2048	10,038,003	4,593,659	5,444,345	3,970,120	2.8261	11,219,955	8,184,872	218,856	7,966,016	5,808,970	2.0406	11,853,785	0	0	1.0000	0	13,410,361	9,779,090	23,073,739
2049	9,293,107	4,593,659	4,699,448	3,426,927	2.9329	10,050,834	6,010,095	218,856	5,791,239	4,223,081	2.0932	8,839,754	0	0	1.0000	0	10,490,687	7,650,008	18,890,587
2050	10,911,950	4,593,659	6,318,292	4,607,418	3.0438	14,024,060	10,866,625	218,856	10,647,769	7,764,555	2.1472	16,672,053	0	0	1.0000	0	16,966,060	12,371,974	30,696,113
2051	10,911,950	4,593,659	6,318,292	4,607,418	3.1588	14,553,913	10,866,625	218,856	10,647,769	7,764,555	2.2026	17,102,210	0	0	1.0000	0	16,966,060	12,371,974	31,656,122
2052	10,937,361	4,593,659	6,343,702	4,625,948	3.2782	15,164,783	10,882,944	218,856	10,664,088	7,776,456	2.2595	17,570,902	0	0	1.0000	0	17,007,790	12,402,404	32,735,685
2053	10,911,950	4,593,659	6,318,292	4,607,418	3.4021	15,674,898	10,866,625	218,856	10,647,769	7,764,555	2.3178	17,996,686	0	0	1.0000	0	16,966,060	12,371,974	33,671,584
2054	10,911,950	4,593,659	6,318,292	4,607,418	3.5307	16,267,412	10,866,625	218,856	10,647,769	7,764,555	2.3776	18,461,007	0	0	1.0000	0	16,966,060	12,371,974	34,728,418
2055	10,911,950	4,593,659	6,318,292	4,607,418	3.6642	16,882,502	10,866,625	218,856	10,647,769	7,764,555	2.4389	18,936,974	0	0	1.0000	0	16,966,060	12,371,974	35,819,476
2056	10,937,361	4,593,659	6,343,702	4,625,948	3.8027	17,591,093	10,882,944	218,856	10,664,088	7,776,456	2.5018	19,455,137	0	0	1.0000	0	17,007,790	12,402,404	37,046,230
2057	10,911,950	4,593,659	6,318,292	4,607,418	3.9464	18,182,715	10,866,625	218,856	10,647,769	7,764,555	2.5664	19,926,955	0	0	1.0000	0	16,966,060	12,371,974	38,109,670
2058	18,099,790	4,593,659	13,506,131	9,848,928	4.0956	40,337,268	32,430,144	218,856	32,211,288	23,489,083	2.6326	61,837,360	0	0	1.0000	0	45,717,419	33,338,011	102,174,628
2059	10,911,950	4,593,659	6,318,292	4,607,418	4.2504	19,583,370	10,866,625	218,856	10,647,769	7,764,555	2.7005	20,968,182	0	0	1.0000	0	16,966,060	12,371,974	40,551,552
2060	10,937,361	4,593,659	6,343,702	4,625,948	4.4111	20,405,519	10,882,944	218,856	10,664,088	7,776,456	2.7702	21,542,338	0	0	1.0000	0	17,007,790	12,402,404	41,947,857
2061	10,911,950	4,593,659	6,318,292	4,607,418	4.5778	21,091,839	10,866,625	218,856	10,647,769	7,764,555	2.8416	22,063,760	0	0	1.0000	0	16,966,060	12,371,974	43,155,600
2062	10,911,950	4,593,659	6,318,292	4,607,418	4.7509	21,889,383	10,866,625	218,856	10,647,769	7,764,555	2.9150	22,633,679	0	0	1.0000	0	16,966,060	12,371,974	44,523,062
2063	14,505,870	4,593,659	9,912,211	7,228,173	4.9305	35,638,506	21,648,384	218,856	21,429,528	15,626,819	2.9902	46,727,315	0	0	1.0000	0	31,341,740	22,854,992	82,365,821
2064	10,937,361	4,593,659	6,343,702	4,625,948	5.1168	23,670,051	10,882,944	218,856	10,664,088	7,776,456	3.0673	23,852,723	0	0	1.0000	0	17,007,790	12,402,404	47,522,774
2065	10,911,950	4,593,659	6,318,292	4,607,418	5.3103	24,466,773	10,866,625	218,856	10,647,769	7,764,555	3.1465	24,431,173	0	0	1.0000	0	16,966,060	12,371,974	48,897,946
2066	11,630,734	4,593,659	7,037,076	5,131,569	5.5110	28,280,078	13,022,977	218,856	12,804,121	9,337,008	3.2276	30,136,127	0	0	1.0000	0	19,841,196	14,468,577	58,416,205
2067	10,911,950	4,593,659	6,318,292	4,607,418	5.7193	26,351,207	10,866,625	218,856	10,647,769	7,764,555	3.3109	25,707,666	0	0	1.0000	0	16,966,060	12,371,974	52,058,873
2068	21,000,336	4,593,659	16,406,678	11,964,061	5.9355	71,012,684	41,071,871	218,856	40,853,015	29,790,795	3.3963	101,178,477	0	0	1.0000	0	57,259,693	41,754,856	172,191,161
2069	10,911,950	4,593,659	6,318,292	4,607,418	6.1598	28,380,775	10,866,625	218,856	10,647,769	7,764,555	3.4840	27,051,711	0	0	1.0000	0	16,966,060	12,371,974	55,432,486
2070	10,911,950	4,593,659	6,318,292	4,607,418	6.3927	29,453,843	10,866,625	218,856	10,647,769	7,764,555	3.5738	27,748,968	0	0	1.0000	0	16,966,060	12,371,974	57,202,810
2071	10,911,950	4,593,659	6,318,292	4,607,418	6.6343	30,566,995	10,866,625	218,856	10,647,769	7,764,555	3.6660	28,464,860	0	0	1.0000	0	16,966,060	12,371,974	59,031,855
2072	10,937,361	4,593,659	6,343,702	4,625,948	6.8851	31,850,115	10,882,944	218,856	10,664,088	7,776,456	3.7606	29,244,140	0	0	1.0000	0	17,007,790	12,402,404	61,094,255
2073	10,911,950	4,593,659	6,318,292	4,607,418	7.1454	32,921,846	10,866,625	218,856	10,647,769	7,764,555	3.8576	29,952,549	0	0	1.0000	0	16,966,060	12,371,974	62,874,395
2074	10,911,950	4,593,659	6,318,292	4,607,418	7.4155	34,166,310	10,866,625	218,856	10,647,769	7,764,555	3.9572	30,725,898	0	0	1.0000	0	16,966,060	12,371,974	64,892,208
2075	10,911,950	4,593,659	6,318,292	4,607,418	7.6958	35,457,769	10,866,625	218,856	10,647,769	7,764,555	4.0593	31,518,659	0	0	1.0000	0	16,966,060	12,371,974	66,976,429
2076	10,937,361	4,593,659	6,343,702	4,625,948	7.9867	36,946,059	10,882,944	218,856	10,664,088	7,776,456	4.1640	32,381,162	0	0	1.0000	0	17,007,790	12,402,404	69,327,221
2077	10,911,950	4,593,659	6,318,292	4,607,418	8.2886	38,189,047	10,866,625	218,856	10,647,769	7,764,555	4.2714	33,165,522	0	0	1.0000	0	16,966,060	12,371,974	71,354,568
2078	10,911,950	4,593,659	6,318,292	4,607,418	8.6019	39,632,551	10,866,625	218,856	10,647,769	7,764,555	4.3816	34,021,176	0	0	1.0000	0	16,966,060	12,371,974	73,653,727
2079	10,911,950	4,593,659	6,318,292	4,607,418	8.9270	41,130,423	10,866,625	218,856	10,647,769	7,764,555	4.4947	34,899,347	0	0	1.0000	0	16,966,060	12,371,974	76,029,769
2080	10,937,361	4,593,659	6,343,702	4,625,948	9.2645	42,857,096	10,882,944	218,856	10,664,088	7,776,456	4.6106	35,854,127	0	0	1.0000	0	17,007,790	12,402,404	78,711,223
2081	10,911,950	4,593,659	6,318,292	4,607,418	9.6147	44,298,944	10,866,625	218,856	10,647,769	7,764,555	4.7296	36,723,241	0	0	1.0000	0	16,966,060	12,371,974	81,022,185
2082	10,911,950	4,593,659	6,318,292	4,607,418	9.9781	45,973,280	10,866,625	218,856	10,647,769	7,764,555	4.8516	37,670,517	0	0	1.0000	0	16,966,060	12,371,974	83,643,797
2083	10,911,950	4,593,659	6,318,292	4,607,418	10.3553	47,711,198	10,866,625	218,856	10,647,769	7,764,555	4.9768	38,642,639	0	0	1.0000	0	16,966,060	12,371,974	86,353,837
2084	36,094,800	4,593,659	31,501,141	22,971,231	10.7467	246,864,924	86,355,261	218,856	86,136,405	62,812,303	5.1052	320,669,371	0	0	1.0000	0	117,637,546	85,783,534	567,534,295
2085	39,882,393	4,593,659	35,288,734	25,733,216	11.1529	286,999,979	16,073,547	218,856	15,854,691	11,561,542	5.2369	60,546,638	0	0	1.0000	0	51,143,425	37,294,757	347,546,617
2086	56,569,982	4,593,659	51,976,324	37,902,123	11.5745	438,698,121	45,582,067	218,856	45,363,211	33,079,715	5.3720	177,704,231	0	0	1.0000	0	97,339,535	70,981,838	616,402,351
2087	67,543,773	4,593,659	62,950,114	45,904,419	12.0120	551,403,887	127,312,650	218,856	127,093,794	92,679,209	5.5106	510,718,052	0	0	1.0000	0	190,043,909	138,583,629	1,062,121,939
2088	60,817,230	4,593,659	56,223,572	40,999,297	12.4661	511,101,332	48,582,126	218,856	48,363,270	35,267,415	5.6528	199,359,644	0	0	1.0000	0	104,586,841	76,266,712	710,460,976
2089	58,571,147	4,593,659	53,977,489	39,361,410	12.9373	509,230,372	43,973,574	218,856	43,754,718	31,906,772	5.7986	185,014,608	0	0	1.0000	0	97,732,207	71,268,182	694,244,980
2090	35,101,277	4,593,659	30,507,618	22,246,735	13.4263	298,691,335	15,419,970	218,856	15,201,114	11,084,941	5.9482	65,935,446	0	0	1.0000	0	45,708,732	33,331,676	364,626,781
2091	24,491,560	4,593,659	19,897,902	14,509,928	13.9338	202,178,433	22,431,075	218,856	22,212,219	16,197,572	6.1017	98,832,726	0	0	1.0000	0	42,110,120	30,707,500	301,011,158
2092	15,474,479	4,593,659	10,880,821	7,934,501	14.4605	114,736,853	13,685,530	218,856	13,466,674	9,820,155	6.2591	61,465,329	0	0	1.0000	0	24,347,495	17,754,656	176,202,183
2093	8,932,456	4,593,659	4,338,798	3,163,934	15.0071	47,481,468	7,362,321	218,856	7,143,465	5,209,151	6.4206	33,445,873	0	0	1.0000	0	11,482,263	8,373,084	80,927,342
2094	8,932,456	4,593,659	4,338,798	3,163,934	15.5744	49,276,368	7,362,321	218,856	7,143,465	5,209,151	6.5863	34,309,029	0	0	1.0000	0	11,482,263	8,373,084	83,585,397
2095	8,990,602	4,593,659	4,396,944	3,206,335	16.1631	51,824,310	15,848,222	218,856	15,629,366	11,397,231	6.7562	77,001,972	0	0	1.0000	0	20,026,310	14,603,566	128,826,282
2096	8,952,444	4,593,659	4,358,786	3,178,509	16.7741	53,316,632	7,369,039	218,856	7,150,183	5,214,049	6.9305	36,135,968	0	0	1.0000	0	11,508,968	8,392,558	89,452,600
2097	8,932,456	4,593,659	4,338,798	3,163,934	17.4081	55,078,073	7,362,321	218,856	7,143,465	5,209,151	7.1093	37,033,415	0	0	1.0000	0	11,482,263	8,373,084	92,111,488
2098	8,932,456	4,593,659	4,338,798	3,163,934	18.0662	57,160,258	7,362,321	218,856	7,143,465	5,209,151	7.2927	37,988,774	0	0	1.0000	0	11,482,263	8,373,084	95,149,031
2099	8,932,456	4,593,659	4,338,798	3,163,934	18.7491	59,320,908	7,362,321	218,856	7,143,465	5,209,151	7.4809	38,969,136	0	0	1.0000	0	11,482,263	8,373,084	98,290,044
2100	8,932,456	4,593,659	4,338,798	3,163,934	19.4578	61,563,188	7,362,321	218,856	7,143,465	5,209,151	7.6739	39,974,502	0	0	1.0000	0	11,482,263	8,373,084	101,537,690
2101	8,932,456	4,593,659	4,338,798	3,163,934	20.1933	63,890,261	7,362,321	218,856	7,143,465	5,209,151	7.8719	41,005,914	0	0	1.0000	0	11,482,263	8,373,084	104,896,175
2102	8,932,456	4,593,659	4,338,798	3,163,934	20.9566	66,305,292	7,362,321	218,856	7,143,465	5,209,151	8.0750	42,063,892	0	0	1.0000	0	11,482,263	8,373,084	108,369,184
2103	8,932,456	4,593,659	4,338,798	3,163,934	21.7488	68,811,760	7,362,321	218,856	7,143,465	5,209,151	8.2833	43,148,958	0	0	1.0000	0	11,482,263	8,373,084	111,960,718
2104	8,952,444	4,593,659	4,358,786	3,178,509	22.5709	71,741,815	7,369,039	218,856	7,150,183	5,214,049	8.4970	44,303,776	0	0	1.0000	0	11,508,968	8,392,558	116,045,590

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.8
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2105	8,932,456	4,593,659	4,338,798	3,163,934	23.4240	74,111,981	7,362,321	218,856	7,143,465	5,209,151	8.7162	45,404,000	0	0	1.0000	0	11,482,263	8,373,084	119,515,981
2106	8,932,456	4,593,659	4,338,798	3,163,934	24.3095	76,913,645	7,362,321	218,856	7,143,465	5,209,151	8.9411	46,575,538	0	0	1.0000	0	11,482,263	8,373,084	123,489,182
2107	8,932,456	4,593,659	4,338,798	3,163,934	25.2284	79,820,983	7,362,321	218,856	7,143,465	5,209,151	9.1718	47,777,289	0	0	1.0000	0	11,482,263	8,373,084	127,598,272
2108	16,140,284	4,593,659	11,546,625	8,420,019	26.1820	220,452,926	28,932,558	218,856	28,713,702	20,938,577	9.4084	196,998,508	0	0	1.0000	0	40,260,327	29,358,596	417,451,434
2109	8,932,456	4,593,659	4,338,798	3,163,934	27.1717	85,969,455	7,362,321	218,856	7,143,465	5,209,151	9.6512	50,274,556	0	0	1.0000	0	11,482,263	8,373,084	136,244,011
2110	8,932,456	4,593,659	4,338,798	3,163,934	28.1988	89,219,132	7,362,321	218,856	7,143,465	5,209,151	9.9002	51,571,634	0	0	1.0000	0	11,482,263	8,373,084	140,790,766
2111	8,932,456	4,593,659	4,338,798	3,163,934	29.2647	92,591,569	7,362,321	218,856	7,143,465	5,209,151	10.1556	52,902,051	0	0	1.0000	0	11,482,263	8,373,084	145,493,620
2112	8,952,444	4,593,659	4,358,786	3,178,509	30.3709	96,534,187	7,369,039	218,856	7,150,183	5,214,049	10.4176	54,317,878	0	0	1.0000	0	11,508,968	8,392,558	150,852,066
2113	12,526,376	4,593,659	7,932,717	5,784,688	31.5189	182,327,011	18,144,081	218,856	17,925,225	13,071,415	10.6864	139,686,366	0	0	1.0000	0	25,857,942	18,856,103	322,013,377
2114	8,932,456	4,593,659	4,338,798	3,163,934	32.7103	103,493,218	7,362,321	218,856	7,143,465	5,209,151	10.9621	57,103,231	0	0	1.0000	0	11,482,263	8,373,084	160,596,449
2115	8,932,456	4,593,659	4,338,798	3,163,934	33.9468	107,405,422	7,362,321	218,856	7,143,465	5,209,151	11.2449	58,576,379	0	0	1.0000	0	11,482,263	8,373,084	165,981,801
2116	9,671,228	4,593,659	5,077,570	3,702,660	35.2299	130,444,349	9,525,391	218,856	9,306,535	6,786,502	11.5350	78,282,300	0	0	1.0000	0	14,384,104	10,489,162	208,726,648
2117	8,932,456	4,593,659	4,338,798	3,163,934	36.5616	115,678,476	7,362,321	218,856	7,143,465	5,209,151	11.8326	61,637,797	0	0	1.0000	0	11,482,263	8,373,084	177,316,273
2118	18,995,432	4,593,659	14,401,773	10,502,047	37.9437	398,486,507	37,551,248	218,856	37,332,392	27,223,490	12.1379	330,435,996	0	0	1.0000	0	51,734,165	37,725,536	728,922,504
2119	8,932,456	4,593,659	4,338,798	3,163,934	39.3779	124,589,062	7,362,321	218,856	7,143,465	5,209,151	12.4511	64,859,657	0	0	1.0000	0	11,482,263	8,373,084	189,448,719
2120	8,952,444	4,593,659	4,358,786	3,178,509	40.8664	129,894,231	7,369,039	218,856	7,150,183	5,214,049	12.7723	66,595,400	0	0	1.0000	0	11,508,968	8,392,558	196,489,631
2121	8,932,456	4,593,659	4,338,798	3,163,934	42.4112	134,186,222	7,362,321	218,856	7,143,465	5,209,151	13.1018	68,249,251	0	0	1.0000	0	11,482,263	8,373,084	202,435,473
2122	8,932,456	4,593,659	4,338,798	3,163,934	44.0143	139,258,324	7,362,321	218,856	7,143,465	5,209,151	13.4399	70,010,465	0	0	1.0000	0	11,482,263	8,373,084	209,268,789
2123	8,932,456	4,593,659	4,338,798	3,163,934	45.6781	144,522,477	7,362,321	218,856	7,143,465	5,209,151	13.7866	71,816,477	0	0	1.0000	0	11,482,263	8,373,084	216,338,954
2124	8,952,444	4,593,659	4,358,786	3,178,509	47.4047	150,676,278	7,369,039	218,856	7,150,183	5,214,049	14.1423	73,738,647	0	0	1.0000	0	11,508,968	8,392,558	224,414,926
2125	8,932,456	4,593,659	4,338,798	3,163,934	49.1966	155,654,777	7,362,321	218,856	7,143,465	5,209,151	14.5072	75,570,191	0	0	1.0000	0	11,482,263	8,373,084	231,224,969
2126	8,932,456	4,593,659	4,338,798	3,163,934	51.0562	161,538,428	7,362,321	218,856	7,143,465	5,209,151	14.8815	77,519,977	0	0	1.0000	0	11,482,263	8,373,084	239,058,405
2127	8,932,456	4,593,659	4,338,798	3,163,934	52.9861	167,644,504	7,362,321	218,856	7,143,465	5,209,151	15.2654	79,519,770	0	0	1.0000	0	11,482,263	8,373,084	247,164,273
2128	9,671,930	4,593,659	5,078,272	3,703,172	54.9890	203,633,731	9,527,497	218,856	9,308,641	6,788,038	15.6593	106,295,918	0	0	1.0000	0	14,386,912	10,491,210	309,929,649
2129	8,932,456	4,593,659	4,338,798	3,163,934	57.0676	180,558,099	7,362,321	218,856	7,143,465	5,209,151	16.0633	83,676,151	0	0	1.0000	0	11,482,263	8,373,084	264,234,250
2130	8,932,456	4,593,659	4,338,798	3,163,934	59.2248	187,383,337	7,362,321	218,856	7,143,465	5,209,151	16.4777	85,834,823	0	0	1.0000	0	11,482,263	8,373,084	273,218,159
2131	8,932,456	4,593,659	4,338,798	3,163,934	61.4635	194,466,435	7,362,321	218,856	7,143,465	5,209,151	16.9028	88,049,233	0	0	1.0000	0	11,482,263	8,373,084	282,515,668
2132	8,952,444	4,593,659	4,358,786	3,178,509	63.7868	202,746,935	7,369,039	218,856	7,150,183	5,214,049	17.3389	90,405,877	0	0	1.0000	0	11,508,968	8,392,558	293,152,812
2133	8,932,456	4,593,659	4,338,798	3,163,934	66.1979	209,445,762	7,362,321	218,856	7,143,465	5,209,151	17.7863	92,651,518	0	0	1.0000	0	11,482,263	8,373,084	302,097,280
2134	34,089,895	4,593,659	29,496,237	21,509,216	68.7002	1,477,687,452	82,834,639	218,856	82,615,783	60,244,998	18.2451	1,099,176,019	0	0	1.0000	0	112,112,019	81,754,214	2,576,863,471
2135	8,932,456	4,593,659	4,338,798	3,163,934	71.2971	225,579,292	7,362,321	218,856	7,143,465	5,209,151	18.7159	97,493,944	0	0	1.0000	0	11,482,263	8,373,084	323,073,237
2136	8,952,444	4,593,659	4,358,786	3,178,509	73.9921	235,184,576	7,369,039	218,856	7,150,183	5,214,049	19.1987	100,102,965	0	0	1.0000	0	11,508,968	8,392,558	335,287,541
2137	8,932,456	4,593,659	4,338,798	3,163,934	76.7890	242,955,300	7,362,321	218,856	7,143,465	5,209,151	19.6941	102,589,535	0	0	1.0000	0	11,482,263	8,373,084	345,544,835
2138	8,932,456	4,593,659	4,338,798	3,163,934	79.6916	252,138,933	7,362,321	218,856	7,143,465	5,209,151	20.2022	105,236,305	0	0	1.0000	0	11,482,263	8,373,084	357,375,238
2139	8,932,456	4,593,659	4,338,798	3,163,934	82.7040	261,669,967	7,362,321	218,856	7,143,465	5,209,151	20.7234	107,951,314	0	0	1.0000	0	11,482,263	8,373,084	369,621,281
2140	8,952,444	4,593,659	4,358,786	3,178,509	85.8302	272,812,087	7,369,039	218,856	7,150,183	5,214,049	21.2580	110,840,257	0	0	1.0000	0	11,508,968	8,392,558	383,652,343
2141	8,932,456	4,593,659	4,338,798	3,163,934	89.0745	281,825,806	7,362,321	218,856	7,143,465	5,209,151	21.8065	113,593,345	0	0	1.0000	0	11,482,263	8,373,084	395,419,152
2142	8,932,456	4,593,659	4,338,798	3,163,934	92.4416	292,479,087	7,362,321	218,856	7,143,465	5,209,151	22.3691	116,524,014	0	0	1.0000	0	11,482,263	8,373,084	409,003,101
2143	8,932,456	4,593,659	4,338,798	3,163,934	95.9359	303,534,820	7,362,321	218,856	7,143,465	5,209,151	22.9462	119,530,214	0	0	1.0000	0	11,482,263	8,373,084	423,065,035
2144	8,952,444	4,593,659	4,358,786	3,178,509	99.5622	316,459,376	7,369,039	218,856	7,150,183	5,214,049	23.5382	122,729,331	0	0	1.0000	0	11,508,968	8,392,558	439,188,707
2145	8,932,456	4,593,659	4,338,798	3,163,934	103.3257	326,915,657	7,362,321	218,856	7,143,465	5,209,151	24.1455	125,777,549	0	0	1.0000	0	11,482,263	8,373,084	452,693,206
2146	8,932,456	4,593,659	4,338,798	3,163,934	107.2314	339,273,033	7,362,321	218,856	7,143,465	5,209,151	24.7685	129,022,850	0	0	1.0000	0	11,482,263	8,373,084	468,295,883
2147	8,932,456	4,593,659	4,338,798	3,163,934	111.2847	352,097,405	7,362,321	218,856	7,143,465	5,209,151	25.4075	132,351,497	0	0	1.0000	0	11,482,263	8,373,084	484,448,902
2148	8,952,444	4,593,659	4,358,786	3,178,509	115.4913	367,090,168	7,369,039	218,856	7,150,183	5,214,049	26.0630	135,893,763	0	0	1.0000	0	11,508,968	8,392,558	502,983,931
2149	8,932,456	4,593,659	4,338,798	3,163,934	119.8569	379,219,277	7,362,321	218,856	7,143,465	5,209,151	26.7355	139,269,249	0	0	1.0000	0	11,482,263	8,373,084	518,488,526
2150	8,932,456	4,593,659	4,338,798	3,163,934	124.3875	393,553,795	7,362,321	218,856	7,143,465	5,209,151	27.4252	142,862,001	0	0	1.0000	0	11,482,263	8,373,084	536,415,795
2151	8,932,456	4,593,659	4,338,798	3,163,934	129.0893	408,429,978	7,362,321	218,856	7,143,465	5,209,151	28.1328	146,547,996	0	0	1.0000	0	11,482,263	8,373,084	554,977,973
2152	8,952,444	4,593,659	4,358,786	3,178,509	133.9689	425,821,391	7,369,039	218,856	7,150,183	5,214,049	28.8586	150,470,159	0	0	1.0000	0	11,508,968	8,392,558	576,291,549
2153	8,932,456	4,593,659	4,338,798	3,163,934	139.0329	439,890,868	7,362,321	218,856	7,143,465	5,209,151	29.6032	154,207,531	0	0	1.0000	0	11,482,263	8,373,084	594,098,399
2154	8,932,456	4,593,659	4,338,798	3,163,934	144.2884	456,518,921	7,362,321	218,856	7,143,465	5,209,151	30.3669	158,185,759	0	0	1.0000	0	11,482,263	8,373,084	614,704,681
2155	8,932,456	4,593,659	4,338,798	3,163,934	149.7425	473,775,332	7,362,321	218,856	7,143,465	5,209,151	31.1504	162,267,129	0	0	1.0000	0	11,482,263	8,373,084	636,042,461
2156	8,952,444	4,593,659	4,358,786	3,178,509	155.4027	493,948,923	7,369,039	218,856	7,150,183	5,214,049	31.9541	166,610,248	0	0	1.0000	0	11,508,968	8,392,558	660,559,170
2157	8,932,456	4,593,659	4,338,798	3,163,934	161.2769	510,269,408	7,362,321	218,856	7,143,465	5,209,151	32.7785	170,748,147	0	0	1.0000	0	11,482,263	8,373,084	681,017,555
2158	16,120,296	4,593,659	11,526,637	8,405,443	167.3732	1,406,845,880	28,925,841	218,856	28,706,985	20,933,679	33.6242	703,878,196	0	0	1.0000	0	40,233,622	29,339,122	2,110,724,076
2159	8,932,456	4,593,659	4,338,798	3,163,934	173.6999	549,574,955	7,362,321	218,856	7,143,465	5,209,151	34.4917	179,672,464	0	0	1.0000	0	11,482,263	8,373,084	729,247,420
2160	8,952,444	4,593,659	4,358,786	3,178,509	180.2658	572,976,517	7,369,039	218,856	7,150,183	5,214,049	35.3816	184,481,401	0	0	1.0000	0	11,508,968	8,392,558	757,457,918
2161	8,932,456	4,593,659	4,338,798	3,163,934	187.0798	591,908,071	7,362,321	218,856	7,143,465	5,209,151	36.2944	189,063,000	0	0	1.0000	0	11,482,263	8,373,084	780,971,071
2162	8,932,456	4,593,659	4,338,798	3,163,934	194.1514	614,282,144	7,362,321	218,856	7,143,465	5,209,151	37.2308	193,940,849	0	0	1.0000	0	11,482,263	8,373,084	808,222,993
2163	12,526,376	4,593,659	7,932,717	5,784,688	201.4904	1,165,559,155	18,144,081	218,856	17,925,225	13,071,415	38.1914	499,215,626	0	0	1.0000	0	25,857,942	18,856,103	1,664,774,781
2164	8,952,444	4,593,659	4,358,786	3,178,509	209.1067	664,647,585	7,369,039	218,856	7,150,183	5,214,049	39.1767	204,269,239	0	0	1.0000	0	11,508,968	8,392,558	868,916,824
2165	8,932,456	4,593,659	4,338,798	3,163,934	217.0109	686,608,085	7,362,321	218,856	7,143,465	5,209,151	40.1875	209,342,745	0	0	1.0000	0	11,482,263	8,373,084	895,950,830
2166	9,651,240	4,593,659	5,057,582	3,688,085	225.2140	830,608,276	9,518,673	218,856	9,299,817	6,781,604	41.2243	279,566,858	0	0	1.0000	0	14,357,399	10,469,688	1,110,175,134
2167	8,932,456	4,593,659	4,338,798	3,163,934	233.7270	739,496,716	7,362,321	218,856	7,143,465	5,209,151	42.2879	220,284,045	0	0	1.0000	0	11,482,263	8,373,084	959,780,761
2168	19,734,906	4,593,659	15,141,247	11,041,285	242.5619	2,678,195,097	39,716,424	218,856	39,497,568	28,802,377	43.3789	1,249,415,418	0	0	1.0000	0	54,638,815	39,843,662	3,927,610,515
2169	8,932,456	4,593,659	4,338,798	3,163,934	251.7308	796,459,544	7,362,321	218,856	7,143,465	5,209,151	44.4981	231,797,310	0	0	1.0000	0	11,482,263	8,373,084	1,028,256,854
2170	8,932,456	4,593,659	4,338,798	3,163,934	261.2462	826,565,638	7,362,321	218,856	7,143,465	5,209,151	45.6462	237,777,936	0	0	1.0000	0	11,482,263	8,373,084	1,064,343,574
2171	8,932,456	4,593,659	4,338,798	3,163,934	271.1213	857,809,799	7,362,321	218,856	7,143,465	5,209,151	46.8238	243,912,232	0	0	1.0000	0	11,482,263	8,373,084	1,101,722,031
2172	8,952,444	4,593,659	4,358,786	3,178,509	281.3697	894,336,200	7,369,039	218,856	7,150,183	5,214,049	48.0319	250,440,687	0	0	1.0000	0	11,508,968	8,392,558	1,144,776,887
2173	8,932,456	4,593,659	4,338,798	3,163,934	292.0054	923,885,706	7,362,321	218,856	7,143,465	5,209,151	49.2711	256,660,586	0	0	1.0000	0	11,482,263	8,373,084	1,180,546,292
2174	8,932,456	4,593,659	4,338,798	3,163,934	303.0433	958,808,889	7,362,321	218,856	7,143,465	5,209,151	50.5423	263,282,459	0	0	1.0000	0	11,482,263	8,373,084	1,222,091,347
2175	8,932,456	4,593,659	4,338,798	3,163,934	314.4983	995,051,748	7,362,321	218,856	7,143,465	5,209,151	51.8463	270,075,191	0	0	1.0000	0	11,482,263	8,373,084	1,265,126,940
2176	8,952,444	4,593,659	4,358,786	3,178,509	326.3863	1,037,421,881	7,369,039	218,856	7,150,183	5,214,049	53.1839	277,303,468	0	0	1.0000	0	11,508,968	8,392,558	1,314,725,349
2177	8,932,456	4,593,659	4,338,798	3,163,934	338.7237	1,071,699,306	7,362,321	218,856	7,143,465	5,209,151	54.5561	284,190,948	0	0	1.0000	0	11,482,263	8,373,084	1,355,890,254
2178	8,932,456	4,593,659	4,338,798	3,163,934	351.5275	1,112,209,680	7,362,321	218,856	7,143,465	5,209,151	55.9636	291,522,828	0	0	1.0000	0	11,482,263	8,373,084	1,403,732,507
2179	8,932,456	4,593,659	4,338,798	3,163,934	364.8152	1,154,251,080	7,362,321	218,856	7,143,465	5,209,151	57.4075	299,044,320	0	0	1.0000	0	11,482,263	8,373,084	1,453,295,401
2180	8,952,444	4,593,659	4,358,786	3,178,509	378.6052	1,203,400,139	7,369,039	218,856	7,150,183	5,214,049	58.8886	307,048,054	0	0	1.0000	0	11,508,968	8,392,558	1,510,448,193
2181	8,932,456	4,593,659	4,338,798	3,163,934	392.9165	1,243,161,729	7,362,321	218,856	7,143,465	5,209,151	60.4079	314,673,856	0	0	1.0000	0	11,482,263	8,373,084	1,557,835,585

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.8
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2182	8,932,456	4,593,659	4,338,798	3,163,934	407.7688	1,290,153,420	7,362,321	218,856	7,143,465	5,209,151	61.9664	322,792,318	0	0	1.0000	0	11,482,263	8,373,084	1,612,945,738
2183	8,932,456	4,593,659	4,338,798	3,163,934	423.1824	1,338,921,027	7,362,321	218,856	7,143,465	5,209,151	63.5652	331,120,708	0	0	1.0000	0	11,482,263	8,373,084	1,670,041,735
2184	34,109,883	4,593,659	29,516,225	21,523,792	439.1787	9,452,790,904	82,841,356	218,856	82,622,500	60,249,897	65.2052	3,928,606,567	0	0	1.0000	0	112,138,725	81,773,689	13,381,397,471
2185	8,932,456	4,593,659	4,338,798	3,163,934	455.7797	1,442,056,721	7,362,321	218,856	7,143,465	5,209,151	66.8874	348,426,548	0	0	1.0000	0	11,482,263	8,373,084	1,790,483,270
2186	8,932,456	4,593,659	4,338,798	3,163,934	473.0081	1,496,566,235	7,362,321	218,856	7,143,465	5,209,151	68.6131	357,415,980	0	0	1.0000	0	11,482,263	8,373,084	1,853,982,215
2187	8,932,456	4,593,659	4,338,798	3,163,934	490.8878	1,553,136,420	7,362,321	218,856	7,143,465	5,209,151	70.3834	366,637,739	0	0	1.0000	0	11,482,263	8,373,084	1,919,774,159
2188	8,952,444	4,593,659	4,358,786	3,178,509	509.4434	1,619,270,570	7,369,039	218,856	7,150,183	5,214,049	72.1993	376,450,698	0	0	1.0000	0	11,508,968	8,392,558	1,995,721,269
2189	8,932,456	4,593,659	4,338,798	3,163,934	528.7004	1,672,772,976	7,362,321	218,856	7,143,465	5,209,151	74.0620	385,800,121	0	0	1.0000	0	11,482,263	8,373,084	2,058,573,098
2190	8,932,456	4,593,659	4,338,798	3,163,934	548.6852	1,736,003,557	7,362,321	218,856	7,143,465	5,209,151	75.9728	395,753,766	0	0	1.0000	0	11,482,263	8,373,084	2,131,757,324
2191	8,932,456	4,593,659	4,338,798	3,163,934	569.4255	1,801,624,490	7,362,321	218,856	7,143,465	5,209,151	77.9329	405,964,223	0	0	1.0000	0	11,482,263	8,373,084	2,207,588,713
2192	9,672,344	4,593,659	5,078,686	3,703,474	590.9498	2,188,567,237	9,528,739	218,856	9,309,883	6,788,943	79.9436	542,732,577	0	0	1.0000	0	14,388,568	10,492,417	2,731,299,814
2193	10,192,281	4,593,659	5,598,623	4,082,622	613.2877	2,503,821,831	11,141,796	218,856	10,922,940	7,965,216	82.0061	653,196,276	0	0	1.0000	0	16,521,563	12,047,838	3,157,018,106
2194	9,112,431	4,593,659	4,518,773	3,295,175	636.4700	2,097,279,918	7,902,246	218,856	7,683,390	5,602,874	84.1219	471,324,431	0	0	1.0000	0	12,202,163	8,898,049	2,568,604,349
2195	10,012,306	4,593,659	5,418,648	3,951,381	660.5286	2,610,000,007	10,601,871	218,856	10,383,015	7,571,492	86.2922	653,360,714	0	0	1.0000	0	15,801,663	11,522,873	3,263,360,721
2196	10,392,244	4,593,659	5,798,586	4,228,439	685.4966	2,898,580,413	11,688,439	218,856	11,469,583	8,363,838	88.5185	740,354,367	0	0	1.0000	0	17,268,168	12,592,276	3,638,934,779
2197	7,295,626	4,593,659	2,701,967	1,970,326	711.4083	1,401,706,044	2,451,830	218,856	2,232,974	1,628,327	90.8023	147,855,826	0	0	1.0000	0	4,934,941	3,598,653	1,549,561,870
2198	7,295,626	4,593,659	2,701,967	1,970,326	738.2996	1,454,690,663	2,451,830	218,856	2,232,974	1,628,327	93.1450	151,670,507	0	0	1.0000	0	4,934,941	3,598,653	1,606,361,170
2199	7,295,626	4,593,659	2,701,967	1,970,326	766.2073	1,509,677,921	2,451,830	218,856	2,232,974	1,628,327	95.5482	155,583,702	0	0	1.0000	0	4,934,941	3,598,653	1,665,261,623
2200	7,295,626	4,593,659	2,701,967	1,970,326	795.1699	1,566,743,675	2,451,830	218,856	2,232,974	1,628,327	98.0133	159,597,691	0	0	1.0000	0	4,934,941	3,598,653	1,726,341,366
2201	7,295,626	4,593,659	2,701,967	1,970,326	825.2273	1,625,966,542	2,451,830	218,856	2,232,974	1,628,327	100.5421	163,715,404	0	0	1.0000	0	4,934,941	3,598,653	1,789,681,946
2202	7,295,626	4,593,659	2,701,967	1,970,326	856.4209	1,687,428,094	2,451,830	218,856	2,232,974	1,628,327	103.1360	167,939,121	0	0	1.0000	0	4,934,941	3,598,653	1,855,367,215
2203	7,295,626	4,593,659	2,701,967	1,970,326	888.7937	1,751,213,053	2,451,830	218,856	2,232,974	1,628,327	105.7969	172,271,936	0	0	1.0000	0	4,934,941	3,598,653	1,923,484,989
2204	7,315,614	4,593,659	2,721,955	1,984,901	922.3901	1,830,853,329	2,458,547	218,856	2,239,691	1,633,225	108.5265	177,248,225	0	0	1.0000	0	4,961,646	3,618,127	2,008,101,554
2205	7,295,626	4,593,659	2,701,967	1,970,326	957.2564	1,886,106,869	2,451,830	218,856	2,232,974	1,628,327	111.3265	181,275,932	0	0	1.0000	0	4,934,941	3,598,653	2,067,382,801
2206	7,295,626	4,593,659	2,701,967	1,970,326	993.4407	1,957,401,724	2,451,830	218,856	2,232,974	1,628,327	114.1987	185,952,813	0	0	1.0000	0	4,934,941	3,598,653	2,143,354,537
2207	7,295,626	4,593,659	2,701,967	1,970,326	1,030.9927	2,031,391,395	2,451,830	218,856	2,232,974	1,628,327	117.1450	190,750,352	0	0	1.0000	0	4,934,941	3,598,653	2,222,141,747
2208	15,222,939	4,593,659	10,629,281	7,751,073	1,069.9643	8,293,371,881	26,180,524	218,856	25,961,668	18,931,742	120.1674	2,274,978,176	0	0	1.0000	0	36,590,949	26,682,815	10,568,350,057
2209	7,295,626	4,593,659	2,701,967	1,970,326	1,110.4089	2,187,867,173	2,451,830	218,856	2,232,974	1,628,327	123.2677	200,720,109	0	0	1.0000	0	4,934,941	3,598,653	2,388,587,282
2210	7,295,626	4,593,659	2,701,967	1,970,326	1,152.3824	2,270,568,638	2,451,830	218,856	2,232,974	1,628,327	126.4480	205,898,677	0	0	1.0000	0	4,934,941	3,598,653	2,476,467,315
2211	7,295,626	4,593,659	2,701,967	1,970,326	1,195.9424	2,356,396,025	2,451,830	218,856	2,232,974	1,628,327	129.7104	211,210,931	0	0	1.0000	0	4,934,941	3,598,653	2,567,606,955
2212	7,315,614	4,593,659	2,721,955	1,984,901	1,241.1491	2,463,558,490	2,458,547	218,856	2,239,691	1,633,225	133.0569	217,311,894	0	0	1.0000	0	4,961,646	3,618,127	2,680,870,384
2213	10,889,546	4,593,659	6,295,887	4,591,080	1,288.0645	5,913,607,589	13,233,589	218,856	13,014,733	9,490,591	136.4898	1,295,368,843	0	0	1.0000	0	19,310,620	14,081,671	7,208,976,432
2214	7,295,626	4,593,659	2,701,967	1,970,326	1,336.7533	2,633,839,357	2,451,830	218,856	2,232,974	1,628,327	140.0112	227,984,000	0	0	1.0000	0	4,934,941	3,598,653	2,861,823,358
2215	7,295,626	4,593,659	2,701,967	1,970,326	1,387.2826	2,733,398,535	2,451,830	218,856	2,232,974	1,628,327	143.6235	233,866,006	0	0	1.0000	0	4,934,941	3,598,653	2,967,264,540
2216	8,034,398	4,593,659	3,440,739	2,509,052	1,439.7219	3,612,337,475	4,614,899	218,856	4,396,043	3,205,678	147.3290	472,289,346	0	0	1.0000	0	7,836,782	5,714,730	4,084,626,821
2217	7,295,626	4,593,659	2,701,967	1,970,326	1,494.1434	2,943,949,113	2,451,830	218,856	2,232,974	1,628,327	151.1301	246,089,204	0	0	1.0000	0	4,934,941	3,598,653	3,190,038,317
2218	17,877,539	4,593,659	13,283,880	9,686,858	1,550.6220	15,020,654,784	34,197,569	218,856	33,978,713	24,777,923	155.0292	3,841,301,607	0	0	1.0000	0	47,262,593	34,464,781	18,861,956,392
2219	7,918,351	4,593,659	3,324,692	2,424,429	1,609.2355	3,901,476,544	4,320,005	218,856	4,101,149	2,990,636	159.0290	475,597,786	0	0	1.0000	0	7,425,841	5,415,064	4,377,074,330
2220	7,834,551	4,593,659	3,240,893	2,363,320	1,670.0646	3,946,897,751	4,015,360	218,856	3,796,504	2,768,483	163.1319	451,627,818	0	0	1.0000	0	7,037,396	5,131,803	4,398,525,569
2221	7,814,563	4,593,659	3,220,905	2,348,745	1,733.1930	4,070,827,988	4,008,642	218,856	3,789,786	2,763,584	167.3407	462,460,103	0	0	1.0000	0	7,010,691	5,112,329	4,533,288,092
2222	7,814,563	4,593,659	3,220,905	2,348,745	1,798.7077	4,224,705,297	4,008,642	218,856	3,789,786	2,763,584	171.6581	474,391,602	0	0	1.0000	0	7,010,691	5,112,329	4,699,096,899
2223	7,918,351	4,593,659	3,324,692	2,424,429	1,866.6989	4,525,678,170	4,320,005	218,856	4,101,149	2,990,636	176.0869	526,611,749	0	0	1.0000	0	7,425,841	5,415,064	5,052,289,919
2224	7,834,551	4,593,659	3,240,893	2,363,320	1,937.2601	4,578,366,328	4,015,360	218,856	3,796,504	2,768,483	180.6299	500,070,726	0	0	1.0000	0	7,037,396	5,131,803	5,078,437,054
2225	7,814,563	4,593,659	3,220,905	2,348,745	2,010.4885	4,722,124,343	4,008,642	218,856	3,789,786	2,763,584	185.2902	512,065,057	0	0	1.0000	0	7,010,691	5,112,329	5,234,189,399
2226	7,814,563	4,593,659	3,220,905	2,348,745	2,086.4850	4,900,620,724	4,008,642	218,856	3,789,786	2,763,584	190.0707	525,276,371	0	0	1.0000	0	7,010,691	5,112,329	5,425,897,095
2227	7,918,351	4,593,659	3,324,692	2,424,429	2,165.3541	5,249,746,373	4,320,005	218,856	4,101,149	2,990,636	194.9745	583,097,678	0	0	1.0000	0	7,425,841	5,415,064	5,832,844,051
2228	7,834,551	4,593,659	3,240,893	2,363,320	2,247.2045	5,310,864,254	4,015,360	218,856	3,796,504	2,768,483	200.0048	553,709,798	0	0	1.0000	0	7,037,396	5,131,803	5,864,574,052
2229	7,814,563	4,593,659	3,220,905	2,348,745	2,332.1489	5,477,622,524	4,008,642	218,856	3,789,786	2,763,584	205.1650	566,990,739	0	0	1.0000	0	7,010,691	5,112,329	6,044,613,263
2230	7,450,719	4,593,659	2,857,061	2,083,423	2,420.3041	5,042,517,267	9,382,617	218,856	9,163,761	6,682,389	210.4582	1,406,363,550	0	0	1.0000	0	12,020,822	8,765,812	6,448,880,817
2231	1,940,943	4,593,659	(2,652,716)	(1,934,411)	2,511.7916	(4,858,836,358)	5,236,109	218,856	5,017,253	3,658,676	215.8880	789,864,213	0	0	1.0000	0	2,364,537	1,724,265	(4,068,972,146)
	$2,444,586,091	$891,169,774	$1,553,416,317	$1,132,780,693		$198,634,575,587	$2,451,715,946	$42,458,064	$2,409,257,882	$1,756,876,624		$47,195,859,301	$0	$0		$0	$3,962,674,199	$2,889,657,317	$245,830,434,888

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.8
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment					
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 1																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2033	$19,544,542	$0	$19,544,542	$14,252,251	1.6199	$23,087,222	$4,605,809	$0	$4,605,809	$3,358,644	1.3926	$4,677,247	$1,250,000	$911,524	1.0000	$911,524	$25,400,351	$18,522,419	$28,675,993
2034	48,889,567	-	48,889,567	$35,651,201	1.6811	59,933,234	31,903,703	-	31,903,703	23,264,786	1.4285	33,233,747	1,250,000	911,524	1.0000	911,524	82,043,270	59,827,511	94,078,505
2035	15,648,396	-	15,648,396	$11,411,108	1.7446	19,907,819	18,630,107	-	18,630,107	13,585,428	1.4653	19,906,728	1,250,000	911,524	1.0000	911,524	35,528,504	25,908,060	40,726,070
2036	11,693,506	-	11,693,506	$8,527,127	1.8106	15,439,216	16,992,077	-	16,992,077	12,390,945	1.5032	18,626,069	1,250,000	911,524	1.0000	911,524	29,935,583	21,829,596	34,976,809
2037	16,619,039	-	16,619,039	$12,118,919	1.8790	22,771,449	31,814,682	-	31,814,682	23,199,870	1.5419	35,771,880	1,250,000	911,524	1.0000	911,524	49,683,721	36,230,313	59,454,853
2038	23,865,956	-	23,865,956	$17,403,509	1.9501	33,938,583	55,065,305	-	55,065,305	40,154,666	1.5817	63,512,636	1,250,000	911,524	1.0000	911,524	80,181,261	58,469,699	98,362,742
2039	4,978,647	-	4,978,647	$3,630,524	2.0238	7,347,454	5,504,477	-	5,504,477	4,013,969	1.6225	6,512,665	1,250,000	911,524	1.0000	911,524	11,733,124	8,556,017	14,771,643
2040	4,992,286	-	4,992,286	$3,640,470	2.1003	7,646,079	5,522,983	-	5,522,983	4,027,464	1.6644	6,703,312	1,250,000	911,524	1.0000	911,524	11,765,270	8,579,458	15,260,915
2041	4,978,647	2,315,817	2,662,829	$1,941,786	2.1797	4,232,510	5,504,477	109,428	5,395,049	3,934,172	1.7073	6,716,813	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	11,860,847
2042	4,978,647	2,315,817	2,662,829	$1,941,786	2.2620	4,392,319	5,504,477	109,428	5,395,049	3,934,172	1.7514	6,890,310	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	12,194,153
2043	4,978,647	2,315,817	2,662,829	$1,941,786	2.3475	4,558,342	5,504,477	109,428	5,395,049	3,934,172	1.7966	7,068,134	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	12,538,000
2044	4,992,286	2,315,817	2,676,469	$1,951,732	2.4363	4,755,004	5,522,983	109,428	5,413,555	3,947,667	1.8429	7,275,156	1,250,000	911,524	1.0000	911,524	9,340,024	6,810,923	12,941,684
2045	6,492,785	2,315,817	4,176,967	$3,045,924	2.5284	7,701,314	10,046,890	109,428	9,937,462	7,246,586	1.8905	13,699,672	1,250,000	911,524	1.0000	911,524	15,364,430	11,204,034	22,312,509
2046	5,988,072	2,315,817	3,672,254	$2,677,878	2.6239	7,026,483	8,532,752	109,428	8,423,324	6,142,448	1.9392	11,911,436	1,250,000	911,524	1.0000	911,524	13,345,579	9,731,850	19,849,443
2047	5,988,072	2,315,817	3,672,254	$2,677,878	2.7231	7,292,129	8,532,752	109,428	8,423,324	6,142,448	1.9893	12,219,172	1,250,000	911,524	1.0000	911,524	13,345,579	9,731,850	20,422,825
2048	4,992,286	2,315,817	2,676,469	$1,951,732	2.8261	5,515,790	5,522,983	109,428	5,413,555	3,947,667	2.0406	8,055,610	1,250,000	911,524	1.0000	911,524	9,340,024	6,810,923	14,482,923
2049	5,988,072	2,315,817	3,672,254	$2,677,878	2.9329	7,853,948	8,532,752	109,428	8,423,324	6,142,448	2.0932	12,857,373	1,250,000	911,524	1.0000	911,524	13,345,579	9,731,850	21,622,844
2050	6,492,785	2,315,817	4,176,967	$3,045,924	3.0438	9,271,183	10,046,890	109,428	9,937,462	7,246,586	2.1472	15,559,870	1,250,000	911,524	1.0000	911,524	15,364,430	11,204,034	25,742,577
2051	6,438,009	2,315,817	4,122,192	$3,005,981	3.1588	9,495,292	9,882,565	109,428	9,773,137	7,126,757	2.2026	15,697,395	1,250,000	911,524	1.0000	911,524	15,145,329	11,044,262	26,104,211
2052	6,506,424	2,315,817	4,190,607	$3,055,870	3.2782	10,017,753	10,065,396	109,428	9,955,968	7,260,081	2.2595	16,404,154	1,250,000	911,524	1.0000	911,524	15,396,575	11,227,475	27,333,431
2053	4,978,647	2,315,817	2,662,829	$1,941,786	3.4021	6,606,149	5,504,477	109,428	5,395,049	3,934,172	2.3178	9,118,625	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	16,636,298
2054	4,978,647	2,315,817	2,662,829	$1,941,786	3.5307	6,855,863	5,504,477	109,428	5,395,049	3,934,172	2.3776	9,353,888	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	17,121,275
2055	6,492,785	2,315,817	4,176,967	$3,045,924	3.6642	11,160,874	10,046,890	109,428	9,937,462	7,246,586	2.4389	17,673,700	1,250,000	911,524	1.0000	911,524	15,364,430	11,204,034	29,746,097
2056	6,001,712	2,315,817	3,685,894	$2,687,824	3.8027	10,220,988	8,551,259	109,428	8,441,831	6,155,943	2.5018	15,400,939	1,250,000	911,524	1.0000	911,524	13,377,725	9,755,291	26,533,451
2057	5,988,072	2,315,817	3,672,254	$2,677,878	3.9464	10,567,977	8,532,752	109,428	8,423,324	6,142,448	2.5664	15,763,979	1,250,000	911,524	1.0000	911,524	13,345,579	9,731,850	27,243,480
2058	4,978,647	2,315,817	2,662,829	$1,941,786	4.0956	7,952,777	5,504,477	109,428	5,395,049	3,934,172	2.6326	10,357,102	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	19,221,403
2059	5,933,297	2,315,817	3,617,479	$2,637,935	4.2504	11,212,278	8,368,427	109,428	8,258,999	6,022,619	2.7005	16,264,083	1,250,000	911,524	1.0000	911,524	13,126,478	9,572,077	28,387,884
2060	6,001,712	2,315,817	3,685,894	$2,687,824	4.4111	11,856,260	8,551,259	109,428	8,441,831	6,155,943	2.7702	17,053,194	1,250,000	911,524	1.0000	911,524	13,377,725	9,755,291	29,820,978
2061	5,988,072	2,315,817	3,672,254	$2,677,878	4.5778	12,258,789	8,532,752	109,428	8,423,324	6,142,448	2.8416	17,454,381	1,250,000	911,524	1.0000	911,524	13,345,579	9,731,850	30,624,693
2062	4,978,647	2,315,817	2,662,829	$1,941,786	4.7509	9,225,229	5,504,477	109,428	5,395,049	3,934,172	2.9150	11,468,113	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	21,604,866
2063	8,006,922	2,315,817	5,691,105	$4,150,062	4.9305	20,461,880	14,589,304	109,428	14,479,876	10,559,001	2.9902	31,573,524	1,250,000	911,524	1.0000	911,524	21,420,981	15,620,587	52,946,928
2064	6,956,362	2,315,817	4,640,544	$3,383,973	5.1168	17,315,113	11,415,209	109,428	11,305,781	8,244,390	3.0673	25,288,018	1,250,000	911,524	1.0000	911,524	17,196,325	12,539,887	43,514,655
2065	5,988,072	2,315,817	3,672,254	$2,677,878	5.3103	14,220,334	8,532,752	109,428	8,423,324	6,142,448	3.1465	19,327,213	1,250,000	911,524	1.0000	911,524	13,345,579	9,731,850	34,459,071
2066	4,978,647	2,315,817	2,662,829	$1,941,786	5.5110	10,701,181	5,504,477	109,428	5,395,049	3,934,172	3.2276	12,697,935	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	24,310,639
2067	4,978,647	2,315,817	2,662,829	$1,941,786	5.7193	11,105,655	5,504,477	109,428	5,395,049	3,934,172	3.3109	13,025,652	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	25,042,830
2068	7,011,137	2,315,817	4,695,319	$3,423,916	5.9355	20,322,654	11,579,534	109,428	11,470,106	8,364,220	3.3963	28,407,399	1,250,000	911,524	1.0000	911,524	17,415,426	12,699,659	49,641,577
2069	6,492,785	2,315,817	4,176,967	$3,045,924	6.1598	18,762,281	10,046,890	109,428	9,937,462	7,246,586	3.4840	25,247,107	1,250,000	911,524	1.0000	911,524	15,364,430	11,204,034	44,920,912
2070	4,978,647	2,315,817	2,662,829	$1,941,786	6.3927	12,413,253	5,504,477	109,428	5,395,049	3,934,172	3.5738	14,059,945	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	27,384,722
2071	4,978,647	2,315,817	2,662,829	$1,941,786	6.6343	12,882,389	5,504,477	109,428	5,395,049	3,934,172	3.6660	14,422,676	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	28,216,588
2072	7,461,074	2,315,817	5,145,257	$3,752,019	6.8851	25,833,027	12,929,347	109,428	12,819,919	9,348,528	3.7606	35,156,076	1,250,000	911,524	1.0000	911,524	19,215,176	14,012,071	61,900,626
2073	4,978,647	2,315,817	2,662,829	$1,941,786	7.1454	13,874,835	5,504,477	109,428	5,395,049	3,934,172	3.8576	15,176,464	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	29,962,823
2074	4,978,647	2,315,817	2,662,829	$1,941,786	7.4155	14,399,312	5,504,477	109,428	5,395,049	3,934,172	3.9572	15,568,307	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	30,879,142
2075	7,861,953	2,315,817	5,546,135	$4,044,347	7.6958	31,124,488	14,154,395	109,428	14,044,967	10,241,857	4.0593	41,574,770	1,250,000	911,524	1.0000	911,524	20,841,103	15,197,728	73,610,782
2076	4,992,286	2,315,817	2,676,469	$1,951,732	7.9867	15,587,897	5,522,983	109,428	5,413,555	3,947,667	4.1640	16,438,087	1,250,000	911,524	1.0000	911,524	9,340,024	6,810,923	32,937,508
2077	4,978,647	2,315,817	2,662,829	$1,941,786	8.2886	16,094,685	5,504,477	109,428	5,395,049	3,934,172	4.2714	16,804,424	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	33,810,632
2078	7,502,210	2,315,817	5,186,392	$3,782,016	8.6019	32,532,522	13,075,166	109,428	12,965,738	9,454,863	4.3816	41,427,426	1,250,000	911,524	1.0000	911,524	19,402,131	14,148,402	74,871,473
2079	4,978,647	2,315,817	2,662,829	$1,941,786	8.9270	17,334,321	5,504,477	109,428	5,395,049	3,934,172	4.4947	17,682,925	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	35,928,769
2080	4,992,286	2,315,817	2,676,469	$1,951,732	9.2645	18,081,820	5,522,983	109,428	5,413,555	3,947,667	4.6106	18,201,115	1,250,000	911,524	1.0000	911,524	9,340,024	6,810,923	37,194,459
2081	4,978,647	2,315,817	2,662,829	$1,941,786	9.6147	18,669,687	5,504,477	109,428	5,395,049	3,934,172	4.7296	18,607,062	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	38,188,272
2082	7,392,660	2,315,817	5,076,842	$3,702,130	9.9781	36,940,221	12,746,515	109,428	12,637,087	9,215,204	4.8516	44,708,485	1,250,000	911,524	1.0000	911,524	18,963,930	13,828,858	82,560,229
2083	4,978,647	2,315,817	2,662,829	$1,941,786	10.3553	20,107,773	5,504,477	109,428	5,395,049	3,934,172	4.9768	19,579,589	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	40,598,886
2084	4,992,286	2,315,817	2,676,469	$1,951,732	10.7467	20,974,677	5,522,983	109,428	5,413,555	3,947,667	5.1052	20,153,632	1,250,000	911,524	1.0000	911,524	9,340,024	6,810,923	42,039,833
2085	4,978,647	2,315,817	2,662,829	$1,941,786	11.1529	21,656,541	5,504,477	109,428	5,395,049	3,934,172	5.2369	20,602,868	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	43,170,933
2086	4,978,647	2,315,817	2,662,829	$1,941,786	11.5745	22,475,198	5,504,477	109,428	5,395,049	3,934,172	5.3720	21,134,374	1,250,000	911,524	1.0000	911,524	9,307,878	6,787,482	44,521,096
2087	27,646,324	2,315,817	25,330,507	$18,471,487	12.0120	221,879,500	10,574,492	109,428	10,465,064	7,631,323	5.5106	42,053,170	1,250,000	911,524	1.0000	911,524	37,045,570	27,014,334	264,844,194
2088	64,790,288	2,315,817	62,474,470	$45,557,571	12.4661	567,925,234	65,822,144	109,428	65,712,716	47,918,961	5.6528	270,876,305	1,250,000	911,524	1.0000	911,524	129,437,187	94,388,056	839,713,063
2089	57,854,410	2,315,817	55,538,593	$40,499,797	12.9373	523,958,025	68,105,685	109,428	67,996,257	49,584,162	5.7986	287,518,724	1,250,000	911,524	1.0000	911,524	124,784,850	90,995,483	812,388,273
2090	43,227,498	2,315,817	40,911,680	$29,833,575	13.4263	400,554,523	46,637,084	109,428	46,527,656	33,928,851	5.9482	201,815,590	1,250,000	911,524	1.0000	911,524	88,689,336	64,673,949	603,281,636
2091	37,320,475	2,315,817	35,004,658	$25,526,062	13.9338	355,675,038	37,967,073	109,428	37,857,645	27,606,514	6.1017	168,446,666	1,250,000	911,524	1.0000	911,524	74,112,303	54,044,099	525,033,228
2092	7,957,364	2,315,817	5,641,547	$4,113,923	14.4605	59,489,384	7,220,328	109,428	7,110,900	5,185,403	6.2591	32,455,959	1,250,000	911,524	1.0000	911,524	14,002,447	10,210,850	92,856,867
2093	20,910,253	2,315,817	18,594,436	$13,559,416	15.0071	203,487,507	8,811,802	109,428	8,702,374	6,345,937	6.4206	40,744,720	1,250,000	911,524	1.0000	911,524	28,546,810	20,816,876	245,143,751
2094	15,844,987	2,315,817	13,529,169	$9,865,727	15.5744	153,652,785	12,325,838	109,428	12,216,410	8,908,439	6.5863	58,673,649	1,250,000	911,524	1.0000	911,524	26,995,580	19,685,690	213,237,957
2095	13,995,036	2,315,817	11,679,219	$8,516,708	16.1631	137,656,405	14,061,520	109,428	13,952,092	10,174,130	6.7562	68,738,460	1,250,000	911,524	1.0000	911,524	26,881,310	19,602,362	207,306,389
2096	4,693,602	2,315,817	2,377,784	$1,733,926	16.7741	29,085,040	5,179,687	109,428	5,070,259	3,697,329	6.9305	25,624,341	1,250,000	911,524	1.0000	911,524	8,698,044	6,342,779	55,620,905
2097	4,683,544	2,315,817	2,367,727	$1,726,591	17.4081	30,056,673	5,170,419	109,428	5,060,991	3,690,571	7.1093	26,237,374	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	57,205,571
2098	3,671,061	2,315,817	1,355,244	$988,269	18.0662	17,854,272	2,132,969	109,428	2,023,541	1,475,605	7.2927	10,761,143	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	29,526,939
2099	4,683,544	2,315,817	2,367,727	$1,726,591	18.7491	32,372,032	5,170,419	109,428	5,060,991	3,690,571	7.4809	27,608,790	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	60,892,346
2100	5,189,786	2,315,817	2,873,968	$2,095,752	19.4578	40,778,728	6,689,143	109,428	6,579,715	4,798,053	7.6739	36,819,783	1,250,000	911,524	1.0000	911,524	10,703,684	7,805,329	78,510,034
2101	5,189,786	2,315,817	2,873,968	$2,095,752	20.1933	42,320,154	6,689,143	109,428	6,579,715	4,798,053	7.8719	37,769,797	1,250,000	911,524	1.0000	911,524	10,703,684	7,805,329	81,001,475
2102	5,189,786	2,315,817	2,873,968	$2,095,752	20.9566	43,919,841	6,689,143	109,428	6,579,715	4,798,053	8.0750	38,744,282	1,250,000	911,524	1.0000	911,524	10,703,684	7,805,329	83,575,647
2103	3,671,061	2,315,817	1,355,244	$988,269	21.7488	21,493,672	2,132,969	109,428	2,023,541	1,475,605	8.2833	12,222,877	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	34,628,073
2104	3,681,119	2,315,817	1,365,301	$995,604	22.5709	22,471,669	2,142,238	109,428	2,032,810	1,482,364	8.4970	12,595,643	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	35,978,836
2105	5,189,786	2,315,817	2,873,968	$2,095,752	23.4240	49,090,900	6,689,143	109,428	6,579,715	4,798,053	8.7162	41,820,794	1,250,000	911,524	1.0000	911,524	10,703,684	7,805,329	91,823,218
2106	4,683,544	2,315,817	2,367,727	$1,726,591	24.3095	41,972,570	5,170,419	109,428	5,060,991	3,690,571	8.9411	32,997,761	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	75,881,855
2107	4,683,544	2,315,817	2,367,727	$1,726,591	25.2284	43,559,135	5,170,419	109,428	5,060,991	3,690,571	9.1718	33,849,175	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	78,319,834

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.8
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2108	3,681,119	2,315,817	1,365,301	$995,604	26.1820	26,066,894	2,142,238	109,428	2,032,810	1,482,364	9.4084	13,946,669	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	40,925,086
2109	4,683,544	2,315,817	2,367,727	$1,726,591	27.1717	46,914,420	5,170,419	109,428	5,060,991	3,690,571	9.6512	35,618,435	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	83,444,379
2110	4,683,544	2,315,817	2,367,727	$1,726,591	28.1988	48,687,802	5,170,419	109,428	5,060,991	3,690,571	9.9002	36,537,387	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	86,136,713
2111	4,683,544	2,315,817	2,367,727	$1,726,591	29.2647	50,528,176	5,170,419	109,428	5,060,991	3,690,571	10.1556	37,479,959	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	88,919,658
2112	3,681,119	2,315,817	1,365,301	$995,604	30.3709	30,237,378	2,142,238	109,428	2,032,810	1,482,364	10.4176	15,442,670	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	46,591,572
2113	6,708,510	2,315,817	4,392,693	$3,203,235	31.5189	100,962,448	11,245,317	109,428	11,135,889	8,120,502	10.6864	86,778,934	1,250,000	911,524	1.0000	911,524	16,778,582	12,235,261	188,652,906
2114	5,696,027	2,315,817	3,380,210	$2,464,913	32.7103	80,628,050	8,207,868	109,428	8,098,440	5,905,536	10.9621	64,737,080	1,250,000	911,524	1.0000	911,524	12,728,650	9,281,973	146,276,654
2115	5,043,287	2,315,817	2,727,470	$1,988,923	33.9468	67,517,561	6,249,648	109,428	6,140,220	4,477,565	11.2449	50,349,769	1,250,000	911,524	1.0000	911,524	10,117,689	7,378,011	118,778,854
2116	3,681,119	2,315,817	1,365,301	$995,604	35.2299	35,075,016	2,142,238	109,428	2,032,810	1,482,364	11.5350	17,099,063	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	53,085,603
2117	3,671,061	2,315,817	1,355,244	$988,269	36.5616	36,132,708	2,132,969	109,428	2,023,541	1,475,605	11.8326	17,460,242	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	54,504,474
2118	5,696,027	2,315,817	3,380,210	$2,464,913	37.9437	93,527,927	8,207,868	109,428	8,098,440	5,905,536	12.1379	71,680,810	1,250,000	911,524	1.0000	911,524	12,728,650	9,281,973	166,120,261
2119	5,189,786	2,315,817	2,873,968	$2,095,752	39.3779	82,526,322	6,689,143	109,428	6,579,715	4,798,053	12.4511	59,741,044	1,250,000	911,524	1.0000	911,524	10,703,684	7,805,329	143,178,890
2120	3,681,119	2,315,817	1,365,301	$995,604	40.8664	40,686,735	2,142,238	109,428	2,032,810	1,482,364	12.7723	18,933,192	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	60,531,451
2121	3,671,061	2,315,817	1,355,244	$988,269	42.4112	41,913,689	2,132,969	109,428	2,023,541	1,475,605	13.1018	19,333,079	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	62,158,292
2122	6,202,269	2,315,817	3,886,451	$2,834,074	44.0143	124,739,790	9,726,593	109,428	9,617,165	7,013,019	13.4399	94,254,278	1,250,000	911,524	1.0000	911,524	14,753,616	10,758,617	219,905,592
2123	3,671,061	2,315,817	1,355,244	$988,269	45.6781	45,142,266	2,132,969	109,428	2,023,541	1,475,605	13.7866	20,343,573	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	66,397,363
2124	3,681,119	2,315,817	1,365,301	$995,604	47.4047	47,196,290	2,142,238	109,428	2,032,810	1,482,364	14.1423	20,964,030	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	69,071,844
2125	6,202,269	2,315,817	3,886,451	$2,834,074	49.1966	139,426,813	9,726,593	109,428	9,617,165	7,013,019	14.5072	101,739,273	1,250,000	911,524	1.0000	911,524	14,753,616	10,758,617	242,077,610
2126	3,671,061	2,315,817	1,355,244	$988,269	51.0562	50,457,277	2,132,969	109,428	2,023,541	1,475,605	14.8815	21,959,213	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	73,328,014
2127	3,671,061	2,315,817	1,355,244	$988,269	52.9861	52,364,538	2,132,969	109,428	2,023,541	1,475,605	15.2654	22,525,698	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	75,801,760
2128	6,212,326	2,315,817	3,896,509	$2,841,408	54.9890	156,246,208	9,735,861	109,428	9,626,433	7,019,778	15.6593	109,924,809	1,250,000	911,524	1.0000	911,524	14,772,942	10,772,710	267,082,541
2129	3,671,061	2,315,817	1,355,244	$988,269	57.0676	56,398,160	2,132,969	109,428	2,023,541	1,475,605	16.0633	23,703,083	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	81,012,766
2130	3,671,061	2,315,817	1,355,244	$988,269	59.2248	58,530,054	2,132,969	109,428	2,023,541	1,475,605	16.4777	24,314,574	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	83,756,151
2131	3,671,061	2,315,817	1,355,244	$988,269	61.4635	60,742,493	2,132,969	109,428	2,023,541	1,475,605	16.9028	24,941,853	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	86,595,870
2132	6,212,326	2,315,817	3,896,509	$2,841,408	63.7868	181,244,351	9,735,861	109,428	9,626,433	7,019,778	17.3389	121,715,228	1,250,000	911,524	1.0000	911,524	14,772,942	10,772,710	303,871,103
2133	3,671,061	2,315,817	1,355,244	$988,269	66.1979	65,421,355	2,132,969	109,428	2,023,541	1,475,605	17.7863	26,245,550	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	92,578,429
2134	3,671,061	2,315,817	1,355,244	$988,269	68.7002	67,894,301	2,132,969	109,428	2,023,541	1,475,605	18.2451	26,922,557	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	95,728,383
2135	3,671,061	2,315,817	1,355,244	$988,269	71.2971	70,460,738	2,132,969	109,428	2,023,541	1,475,605	18.7159	27,617,272	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	98,989,534
2136	3,681,119	2,315,817	1,365,301	$995,604	73.9921	73,666,802	2,142,238	109,428	2,032,810	1,482,364	19.1987	28,459,452	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	103,037,778
2137	3,671,061	2,315,817	1,355,244	$988,269	76.7890	75,888,215	2,132,969	109,428	2,023,541	1,475,605	19.6941	29,060,709	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	105,860,447
2138	18,858,308	2,315,817	16,542,490	$12,063,098	79.6916	961,327,602	47,694,710	109,428	47,585,282	34,700,092	20.2022	701,018,190	1,250,000	911,524	1.0000	911,524	65,377,772	47,674,714	1,663,257,316
2139	3,671,061	2,315,817	1,355,244	$988,269	82.7040	81,733,828	2,132,969	109,428	2,023,541	1,475,605	20.7234	30,579,549	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	113,224,900
2140	3,681,119	2,315,817	1,365,301	$995,604	85.8302	85,452,857	2,142,238	109,428	2,032,810	1,482,364	21.2580	31,512,084	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	117,876,464
2141	3,671,061	2,315,817	1,355,244	$988,269	89.0745	88,029,598	2,132,969	109,428	2,023,541	1,475,605	21.8065	32,177,776	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	121,118,898
2142	3,671,061	2,315,817	1,355,244	$988,269	92.4416	91,357,199	2,132,969	109,428	2,023,541	1,475,605	22.3691	33,007,952	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	125,276,675
2143	3,671,061	2,315,817	1,355,244	$988,269	95.9359	94,810,509	2,132,969	109,428	2,023,541	1,475,605	22.9462	33,859,523	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	129,581,556
2144	3,681,119	2,315,817	1,365,301	$995,604	99.5622	99,124,486	2,142,238	109,428	2,032,810	1,482,364	23.5382	34,892,169	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	134,928,178
2145	5,189,786	2,315,817	2,873,968	$2,095,752	103.3257	216,545,067	6,689,143	109,428	6,579,715	4,798,053	24.1455	115,851,401	1,250,000	911,524	1.0000	911,524	10,703,684	7,805,329	333,307,991
2146	4,683,544	2,315,817	2,367,727	$1,726,591	107.2314	185,144,799	5,170,419	109,428	5,060,991	3,690,571	24.7685	91,409,898	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	277,466,221
2147	4,683,544	2,315,817	2,367,727	$1,726,591	111.2847	192,143,192	5,170,419	109,428	5,060,991	3,690,571	25.4075	93,768,173	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	286,822,888
2148	3,681,119	2,315,817	1,365,301	$995,604	115.4913	114,983,555	2,142,238	109,428	2,032,810	1,482,364	26.0630	38,634,840	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	154,529,919
2149	4,683,544	2,315,817	2,367,727	$1,726,591	119.8569	206,943,877	5,170,419	109,428	5,060,991	3,690,571	26.7355	98,669,250	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	306,524,651
2150	5,189,786	2,315,817	2,873,968	$2,095,752	124.3875	260,685,381	6,689,143	109,428	6,579,715	4,798,053	27.4252	131,587,577	1,250,000	911,524	1.0000	911,524	10,703,684	7,805,329	393,184,482
2151	5,189,786	2,315,817	2,873,968	$2,095,752	129.0893	270,539,189	6,689,143	109,428	6,579,715	4,798,053	28.1328	134,982,679	1,250,000	911,524	1.0000	911,524	10,703,684	7,805,329	406,433,392
2152	5,199,843	2,315,817	2,884,026	$2,103,087	133.9689	281,748,185	6,698,412	109,428	6,588,984	4,804,812	28.8586	138,660,153	1,250,000	911,524	1.0000	911,524	10,723,010	7,819,422	421,319,862
2153	3,671,061	2,315,817	1,355,244	$988,269	139.0329	137,401,953	2,132,969	109,428	2,023,541	1,475,605	29.6032	43,682,625	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	181,996,101
2154	3,671,061	2,315,817	1,355,244	$988,269	144.2884	142,595,802	2,132,969	109,428	2,023,541	1,475,605	30.3669	44,809,544	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	188,316,870
2155	5,549,529	2,315,817	3,233,711	$2,358,084	149.7425	353,105,341	7,768,372	109,428	7,658,944	5,585,048	31.1504	173,976,471	1,250,000	911,524	1.0000	911,524	12,142,656	8,854,655	527,993,336
2156	4,693,602	2,315,817	2,377,784	$1,733,926	155.4027	269,456,710	5,179,687	109,428	5,070,259	3,697,329	31.9541	118,144,830	1,250,000	911,524	1.0000	911,524	8,698,044	6,342,779	388,513,064
2157	4,683,544	2,315,817	2,367,727	$1,726,591	161.2769	278,459,288	5,170,419	109,428	5,060,991	3,690,571	32.7785	120,971,369	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	400,342,180
2158	3,671,061	2,315,817	1,355,244	$988,269	167.3732	165,409,802	2,132,969	109,428	2,023,541	1,475,605	33.6242	49,616,032	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	215,937,357
2159	4,683,544	2,315,817	2,367,727	$1,726,591	173.6999	299,908,731	5,170,419	109,428	5,060,991	3,690,571	34.4917	127,294,054	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	428,114,309
2160	4,693,602	2,315,817	2,377,784	$1,733,926	180.2658	312,567,474	5,179,687	109,428	5,070,259	3,697,329	35.3816	130,817,427	1,250,000	911,524	1.0000	911,524	8,698,044	6,342,779	444,296,424
2161	4,683,544	2,315,817	2,367,727	$1,726,591	187.0798	323,010,350	5,170,419	109,428	5,060,991	3,690,571	36.2944	133,947,046	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	457,868,919
2162	3,671,061	2,315,817	1,355,244	$988,269	194.1514	191,873,876	2,132,969	109,428	2,023,541	1,475,605	37.2308	54,937,948	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	247,723,348
2163	6,708,510	2,315,817	4,392,693	$3,203,235	201.4904	645,421,127	11,245,317	109,428	11,135,889	8,120,502	38.1914	310,133,347	1,250,000	911,524	1.0000	911,524	16,778,582	12,235,261	956,465,997
2164	5,706,085	2,315,817	3,390,267	$2,472,247	209.1067	516,963,509	8,217,137	109,428	8,107,709	5,912,295	39.1767	231,624,211	1,250,000	911,524	1.0000	911,524	12,747,976	9,296,066	749,499,244
2165	4,683,544	2,315,817	2,367,727	$1,726,591	217.0109	374,689,125	5,170,419	109,428	5,060,991	3,690,571	40.1875	148,314,806	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,686	523,915,455
2166	3,671,061	2,315,817	1,355,244	$988,269	225.2140	222,572,092	2,132,969	109,428	2,023,541	1,475,605	41.2243	60,830,776	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	284,314,391
2167	3,671,061	2,315,817	1,355,244	$988,269	233.7270	230,985,228	2,132,969	109,428	2,023,541	1,475,605	42.2879	62,400,229	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	294,296,981
2168	5,706,085	2,315,817	3,390,267	$2,472,247	242.5619	599,673,042	8,217,137	109,428	8,107,709	5,912,295	43.3789	256,468,858	1,250,000	911,524	1.0000	911,524	12,747,976	9,296,066	857,053,424
2169	5,189,786	2,315,817	2,873,968	$2,095,752	251.7308	527,565,387	6,689,143	109,428	6,579,715	4,798,053	44.4981	213,504,264	1,250,000	911,524	1.0000	911,524	10,703,684	7,805,329	741,981,175
2170	3,671,061	2,315,817	1,355,244	$988,269	261.2462	258,181,610	2,132,969	109,428	2,023,541	1,475,605	45.6462	67,355,753	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	326,448,887
2171	3,671,061	2,315,817	1,355,244	$988,269	271.1213	267,940,869	2,132,969	109,428	2,023,541	1,475,605	46.8238	69,093,425	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	337,945,817
2172	6,212,326	2,315,817	3,896,509	$2,841,408	281.3697	799,486,237	9,735,861	109,428	9,626,433	7,019,778	48.0319	337,173,274	1,250,000	911,524	1.0000	911,524	14,772,942	10,772,710	1,137,571,035
2173	3,671,061	2,315,817	1,355,244	$988,269	292.0054	288,579,985	2,132,969	109,428	2,023,541	1,475,605	49.2711	72,704,673	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	362,196,181
2174	3,671,061	2,315,817	1,355,244	$988,269	303.0433	299,488,403	2,132,969	109,428	2,023,541	1,475,605	50.5423	74,580,461	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	374,980,388
2175	6,202,269	2,315,817	3,886,451	$2,834,074	314.4983	891,311,506	9,726,593	109,428	9,617,165	7,013,019	51.8463	363,599,102	1,250,000	911,524	1.0000	911,524	14,753,616	10,758,617	1,255,822,132
2176	3,681,119	2,315,817	1,365,301	$995,604	326.3863	324,951,378	2,142,238	109,428	2,032,810	1,482,364	53.1839	78,837,873	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	404,700,775
2177	3,671,061	2,315,817	1,355,244	$988,269	338.7237	334,750,248	2,132,969	109,428	2,023,541	1,475,605	54.5561	80,503,244	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	416,165,016
2178	6,202,269	2,315,817	3,886,451	$2,834,074	351.5275	996,255,005	9,726,593	109,428	9,617,165	7,013,019	55.9636	392,473,806	1,250,000	911,524	1.0000	911,524	14,753,616	10,758,617	1,389,640,335
2179	3,671,061	2,315,817	1,355,244	$988,269	364.8152	360,535,678	2,132,969	109,428	2,023,541	1,475,605	57.4075	84,710,784	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	446,157,985
2180	3,681,119	2,315,817	1,365,301	$995,604	378.6052	376,940,703	2,142,238	109,428	2,032,810	1,482,364	58.8886	87,294,312	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	465,146,539
2181	3,671,061	2,315,817	1,355,244	$988,269	392.9165	388,307,331	2,132,969	109,428	2,023,541	1,475,605	60.4079	89,138,188	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	478,357,043
2182	6,202,269	2,315,817	3,886,451	$2,834,074	407.7688	1,155,647,020	9,726,593	109,428	9,617,165	7,013,019	61.9664	434,571,558	1,250,000	911,524	1.0000	911,524	14,753,616	10,758,617	1,591,130,102
2183	3,671,061	2,315,817	1,355,244	$988,269	423.1824	418,218,192	2,132,969	109,428	2,023,541	1,475,605	63.5652	93,797,115	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	512,926,831
2184	3,681,119	2,315,817	1,365,301	$995,604	439.1787	437,247,899	2,142,238	109,428	2,032,810	1,482,364	65.2052	96,657,810	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	534,817,232

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.8
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2185	3,671,061	2,315,817	1,355,244	$988,269	455.7797	450,433,104	2,132,969	109,428	2,023,541	1,475,605	66.8874	98,699,370	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	550,043,998
2186	3,671,061	2,315,817	1,355,244	$988,269	473.0081	467,459,404	2,132,969	109,428	2,023,541	1,475,605	68.6131	101,245,821	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	569,616,748
2187	3,671,061	2,315,817	1,355,244	$988,269	490.8878	485,129,363	2,132,969	109,428	2,023,541	1,475,605	70.3834	103,858,084	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	589,898,971
2188	18,868,365	2,315,817	16,552,548	$12,070,433	509.4434	6,149,202,188	47,703,978	109,428	47,594,550	34,706,850	72.1993	2,505,810,296	1,250,000	911,524	1.0000	911,524	65,397,098	47,688,807	8,655,924,008
2189	3,671,061	2,315,817	1,355,244	$988,269	528.7004	522,498,396	2,132,969	109,428	2,023,541	1,475,605	74.0620	109,286,244	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	632,696,164
2190	3,671,061	2,315,817	1,355,244	$988,269	548.6852	542,248,762	2,132,969	109,428	2,023,541	1,475,605	75.9728	112,105,830	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	655,266,115
2191	3,671,061	2,315,817	1,355,244	$988,269	569.4255	562,745,764	2,132,969	109,428	2,023,541	1,475,605	77.9329	114,998,163	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	678,655,451
2192	3,681,119	2,315,817	1,365,301	$995,604	590.9498	588,351,754	2,142,238	109,428	2,032,810	1,482,364	79.9436	118,505,476	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	707,768,753
2193	3,774,848	2,315,817	1,459,031	$1,063,953	613.2877	652,509,386	2,444,332	109,428	2,334,904	1,702,656	82.0061	139,628,201	1,250,000	911,524	1.0000	911,524	5,043,935	3,678,133	793,049,110
2194	3,930,530	2,315,817	1,614,712	$1,177,479	636.4700	749,429,986	2,911,376	109,428	2,801,948	2,043,233	84.1219	171,880,680	1,250,000	911,524	1.0000	911,524	5,666,660	4,132,236	922,222,189
2195	5,808,997	2,315,817	3,493,180	$2,547,293	660.5286	1,682,560,007	8,546,779	109,428	8,437,351	6,152,676	86.2922	530,927,981	1,250,000	911,524	1.0000	911,524	13,180,531	9,611,493	2,214,399,512
2196	5,004,964	2,315,817	2,689,147	$1,960,977	685.4966	1,344,243,058	6,113,775	109,428	6,004,347	4,378,484	88.5185	387,576,806	1,250,000	911,524	1.0000	911,524	9,943,494	7,250,984	1,732,731,388
2197	4,839,225	2,315,817	2,523,408	$1,840,117	711.4083	1,309,074,504	5,637,462	109,428	5,528,034	4,031,148	90.8023	366,037,490	1,250,000	911,524	1.0000	911,524	9,301,442	6,782,789	1,676,023,518
2198	4,034,317	2,315,817	1,718,500	$1,253,163	738.2996	925,209,521	3,222,738	109,428	3,113,310	2,270,285	93.1450	211,465,687	1,250,000	911,524	1.0000	911,524	6,081,810	4,434,971	1,137,586,732
2199	4,839,225	2,315,817	2,523,408	$1,840,117	766.2073	1,409,911,075	5,637,462	109,428	5,528,034	4,031,148	95.5482	385,168,915	1,250,000	911,524	1.0000	911,524	9,301,442	6,782,789	1,795,991,513
2200	5,293,573	2,315,817	2,977,756	$2,171,436	795.1699	1,726,660,588	7,000,506	109,428	6,891,078	5,025,105	98.0133	492,527,119	1,250,000	911,524	1.0000	911,524	11,118,834	8,108,065	2,220,099,230
2201	5,449,254	2,315,817	3,133,437	$2,284,962	825.2273	1,885,612,838	7,467,550	109,428	7,358,122	5,365,682	100.5421	539,476,949	1,250,000	911,524	1.0000	911,524	11,741,559	8,562,168	2,426,001,310
2202	5,449,254	2,315,817	3,133,437	$2,284,962	856.4209	1,956,889,021	7,467,550	109,428	7,358,122	5,365,682	103.1360	553,394,992	1,250,000	911,524	1.0000	911,524	11,741,559	8,562,168	2,511,195,537
2203	3,826,742	2,315,817	1,510,925	$1,101,795	888.7937	979,268,515	2,600,013	109,428	2,490,585	1,816,182	105.7969	192,146,425	1,250,000	911,524	1.0000	911,524	5,251,510	3,829,501	1,172,326,464
2204	3,888,694	2,315,817	1,572,876	$1,146,971	922.3901	1,057,954,919	2,764,963	109,428	2,655,535	1,936,466	108.5265	210,157,923	1,250,000	911,524	1.0000	911,524	5,478,411	3,994,961	1,269,024,367
2205	5,397,361	2,315,817	3,081,543	$2,247,120	957.2564	2,151,069,875	7,311,868	109,428	7,202,440	5,252,156	111.3265	584,704,190	1,250,000	911,524	1.0000	911,524	11,533,984	8,410,800	2,736,685,589
2206	4,839,225	2,315,817	2,523,408	$1,840,117	993.4407	1,828,047,116	5,637,462	109,428	5,528,034	4,031,148	114.1987	460,351,836	1,250,000	911,524	1.0000	911,524	9,301,442	6,782,789	2,289,310,476
2207	4,891,119	2,315,817	2,575,302	$1,877,959	1,030.9927	1,936,161,921	5,793,144	109,428	5,683,716	4,144,674	117.1450	485,527,778	1,250,000	911,524	1.0000	911,524	9,509,017	6,934,156	2,422,601,223
2208	3,888,694	2,315,817	1,572,876	$1,146,971	1,069.9643	1,227,218,283	2,764,963	109,428	2,655,535	1,936,466	120.1674	232,700,135	1,250,000	911,524	1.0000	911,524	5,478,411	3,994,961	1,460,829,942
2209	4,839,225	2,315,817	2,523,408	$1,840,117	1,110.4089	2,043,282,289	5,637,462	109,428	5,528,034	4,031,148	123.2677	496,910,316	1,250,000	911,524	1.0000	911,524	9,301,442	6,782,789	2,541,104,128
2210	4,891,119	2,315,817	2,575,302	$1,877,959	1,152.3824	2,164,126,789	5,793,144	109,428	5,683,716	4,144,674	126.4480	524,085,676	1,250,000	911,524	1.0000	911,524	9,509,017	6,934,156	2,689,123,989
2211	4,891,119	2,315,817	2,575,302	$1,877,959	1,195.9424	2,245,930,679	5,793,144	109,428	5,683,716	4,144,674	129.7104	537,607,259	1,250,000	911,524	1.0000	911,524	9,509,017	6,934,156	2,784,449,461
2212	3,888,694	2,315,817	1,572,876	$1,146,971	1,241.1491	1,423,562,326	2,764,963	109,428	2,655,535	1,936,466	133.0569	257,660,219	1,250,000	911,524	1.0000	911,524	5,478,411	3,994,961	1,682,134,069
2213	6,916,085	2,315,817	4,600,268	$3,354,603	1,288.0645	4,320,944,727	11,868,042	109,428	11,758,614	8,574,605	136.4898	1,170,346,132	1,250,000	911,524	1.0000	911,524	17,608,882	12,840,732	5,492,202,383
2214	5,903,602	2,315,817	3,587,785	$2,616,281	1,336.7533	3,497,322,036	8,830,593	109,428	8,721,165	6,359,639	140.0112	890,420,729	1,250,000	911,524	1.0000	911,524	13,558,950	9,887,444	4,388,654,289
2215	4,891,119	2,315,817	2,575,302	$1,877,959	1,387.2826	2,605,259,711	5,793,144	109,428	5,683,716	4,144,674	143.6235	595,272,516	1,250,000	911,524	1.0000	911,524	9,509,017	6,934,156	3,201,443,751
2216	3,888,694	2,315,817	1,572,876	$1,146,971	1,439.7219	1,651,319,617	2,764,963	109,428	2,655,535	1,936,466	147.3290	285,297,662	1,250,000	911,524	1.0000	911,524	5,478,411	3,994,961	1,937,528,803
2217	3,852,645	2,315,817	1,536,828	$1,120,684	1,494.1434	1,674,462,568	14,539,545	109,428	14,430,117	10,522,715	151.1301	1,590,299,020	1,250,000	911,524	1.0000	911,524	17,216,945	12,554,923	3,265,673,112
2218	1,123,816	2,315,817	(1,192,001)	($869,230)	1,550.6220	(1,347,847,371)	1,790,582	109,428	1,681,154	1,225,929	155.0292	190,054,869	1,250,000	911,524	1.0000	911,524	1,739,153	1,268,223	(1,156,880,979)
	$1,277,332,851	$412,215,505	$865,117,346	$630,860,006		$75,268,772,857	$1,458,422,764	$19,478,185	$1,438,944,579	$1,049,305,727		$25,978,990,162	$232,500,000	$169,543,418		$169,543,418	$2,536,561,926	$1,849,709,151	$101,417,306,436

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.8
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 2																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2034	$7,675,087	$0	$7,675,087	$5,596,819	1.6811	$9,408,813	$2,952,172	$0	$2,952,172	$2,152,780	1.4285	$3,075,246	$1,250,000	$911,524	1.0000	$911,524	$11,877,259	$8,661,123	$13,395,583
2035	47,507,649	-	47,507,649	34,643,480	1.7446	60,439,016	34,141,374	-	34,141,374	24,896,539	1.4653	36,480,898	1,250,000	911,524	1.0000	911,524	82,899,023	60,451,543	97,831,438
2036	27,599,665	-	27,599,665	20,126,200	1.8106	36,440,498	23,132,961	-	23,132,961	16,868,995	1.5032	25,357,473	1,250,000	911,524	1.0000	911,524	51,982,626	37,906,719	62,709,495
2037	21,434,928	-	21,434,928	15,630,757	1.8790	29,370,192	30,698,087	-	30,698,087	22,385,629	1.5419	34,516,401	1,250,000	911,524	1.0000	911,524	53,383,015	38,927,909	64,798,117
2038	27,847,219	-	27,847,219	20,306,721	1.9501	39,600,137	54,145,593	-	54,145,593	39,483,995	1.5817	62,451,836	1,250,000	911,524	1.0000	911,524	83,242,813	60,702,241	102,963,497
2039	5,034,556	-	5,034,556	3,671,294	2.0238	7,429,964	5,510,734	-	5,510,734	4,018,532	1.6225	6,520,068	1,250,000	911,524	1.0000	911,524	11,795,290	8,601,350	14,861,556
2040	5,048,349	-	5,048,349	3,681,352	2.1003	7,731,944	5,529,256	-	5,529,256	4,032,039	1.6644	6,710,925	1,250,000	911,524	1.0000	911,524	11,827,606	8,624,915	15,354,393
2041	5,034,556	-	5,034,556	3,671,294	2.1797	8,002,319	5,510,734	-	5,510,734	4,018,532	1.7073	6,860,840	1,250,000	911,524	1.0000	911,524	11,795,290	8,601,350	15,774,683
2042	5,034,556	2,315,818	2,718,738	1,982,555	2.2620	4,484,540	5,510,734	109,428	5,401,306	3,938,735	1.7514	6,898,301	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	12,294,365
2043	5,034,556	2,315,818	2,718,738	1,982,555	2.3475	4,654,049	5,510,734	109,428	5,401,306	3,938,735	1.7966	7,076,332	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	12,641,904
2044	5,048,349	2,315,818	2,732,532	1,992,614	2.4363	4,854,605	5,529,256	109,428	5,419,828	3,952,242	1.8429	7,283,586	1,250,000	911,524	1.0000	911,524	9,402,360	6,856,379	13,049,715
2045	6,548,694	2,315,818	4,232,876	3,086,693	2.5284	7,804,396	10,053,148	109,428	9,943,720	7,251,149	1.8905	13,708,298	1,250,000	911,524	1.0000	911,524	15,426,596	11,249,367	22,424,217
2046	6,043,981	2,315,818	3,728,163	2,718,647	2.6239	7,133,459	8,539,010	109,428	8,429,582	6,147,011	1.9392	11,920,284	1,250,000	911,524	1.0000	911,524	13,407,745	9,777,182	19,965,267
2047	6,043,981	2,315,818	3,728,163	2,718,647	2.7231	7,403,149	8,539,010	109,428	8,429,582	6,147,011	1.9893	12,228,249	1,250,000	911,524	1.0000	911,524	13,407,745	9,777,182	20,542,922
2048	5,048,349	2,315,818	2,732,532	1,992,614	2.8261	5,631,326	5,529,256	109,428	5,419,828	3,952,242	2.0406	8,064,945	1,250,000	911,524	1.0000	911,524	9,402,360	6,856,379	14,607,795
2049	6,043,981	2,315,818	3,728,163	2,718,647	2.9329	7,973,521	8,539,010	109,428	8,429,582	6,147,011	2.0932	12,866,924	1,250,000	911,524	1.0000	911,524	13,407,745	9,777,182	21,751,969
2050	6,548,694	2,315,818	4,232,876	3,086,693	3.0438	9,395,278	10,053,148	109,428	9,943,720	7,251,149	2.1472	15,569,668	1,250,000	911,524	1.0000	911,524	15,426,596	11,249,367	25,876,469
2051	6,493,919	2,315,818	4,178,101	3,046,750	3.1588	9,624,075	9,888,822	109,428	9,779,394	7,131,320	2.2026	15,707,446	1,250,000	911,524	1.0000	911,524	15,207,495	11,089,594	26,243,045
2052	6,562,487	2,315,818	4,246,669	3,096,752	3.2782	10,151,773	10,071,670	109,428	9,962,242	7,264,656	2.2595	16,414,490	1,250,000	911,524	1.0000	911,524	15,458,911	11,272,932	27,477,786
2053	5,034,556	2,315,818	2,718,738	1,982,555	3.4021	6,744,852	5,510,734	109,428	5,401,306	3,938,735	2.3178	9,129,200	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	16,785,576
2054	5,034,556	2,315,818	2,718,738	1,982,555	3.5307	6,999,808	5,510,734	109,428	5,401,306	3,938,735	2.3776	9,364,737	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	17,276,069
2055	6,548,694	2,315,818	4,232,876	3,086,693	3.6642	11,310,262	10,053,148	109,428	9,943,720	7,251,149	2.4389	17,684,828	1,250,000	911,524	1.0000	911,524	15,426,596	11,249,367	29,906,614
2056	6,057,775	2,315,818	3,741,957	2,728,706	3.8027	10,376,450	8,557,532	109,428	8,448,104	6,160,518	2.5018	15,412,383	1,250,000	911,524	1.0000	911,524	13,440,061	9,800,748	26,700,358
2057	6,043,981	2,315,818	3,728,163	2,718,647	3.9464	10,728,870	8,539,010	109,428	8,429,582	6,147,011	2.5664	15,775,690	1,250,000	911,524	1.0000	911,524	13,407,745	9,777,182	27,416,084
2058	5,034,556	2,315,818	2,718,738	1,982,555	4.0956	8,119,754	5,510,734	109,428	5,401,306	3,938,735	2.6326	10,369,114	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	19,400,392
2059	5,989,206	2,315,818	3,673,388	2,678,704	4.2504	11,385,565	8,374,684	109,428	8,265,256	6,027,182	2.7005	16,276,405	1,250,000	911,524	1.0000	911,524	13,188,644	9,617,410	28,573,494
2060	6,057,775	2,315,818	3,741,957	2,728,706	4.4111	12,036,595	8,557,532	109,428	8,448,104	6,160,518	2.7702	17,065,866	1,250,000	911,524	1.0000	911,524	13,440,061	9,800,748	30,013,985
2061	6,043,981	2,315,818	3,728,163	2,718,647	4.5778	12,445,424	8,539,010	109,428	8,429,582	6,147,011	2.8416	17,467,347	1,250,000	911,524	1.0000	911,524	13,407,745	9,777,182	30,824,295
2062	5,034,556	2,315,818	2,718,738	1,982,555	4.7509	9,418,922	5,510,734	109,428	5,401,306	3,938,735	2.9150	11,481,413	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	21,811,859
2063	8,062,832	2,315,818	5,747,014	4,190,832	4.9305	20,662,895	14,595,561	109,428	14,486,133	10,563,564	2.9902	31,587,168	1,250,000	911,524	1.0000	911,524	21,483,147	15,665,919	53,161,588
2064	7,012,425	2,315,818	4,696,607	3,424,855	5.1168	17,524,298	11,421,482	109,428	11,312,054	8,248,965	3.0673	25,302,050	1,250,000	911,524	1.0000	911,524	17,258,661	12,585,344	43,737,872
2065	6,043,981	2,315,818	3,728,163	2,718,647	5.3103	14,436,834	8,539,010	109,428	8,429,582	6,147,011	3.1465	19,341,571	1,250,000	911,524	1.0000	911,524	13,407,745	9,777,182	34,689,928
2066	5,034,556	2,315,818	2,718,738	1,982,555	5.5110	10,925,863	5,510,734	109,428	5,401,306	3,938,735	3.2276	12,712,662	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	24,550,048
2067	5,034,556	2,315,818	2,718,738	1,982,555	5.7193	11,338,829	5,510,734	109,428	5,401,306	3,938,735	3.3109	13,040,758	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	25,291,111
2068	7,067,200	2,315,818	4,751,382	3,464,798	5.9355	20,565,309	11,585,808	109,428	11,476,380	8,368,794	3.3963	28,422,935	1,250,000	911,524	1.0000	911,524	17,477,762	12,745,116	49,899,768
2069	6,548,694	2,315,818	4,232,876	3,086,693	6.1598	19,013,415	10,053,148	109,428	9,943,720	7,251,149	3.4840	25,263,004	1,250,000	911,524	1.0000	911,524	15,426,596	11,249,367	45,187,943
2070	5,034,556	2,315,818	2,718,738	1,982,555	6.3927	12,673,882	5,510,734	109,428	5,401,306	3,938,735	3.5738	14,076,252	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	27,661,657
2071	5,034,556	2,315,818	2,718,738	1,982,555	6.6343	13,152,867	5,510,734	109,428	5,401,306	3,938,735	3.6660	14,439,403	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	28,503,794
2072	7,517,137	2,315,818	5,201,320	3,792,901	6.8851	26,114,503	12,935,620	109,428	12,826,192	9,353,103	3.7606	35,173,279	1,250,000	911,524	1.0000	911,524	19,277,512	14,057,528	62,199,306
2073	5,034,556	2,315,818	2,718,738	1,982,555	7.1454	14,166,151	5,510,734	109,428	5,401,306	3,938,735	3.8576	15,194,065	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	30,271,740
2074	5,034,556	2,315,818	2,718,738	1,982,555	7.4155	14,701,639	5,510,734	109,428	5,401,306	3,938,735	3.9572	15,586,363	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	31,199,526
2075	7,917,862	2,315,818	5,602,044	4,085,117	7.6958	31,438,243	14,160,652	109,428	14,051,224	10,246,420	4.0593	41,593,292	1,250,000	911,524	1.0000	911,524	20,903,269	15,243,061	73,943,059
2076	5,048,349	2,315,818	2,732,532	1,992,614	7.9867	15,914,410	5,529,256	109,428	5,419,828	3,952,242	4.1640	16,457,135	1,250,000	911,524	1.0000	911,524	9,402,360	6,856,379	33,283,068
2077	5,034,556	2,315,818	2,718,738	1,982,555	8.2886	16,432,608	5,510,734	109,428	5,401,306	3,938,735	4.2714	16,823,913	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	34,168,045
2078	7,558,119	2,315,818	5,242,301	3,822,786	8.6019	32,883,219	13,081,424	109,428	12,971,996	9,459,426	4.3816	41,447,419	1,250,000	911,524	1.0000	911,524	19,464,297	14,193,735	75,242,162
2079	5,034,556	2,315,818	2,718,738	1,982,555	8.9270	17,698,272	5,510,734	109,428	5,401,306	3,938,735	4.4947	17,703,433	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	36,313,228
2080	5,048,349	2,315,818	2,732,532	1,992,614	9.2645	18,460,572	5,529,256	109,428	5,419,828	3,952,242	4.6106	18,222,206	1,250,000	911,524	1.0000	911,524	9,402,360	6,856,379	37,594,301
2081	5,034,556	2,315,818	2,718,738	1,982,555	9.6147	19,061,675	5,510,734	109,428	5,401,306	3,938,735	4.7296	18,628,642	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	38,601,841
2082	7,448,569	2,315,818	5,132,751	3,742,899	9.9781	37,347,025	12,752,773	109,428	12,643,345	9,219,767	4.8516	44,730,622	1,250,000	911,524	1.0000	911,524	19,026,096	13,874,190	82,989,171
2083	5,034,556	2,315,818	2,718,738	1,982,555	10.3553	20,529,955	5,510,734	109,428	5,401,306	3,938,735	4.9768	19,602,297	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	41,043,776
2084	5,048,349	2,315,818	2,732,532	1,992,614	10.7467	21,414,024	5,529,256	109,428	5,419,828	3,952,242	5.1052	20,176,985	1,250,000	911,524	1.0000	911,524	9,402,360	6,856,379	42,502,532
2085	5,034,556	2,315,818	2,718,738	1,982,555	11.1529	22,111,242	5,510,734	109,428	5,401,306	3,938,735	5.2369	20,626,762	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	43,649,528
2086	5,034,556	2,315,818	2,718,738	1,982,555	11.5745	22,947,087	5,510,734	109,428	5,401,306	3,938,735	5.3720	21,158,885	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	45,017,496
2087	5,034,556	2,315,818	2,718,738	1,982,555	12.0120	23,814,455	5,510,734	109,428	5,401,306	3,938,735	5.5106	21,704,794	1,250,000	911,524	1.0000	911,524	9,370,044	6,832,814	46,430,773
2088	38,955,083	2,315,818	36,639,266	26,718,049	12.4661	333,069,866	60,599,664	109,428	60,490,236	44,110,629	5.6528	249,348,564	1,250,000	911,524	1.0000	911,524	98,379,501	71,740,201	583,329,954
2089	37,814,391	2,315,818	35,498,573	25,886,234	12.9373	334,897,974	27,337,368	109,428	27,227,940	19,855,131	5.7986	115,131,963	1,250,000	911,524	1.0000	911,524	63,976,513	46,652,889	450,941,462
2090	57,989,340	2,315,818	55,673,522	40,598,190	13.4263	545,083,480	68,394,898	109,428	68,285,470	49,795,062	5.9482	296,190,990	1,250,000	911,524	1.0000	911,524	125,208,992	91,304,776	842,185,994
2091	59,765,744	2,315,818	57,449,927	41,893,578	13.9338	583,736,737	46,947,437	109,428	46,838,009	34,155,166	6.1017	208,404,577	1,250,000	911,524	1.0000	911,524	105,537,936	76,960,268	793,052,838
2092	55,868,516	2,315,818	53,552,699	39,051,645	14.4605	564,706,317	39,694,422	109,428	39,584,994	28,866,130	6.2591	180,675,993	1,250,000	911,524	1.0000	911,524	94,387,693	68,829,299	746,293,834
2093	26,036,268	2,315,818	23,720,450	17,297,403	15.0071	259,583,857	11,861,380	109,428	11,751,952	8,569,746	6.4206	55,022,914	1,250,000	911,524	1.0000	911,524	36,722,402	26,778,673	315,518,295
2094	18,615,777	2,315,818	16,299,959	11,886,240	15.5744	185,121,056	19,826,192	109,428	19,716,764	14,377,839	6.5863	94,696,760	1,250,000	911,524	1.0000	911,524	37,266,723	27,175,603	280,729,340
2095	15,999,115	2,315,818	13,683,297	9,978,120	16.1631	161,277,353	19,486,433	109,428	19,377,005	14,130,080	6.7562	95,465,647	1,250,000	911,524	1.0000	911,524	34,310,302	25,019,724	257,654,524
2096	4,693,602	2,315,818	2,377,784	1,733,925	16.7741	29,085,036	5,179,687	109,428	5,070,259	3,697,329	6.9305	25,624,341	1,250,000	911,524	1.0000	911,524	8,698,043	6,342,778	55,620,901
2097	4,683,544	2,315,818	2,367,726	1,726,591	17.4081	30,056,669	5,170,419	109,428	5,060,991	3,690,571	7.1093	26,237,374	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	57,205,566
2098	3,671,061	2,315,818	1,355,243	988,269	18.0662	17,854,267	2,132,969	109,428	2,023,541	1,475,605	7.2927	10,761,143	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	29,526,934
2099	4,683,544	2,315,818	2,367,726	1,726,591	18.7491	32,372,028	5,170,419	109,428	5,060,991	3,690,571	7.4809	27,608,790	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	60,892,341
2100	5,189,786	2,315,818	2,873,968	2,095,752	19.4578	40,778,723	6,689,143	109,428	6,579,715	4,798,054	7.6739	36,819,783	1,250,000	911,524	1.0000	911,524	10,703,683	7,805,329	78,510,029
2101	5,189,786	2,315,818	2,873,968	2,095,752	20.1933	42,320,148	6,689,143	109,428	6,579,715	4,798,054	7.8719	37,769,797	1,250,000	911,524	1.0000	911,524	10,703,683	7,805,329	81,001,470
2102	5,189,786	2,315,818	2,873,968	2,095,752	20.9566	43,919,836	6,689,143	109,428	6,579,715	4,798,054	8.0750	38,744,282	1,250,000	911,524	1.0000	911,524	10,703,683	7,805,329	83,575,642
2103	3,671,061	2,315,818	1,355,243	988,269	21.7488	21,493,667	2,132,969	109,428	2,023,541	1,475,605	8.2833	12,222,877	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	34,628,068
2104	3,681,119	2,315,818	1,365,301	995,603	22.5709	22,471,664	2,142,238	109,428	2,032,810	1,482,364	8.4970	12,595,643	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	35,978,830
2105	5,189,786	2,315,818	2,873,968	2,095,752	23.4240	49,090,894	6,689,143	109,428	6,579,715	4,798,054	8.7162	41,820,794	1,250,000	911,524	1.0000	911,524	10,703,683	7,805,329	91,823,212
2106	4,683,544	2,315,818	2,367,726	1,726,591	24.3095	41,972,564	5,170,419	109,428	5,060,991	3,690,571	8.9411	32,997,761	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	75,881,849
2107	4,683,544	2,315,818	2,367,726	1,726,591	25.2284	43,559,129	5,170,419	109,428	5,060,991	3,690,571	9.1718	33,849,176	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	78,319,828
2108	3,681,119	2,315,818	1,365,301	995,603	26.1820	26,066,887	2,142,238	109,428	2,032,810	1,482,364	9.4084	13,946,669	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	40,925,080

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.8
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2109	4,683,544	2,315,818	2,367,726	1,726,591	27.1717	46,914,413	5,170,419	109,428	5,060,991	3,690,571	9.6512	35,618,435	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	83,444,372
2110	4,683,544	2,315,818	2,367,726	1,726,591	28.1988	48,687,795	5,170,419	109,428	5,060,991	3,690,571	9.9002	36,537,387	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	86,136,706
2111	4,683,544	2,315,818	2,367,726	1,726,591	29.2647	50,528,168	5,170,419	109,428	5,060,991	3,690,571	10.1556	37,479,959	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	88,919,651
2112	3,681,119	2,315,818	1,365,301	995,603	30.3709	30,237,370	2,142,238	109,428	2,032,810	1,482,364	10.4176	15,442,670	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	46,591,564
2113	6,708,510	2,315,818	4,392,693	3,203,235	31.5189	100,962,440	11,245,317	109,428	11,135,889	8,120,502	10.6864	86,778,934	1,250,000	911,524	1.0000	911,524	16,778,582	12,235,261	188,652,898
2114	5,696,027	2,315,818	3,380,209	2,464,913	32.7103	80,628,042	8,207,868	109,428	8,098,440	5,905,536	10.9621	64,737,081	1,250,000	911,524	1.0000	911,524	12,728,650	9,281,973	146,276,646
2115	5,043,287	2,315,818	2,727,469	1,988,922	33.9468	67,517,552	6,249,648	109,428	6,140,220	4,477,565	11.2449	50,349,769	1,250,000	911,524	1.0000	911,524	10,117,689	7,378,011	118,778,845
2116	3,681,119	2,315,818	1,365,301	995,603	35.2299	35,075,007	2,142,238	109,428	2,032,810	1,482,364	11.5350	17,099,063	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	53,085,594
2117	3,671,061	2,315,818	1,355,243	988,269	36.5616	36,132,699	2,132,969	109,428	2,023,541	1,475,605	11.8326	17,460,242	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	54,504,464
2118	5,696,027	2,315,818	3,380,209	2,464,913	37.9437	93,527,917	8,207,868	109,428	8,098,440	5,905,536	12.1379	71,680,810	1,250,000	911,524	1.0000	911,524	12,728,650	9,281,973	166,120,251
2119	5,189,786	2,315,818	2,873,968	2,095,752	39.3779	82,526,312	6,689,143	109,428	6,579,715	4,798,054	12.4511	59,741,044	1,250,000	911,524	1.0000	911,524	10,703,683	7,805,329	143,178,880
2120	3,681,119	2,315,818	1,365,301	995,603	40.8664	40,686,725	2,142,238	109,428	2,032,810	1,482,364	12.7723	18,933,192	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	60,531,440
2121	3,671,061	2,315,818	1,355,243	988,269	42.4112	41,913,678	2,132,969	109,428	2,023,541	1,475,605	13.1018	19,333,079	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	62,158,281
2122	6,202,269	2,315,818	3,886,451	2,834,074	44.0143	124,739,779	9,726,593	109,428	9,617,165	7,013,019	13.4399	94,254,278	1,250,000	911,524	1.0000	911,524	14,753,616	10,758,617	219,905,581
2123	3,671,061	2,315,818	1,355,243	988,269	45.6781	45,142,254	2,132,969	109,428	2,023,541	1,475,605	13.7866	20,343,573	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	66,397,351
2124	3,681,119	2,315,818	1,365,301	995,603	47.4047	47,196,278	2,142,238	109,428	2,032,810	1,482,364	14.1423	20,964,030	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	69,071,832
2125	6,202,269	2,315,818	3,886,451	2,834,074	49.1966	139,426,800	9,726,593	109,428	9,617,165	7,013,019	14.5072	101,739,273	1,250,000	911,524	1.0000	911,524	14,753,616	10,758,617	242,077,597
2126	3,671,061	2,315,818	1,355,243	988,269	51.0562	50,457,264	2,132,969	109,428	2,023,541	1,475,605	14.8815	21,959,213	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	73,328,001
2127	3,671,061	2,315,818	1,355,243	988,269	52.9861	52,364,525	2,132,969	109,428	2,023,541	1,475,605	15.2654	22,525,698	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	75,801,746
2128	6,212,326	2,315,818	3,896,509	2,841,408	54.9890	156,246,194	9,735,861	109,428	9,626,433	7,019,778	15.6593	109,924,809	1,250,000	911,524	1.0000	911,524	14,772,942	10,772,710	267,082,527
2129	3,671,061	2,315,818	1,355,243	988,269	57.0676	56,398,145	2,132,969	109,428	2,023,541	1,475,605	16.0633	23,703,083	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	81,012,752
2130	3,671,061	2,315,818	1,355,243	988,269	59.2248	58,530,039	2,132,969	109,428	2,023,541	1,475,605	16.4777	24,314,574	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	83,756,136
2131	3,671,061	2,315,818	1,355,243	988,269	61.4635	60,742,477	2,132,969	109,428	2,023,541	1,475,605	16.9028	24,941,853	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	86,595,854
2132	6,212,326	2,315,818	3,896,509	2,841,408	63.7868	181,244,335	9,735,861	109,428	9,626,433	7,019,778	17.3389	121,715,229	1,250,000	911,524	1.0000	911,524	14,772,942	10,772,710	303,871,087
2133	3,671,061	2,315,818	1,355,243	988,269	66.1979	65,421,338	2,132,969	109,428	2,023,541	1,475,605	17.7863	26,245,550	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	92,578,412
2134	3,671,061	2,315,818	1,355,243	988,269	68.7002	67,894,284	2,132,969	109,428	2,023,541	1,475,605	18.2451	26,922,558	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	95,728,365
2135	3,671,061	2,315,818	1,355,243	988,269	71.2971	70,460,720	2,132,969	109,428	2,023,541	1,475,605	18.7159	27,617,272	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	98,989,516
2136	3,681,119	2,315,818	1,365,301	995,603	73.9921	73,666,783	2,142,238	109,428	2,032,810	1,482,364	19.1987	28,459,453	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	103,037,759
2137	3,671,061	2,315,818	1,355,243	988,269	76.7890	75,888,195	2,132,969	109,428	2,023,541	1,475,605	19.6941	29,060,709	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	105,860,427
2138	18,858,308	2,315,818	16,542,490	12,063,098	79.6916	961,327,581	47,694,710	109,428	47,585,282	34,700,092	20.2022	701,018,190	1,250,000	911,524	1.0000	911,524	65,377,772	47,674,713	1,663,257,295
2139	3,671,061	2,315,818	1,355,243	988,269	82.7040	81,733,806	2,132,969	109,428	2,023,541	1,475,605	20.7234	30,579,549	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	113,224,879
2140	3,681,119	2,315,818	1,365,301	995,603	85.8302	85,452,835	2,142,238	109,428	2,032,810	1,482,364	21.2580	31,512,084	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	117,876,442
2141	3,671,061	2,315,818	1,355,243	988,269	89.0745	88,029,575	2,132,969	109,428	2,023,541	1,475,605	21.8065	32,177,777	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	121,118,875
2142	3,671,061	2,315,818	1,355,243	988,269	92.4416	91,357,176	2,132,969	109,428	2,023,541	1,475,605	22.3691	33,007,952	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	125,276,651
2143	3,671,061	2,315,818	1,355,243	988,269	95.9359	94,810,484	2,132,969	109,428	2,023,541	1,475,605	22.9462	33,859,523	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	129,581,531
2144	3,681,119	2,315,818	1,365,301	995,603	99.5622	99,124,460	2,142,238	109,428	2,032,810	1,482,364	23.5382	34,892,169	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	134,928,153
2145	5,189,786	2,315,818	2,873,968	2,095,752	103.3257	216,545,040	6,689,143	109,428	6,579,715	4,798,054	24.1455	115,851,401	1,250,000	911,524	1.0000	911,524	10,703,683	7,805,329	333,307,965
2146	4,683,544	2,315,818	2,367,726	1,726,591	107.2314	185,144,772	5,170,419	109,428	5,060,991	3,690,571	24.7685	91,409,898	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	277,466,194
2147	4,683,544	2,315,818	2,367,726	1,726,591	111.2847	192,143,163	5,170,419	109,428	5,060,991	3,690,571	25.4075	93,768,173	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	286,822,860
2148	3,681,119	2,315,818	1,365,301	995,603	115.4913	114,983,526	2,142,238	109,428	2,032,810	1,482,364	26.0630	38,634,840	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	154,529,890
2149	4,683,544	2,315,818	2,367,726	1,726,591	119.8569	206,943,847	5,170,419	109,428	5,060,991	3,690,571	26.7355	98,669,251	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	306,524,621
2150	5,189,786	2,315,818	2,873,968	2,095,752	124.3875	260,685,349	6,689,143	109,428	6,579,715	4,798,054	27.4252	131,587,577	1,250,000	911,524	1.0000	911,524	10,703,683	7,805,329	393,184,450
2151	5,189,786	2,315,818	2,873,968	2,095,752	129.0893	270,539,156	6,689,143	109,428	6,579,715	4,798,054	28.1328	134,982,680	1,250,000	911,524	1.0000	911,524	10,703,683	7,805,329	406,433,359
2152	5,199,843	2,315,818	2,884,026	2,103,086	133.9689	281,748,151	6,698,412	109,428	6,588,984	4,804,812	28.8586	138,660,153	1,250,000	911,524	1.0000	911,524	10,723,009	7,819,422	421,319,828
2153	3,671,061	2,315,818	1,355,243	988,269	139.0329	137,401,917	2,132,969	109,428	2,023,541	1,475,605	29.6032	43,682,625	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	181,996,065
2154	3,671,061	2,315,818	1,355,243	988,269	144.2884	142,595,765	2,132,969	109,428	2,023,541	1,475,605	30.3669	44,809,544	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	188,316,833
2155	5,549,529	2,315,818	3,233,711	2,358,083	149.7425	353,105,303	7,768,372	109,428	7,658,944	5,585,048	31.1504	173,976,472	1,250,000	911,524	1.0000	911,524	12,142,655	8,854,655	527,993,298
2156	4,693,602	2,315,818	2,377,784	1,733,925	155.4027	269,456,670	5,179,687	109,428	5,070,259	3,697,329	31.9541	118,144,831	1,250,000	911,524	1.0000	911,524	8,698,043	6,342,778	388,513,025
2157	4,683,544	2,315,818	2,367,726	1,726,591	161.2769	278,459,246	5,170,419	109,428	5,060,991	3,690,571	32.7785	120,971,369	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	400,342,139
2158	3,671,061	2,315,818	1,355,243	988,269	167.3732	165,409,759	2,132,969	109,428	2,023,541	1,475,605	33.6242	49,616,032	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	215,937,315
2159	4,683,544	2,315,818	2,367,726	1,726,591	173.6999	299,908,686	5,170,419	109,428	5,060,991	3,690,571	34.4917	127,294,054	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	428,114,265
2160	4,693,602	2,315,818	2,377,784	1,733,925	180.2658	312,567,428	5,179,687	109,428	5,070,259	3,697,329	35.3816	130,817,427	1,250,000	911,524	1.0000	911,524	8,698,043	6,342,778	444,296,378
2161	4,683,544	2,315,818	2,367,726	1,726,591	187.0798	323,010,302	5,170,419	109,428	5,060,991	3,690,571	36.2944	133,947,046	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	457,868,871
2162	3,671,061	2,315,818	1,355,243	988,269	194.1514	191,873,827	2,132,969	109,428	2,023,541	1,475,605	37.2308	54,937,948	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	247,723,298
2163	6,708,510	2,315,818	4,392,693	3,203,235	201.4904	645,421,075	11,245,317	109,428	11,135,889	8,120,502	38.1914	310,133,347	1,250,000	911,524	1.0000	911,524	16,778,582	12,235,261	956,465,946
2164	5,706,085	2,315,818	3,390,267	2,472,247	209.1067	516,963,455	8,217,137	109,428	8,107,709	5,912,295	39.1767	231,624,211	1,250,000	911,524	1.0000	911,524	12,747,976	9,296,066	749,499,190
2165	4,683,544	2,315,818	2,367,726	1,726,591	217.0109	374,689,070	5,170,419	109,428	5,060,991	3,690,571	40.1875	148,314,806	1,250,000	911,524	1.0000	911,524	8,678,717	6,328,685	523,915,400
2166	3,671,061	2,315,818	1,355,243	988,269	225.2140	222,572,034	2,132,969	109,428	2,023,541	1,475,605	41.2243	60,830,776	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	284,314,333
2167	3,671,061	2,315,818	1,355,243	988,269	233.7270	230,985,169	2,132,969	109,428	2,023,541	1,475,605	42.2879	62,400,229	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	294,296,921
2168	5,706,085	2,315,818	3,390,267	2,472,247	242.5619	599,672,980	8,217,137	109,428	8,107,709	5,912,295	43.3789	256,468,858	1,250,000	911,524	1.0000	911,524	12,747,976	9,296,066	857,053,362
2169	5,189,786	2,315,818	2,873,968	2,095,752	251.7308	527,565,322	6,689,143	109,428	6,579,715	4,798,054	44.4981	213,504,265	1,250,000	911,524	1.0000	911,524	10,703,683	7,805,329	741,981,110
2170	3,671,061	2,315,818	1,355,243	988,269	261.2462	258,181,543	2,132,969	109,428	2,023,541	1,475,605	45.6462	67,355,753	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	326,448,820
2171	3,671,061	2,315,818	1,355,243	988,269	271.1213	267,940,799	2,132,969	109,428	2,023,541	1,475,605	46.8238	69,093,425	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	337,945,748
2172	6,212,326	2,315,818	3,896,509	2,841,408	281.3697	799,486,165	9,735,861	109,428	9,626,433	7,019,778	48.0319	337,173,274	1,250,000	911,524	1.0000	911,524	14,772,942	10,772,710	1,137,570,963
2173	3,671,061	2,315,818	1,355,243	988,269	292.0054	288,579,910	2,132,969	109,428	2,023,541	1,475,605	49.2711	72,704,673	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	362,196,106
2174	3,671,061	2,315,818	1,355,243	988,269	303.0433	299,488,325	2,132,969	109,428	2,023,541	1,475,605	50.5423	74,580,462	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	374,980,310
2175	6,202,269	2,315,818	3,886,451	2,834,074	314.4983	891,311,426	9,726,593	109,428	9,617,165	7,013,019	51.8463	363,599,102	1,250,000	911,524	1.0000	911,524	14,753,616	10,758,617	1,255,822,051
2176	3,681,119	2,315,818	1,365,301	995,603	326.3863	324,951,295	2,142,238	109,428	2,032,810	1,482,364	53.1839	78,837,873	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	404,700,692
2177	3,671,061	2,315,818	1,355,243	988,269	338.7237	334,750,161	2,132,969	109,428	2,023,541	1,475,605	54.5561	80,503,244	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	416,164,929
2178	6,202,269	2,315,818	3,886,451	2,834,074	351.5275	996,254,915	9,726,593	109,428	9,617,165	7,013,019	55.9636	392,473,806	1,250,000	911,524	1.0000	911,524	14,753,616	10,758,617	1,389,640,245
2179	3,671,061	2,315,818	1,355,243	988,269	364.8152	360,535,584	2,132,969	109,428	2,023,541	1,475,605	57.4075	84,710,784	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	446,157,892
2180	3,681,119	2,315,818	1,365,301	995,603	378.6052	376,940,607	2,142,238	109,428	2,032,810	1,482,364	58.8886	87,294,312	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	465,146,443
2181	3,671,061	2,315,818	1,355,243	988,269	392.9165	388,307,230	2,132,969	109,428	2,023,541	1,475,605	60.4079	89,138,188	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	478,356,942
2182	6,202,269	2,315,818	3,886,451	2,834,074	407.7688	1,155,646,916	9,726,593	109,428	9,617,165	7,013,019	61.9664	434,571,558	1,250,000	911,524	1.0000	911,524	14,753,616	10,758,617	1,591,129,998
2183	3,671,061	2,315,818	1,355,243	988,269	423.1824	418,218,084	2,132,969	109,428	2,023,541	1,475,605	63.5652	93,797,116	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	512,926,723
2184	3,681,119	2,315,818	1,365,301	995,603	439.1787	437,247,786	2,142,238	109,428	2,032,810	1,482,364	65.2052	96,657,810	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	534,817,120
2185	3,671,061	2,315,818	1,355,243	988,269	455.7797	450,432,988	2,132,969	109,428	2,023,541	1,475,605	66.8874	98,699,370	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	550,043,881

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.8
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2186	3,671,061	2,315,818	1,355,243	988,269	473.0081	467,459,283	2,132,969	109,428	2,023,541	1,475,605	68.6131	101,245,821	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	569,616,627
2187	3,671,061	2,315,818	1,355,243	988,269	490.8878	485,129,237	2,132,969	109,428	2,023,541	1,475,605	70.3834	103,858,084	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	589,898,845
2188	18,868,365	2,315,818	16,552,548	12,070,432	509.4434	6,149,202,058	47,703,978	109,428	47,594,550	34,706,850	72.1993	2,505,810,296	1,250,000	911,524	1.0000	911,524	65,397,098	47,688,806	8,655,923,878
2189	3,671,061	2,315,818	1,355,243	988,269	528.7004	522,498,261	2,132,969	109,428	2,023,541	1,475,605	74.0620	109,286,244	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	632,696,029
2190	3,671,061	2,315,818	1,355,243	988,269	548.6852	542,248,621	2,132,969	109,428	2,023,541	1,475,605	75.9728	112,105,830	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	655,265,975
2191	3,671,061	2,315,818	1,355,243	988,269	569.4255	562,745,618	2,132,969	109,428	2,023,541	1,475,605	77.9329	114,998,163	1,250,000	911,524	1.0000	911,524	4,628,785	3,375,398	678,655,305
2192	3,681,119	2,315,818	1,365,301	995,603	590.9498	588,351,602	2,142,238	109,428	2,032,810	1,482,364	79.9436	118,505,476	1,250,000	911,524	1.0000	911,524	4,648,111	3,389,491	707,768,602
2193	3,774,848	2,315,818	1,459,031	1,063,953	613.2877	652,509,229	2,444,332	109,428	2,334,904	1,702,656	82.0061	139,628,201	1,250,000	911,524	1.0000	911,524	5,043,935	3,678,133	793,048,953
2194	3,930,530	2,315,818	1,614,712	1,177,479	636.4700	749,429,823	2,911,376	109,428	2,801,948	2,043,233	84.1219	171,880,680	1,250,000	911,524	1.0000	911,524	5,666,660	4,132,236	922,222,027
2195	5,808,997	2,315,818	3,493,180	2,547,293	660.5286	1,682,559,838	8,546,779	109,428	8,437,351	6,152,676	86.2922	530,927,981	1,250,000	911,524	1.0000	911,524	13,180,530	9,611,493	2,214,399,343
2196	5,004,964	2,315,818	2,689,147	1,960,977	685.4966	1,344,242,882	6,113,775	109,428	6,004,347	4,378,484	88.5185	387,576,806	1,250,000	911,524	1.0000	911,524	9,943,493	7,250,984	1,732,731,212
2197	4,839,225	2,315,818	2,523,408	1,840,117	711.4083	1,309,074,321	5,637,462	109,428	5,528,034	4,031,148	90.8023	366,037,491	1,250,000	911,524	1.0000	911,524	9,301,442	6,782,788	1,676,023,336
2198	4,034,317	2,315,818	1,718,499	1,253,162	738.2996	925,209,332	3,222,738	109,428	3,113,310	2,270,285	93.1450	211,465,687	1,250,000	911,524	1.0000	911,524	6,081,810	4,434,971	1,137,586,543
2199	4,839,225	2,315,818	2,523,408	1,840,117	766.2073	1,409,910,879	5,637,462	109,428	5,528,034	4,031,148	95.5482	385,168,915	1,250,000	911,524	1.0000	911,524	9,301,442	6,782,788	1,795,991,317
2200	5,293,573	2,315,818	2,977,755	2,171,436	795.1699	1,726,660,384	7,000,506	109,428	6,891,078	5,025,105	98.0133	492,527,119	1,250,000	911,524	1.0000	911,524	11,118,833	8,108,064	2,220,099,027
2201	5,449,254	2,315,818	3,133,437	2,284,962	825.2273	1,885,612,626	7,467,550	109,428	7,358,122	5,365,682	100.5421	539,476,949	1,250,000	911,524	1.0000	911,524	11,741,558	8,562,167	2,426,001,099
2202	5,449,254	2,315,818	3,133,437	2,284,962	856.4209	1,956,888,802	7,467,550	109,428	7,358,122	5,365,682	103.1360	553,394,992	1,250,000	911,524	1.0000	911,524	11,741,558	8,562,167	2,511,195,318
2203	3,826,742	2,315,818	1,510,924	1,101,795	888.7937	979,268,287	2,600,013	109,428	2,490,585	1,816,182	105.7969	192,146,426	1,250,000	911,524	1.0000	911,524	5,251,510	3,829,501	1,172,326,236
2204	3,888,694	2,315,818	1,572,876	1,146,971	922.3901	1,057,954,683	2,764,963	109,428	2,655,535	1,936,466	108.5265	210,157,924	1,250,000	911,524	1.0000	911,524	5,478,411	3,994,961	1,269,024,131
2205	5,397,361	2,315,818	3,081,543	2,247,120	957.2564	2,151,069,630	7,311,868	109,428	7,202,440	5,252,156	111.3265	584,704,190	1,250,000	911,524	1.0000	911,524	11,533,983	8,410,800	2,736,685,344
2206	4,839,225	2,315,818	2,523,408	1,840,117	993.4407	1,828,046,862	5,637,462	109,428	5,528,034	4,031,148	114.1987	460,351,837	1,250,000	911,524	1.0000	911,524	9,301,442	6,782,788	2,289,310,222
2207	4,891,119	2,315,818	2,575,301	1,877,959	1,030.9927	1,936,161,657	5,793,144	109,428	5,683,716	4,144,674	117.1450	485,527,779	1,250,000	911,524	1.0000	911,524	9,509,017	6,934,156	2,422,600,959
2208	3,888,694	2,315,818	1,572,876	1,146,971	1,069.9643	1,227,218,009	2,764,963	109,428	2,655,535	1,936,466	120.1674	232,700,136	1,250,000	911,524	1.0000	911,524	5,478,411	3,994,961	1,460,829,669
2209	4,839,225	2,315,818	2,523,408	1,840,117	1,110.4089	2,043,282,005	5,637,462	109,428	5,528,034	4,031,148	123.2677	496,910,316	1,250,000	911,524	1.0000	911,524	9,301,442	6,782,788	2,541,103,844
2210	4,891,119	2,315,818	2,575,301	1,877,959	1,152.3824	2,164,126,494	5,793,144	109,428	5,683,716	4,144,674	126.4480	524,085,676	1,250,000	911,524	1.0000	911,524	9,509,017	6,934,156	2,689,123,694
2211	4,891,119	2,315,818	2,575,301	1,877,959	1,195.9424	2,245,930,373	5,793,144	109,428	5,683,716	4,144,674	129.7104	537,607,259	1,250,000	911,524	1.0000	911,524	9,509,017	6,934,156	2,784,449,155
2212	3,888,694	2,315,818	1,572,876	1,146,971	1,241.1491	1,423,562,008	2,764,963	109,428	2,655,535	1,936,466	133.0569	257,660,220	1,250,000	911,524	1.0000	911,524	5,478,411	3,994,961	1,682,133,752
2213	6,916,085	2,315,818	4,600,268	3,354,603	1,288.0645	4,320,944,397	11,868,042	109,428	11,758,614	8,574,605	136.4898	1,170,346,133	1,250,000	911,524	1.0000	911,524	17,608,882	12,840,731	5,492,202,054
2214	5,903,602	2,315,818	3,587,784	2,616,281	1,336.7533	3,497,321,694	8,830,593	109,428	8,721,165	6,359,639	140.0112	890,420,729	1,250,000	911,524	1.0000	911,524	13,558,950	9,887,444	4,388,653,947
2215	4,891,119	2,315,818	2,575,301	1,877,959	1,387.2826	2,605,259,356	5,793,144	109,428	5,683,716	4,144,674	143.6235	595,272,516	1,250,000	911,524	1.0000	911,524	9,509,017	6,934,156	3,201,443,396
2216	3,888,694	2,315,818	1,572,876	1,146,971	1,439.7219	1,651,319,248	2,764,963	109,428	2,655,535	1,936,466	147.3290	285,297,662	1,250,000	911,524	1.0000	911,524	5,478,411	3,994,961	1,937,528,434
2217	3,852,645	2,315,818	1,536,827	1,120,684	1,494.1434	1,674,462,186	14,539,545	109,428	14,430,117	10,522,715	151.1301	1,590,299,020	1,250,000	911,524	1.0000	911,524	17,216,944	12,554,923	3,265,672,729
2218	1,123,816	2,315,818	(1,192,002)	($869,230)	1,550.6220	(1,347,847,769)	1,790,582	109,428	1,681,154	1,225,929	155.0292	190,054,869	1,250,000	911,524	1.0000	911,524	1,739,152	1,268,223	(1,156,881,375)
	$1,302,354,031	$409,899,749	$892,454,282	$650,794,619		$75,650,417,087	$1,472,914,365	$19,368,757	$1,453,545,609	$1,059,953,075		$26,111,286,978	$231,250,000	$168,631,894		$168,631,894	$2,577,249,891	$1,879,379,588	$101,930,335,959
	$5,024,272,973	$1,713,285,028	$3,310,987,945	$2,414,435,318		$349,553,765,530	$5,383,053,076	$81,305,006	$5,301,748,070	$3,866,135,426		$99,286,136,441	$463,750,000	$338,175,311		$338,175,311	$9,076,486,015	$6,618,746,056	$449,178,077,283

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	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$757,935,327	$15,225,668	$0	$6,696,113	$779,857,107
2021	779,857,107	31,364,426	-	8,507,110	819,728,644
2022	819,728,644	35,255,669	-	123,326,180	978,310,494
2023	978,310,494	41,598,943	-	123,326,180	1,143,235,617
2024	1,143,235,617	48,195,948	-	123,326,180	1,314,757,746
2025	1,314,757,746	55,056,833	-	123,326,180	1,493,140,760
2026	1,493,140,760	62,192,154	-	123,326,180	1,678,659,094
2027	1,678,659,094	69,612,887	-	123,326,180	1,871,598,162
2028	1,871,598,162	77,330,450	-	123,326,180	2,072,254,792
2029	2,072,254,792	85,356,715	-	123,326,180	2,280,937,688
2030	2,280,937,688	91,458,371	(29,153,887)	92,494,635	2,435,736,807
2031	2,435,736,807	95,724,457	(124,694,267)	-	2,406,766,996
2032	2,406,766,996	94,585,943	(77,781,310)	-	2,423,571,629
2033	2,423,571,629	95,246,365	(79,618,616)	-	2,439,199,378
2034	2,439,199,378	95,860,536	(181,199,337)	-	2,353,860,576
2035	2,353,860,576	92,506,721	(18,244,582)	-	2,428,122,715
2036	2,428,122,715	95,425,223	(18,909,387)	-	2,504,638,550
2037	2,504,638,550	98,432,295	(19,491,085)	-	2,583,579,760
2038	2,583,579,760	101,534,685	(13,362,498)	-	2,671,751,947
2039	2,671,751,947	104,999,852	(13,787,364)	-	2,762,964,435
2040	2,762,964,435	108,584,502	(14,285,196)	-	2,857,263,741
2041	2,857,263,741	112,290,465	(14,679,739)	-	2,954,874,467
2042	2,954,874,467	116,126,567	(15,148,013)	-	3,055,853,021
2043	3,055,853,021	120,095,024	(15,631,898)	-	3,160,316,146
2044	3,160,316,146	124,200,425	(16,198,814)	-	3,268,317,757
2045	3,268,317,757	128,444,888	(16,648,377)	-	3,380,114,268
2046	3,380,114,268	132,838,491	(17,181,312)	-	3,495,771,446
2047	3,495,771,446	137,383,818	(17,732,840)	-	3,615,422,424
2048	3,615,422,424	142,086,101	(23,073,739)	-	3,734,434,786
2049	3,734,434,786	146,763,287	(18,890,587)	-	3,862,307,486
2050	3,862,307,486	151,788,684	(30,696,113)	-	3,983,400,057
2051	3,983,400,057	156,547,622	(31,656,122)	-	4,108,291,557
2052	4,108,291,557	161,455,858	(32,735,685)	-	4,237,011,730
2053	4,237,011,730	166,514,561	(33,671,584)	-	4,369,854,707
2054	4,369,854,707	171,735,290	(34,728,418)	-	4,506,861,579
2055	4,506,861,579	177,119,660	(35,819,476)	-	4,648,161,763
2056	4,648,161,763	182,672,757	(37,046,230)	-	4,793,788,291
2057	4,793,788,291	188,395,880	(38,109,670)	-	4,944,074,501
2058	4,944,074,501	194,302,128	(102,174,628)	-	5,036,202,000
2059	5,036,202,000	197,922,739	(40,551,552)	-	5,193,573,187
2060	5,193,573,187	204,107,426	(41,947,857)	-	5,355,732,756

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2061	5,355,732,756	210,480,297	(43,155,600)	-	5,523,057,453
2062	5,523,057,453	217,056,158	(44,523,062)	-	5,695,590,549
2063	5,695,590,549	223,836,709	(82,365,821)	-	5,837,061,436
2064	5,837,061,436	229,396,514	(47,522,774)	-	6,018,935,177
2065	6,018,935,177	236,544,152	(48,897,946)	-	6,206,581,383
2066	6,206,581,383	243,918,648	(58,416,205)	-	6,392,083,826
2067	6,392,083,826	251,208,894	(52,058,873)	-	6,591,233,847
2068	6,591,233,847	259,035,490	(172,191,161)	-	6,678,078,177
2069	6,678,078,177	262,448,472	(55,432,486)	-	6,885,094,163
2070	6,885,094,163	270,584,201	(57,202,810)	-	7,098,475,554
2071	7,098,475,554	278,970,089	(59,031,855)	-	7,318,413,788
2072	7,318,413,788	287,613,662	(61,094,255)	-	7,544,933,196
2073	7,544,933,196	296,515,875	(62,874,395)	-	7,778,574,675
2074	7,778,574,675	305,697,985	(64,892,208)	-	8,019,380,452
2075	8,019,380,452	315,161,652	(66,976,429)	-	8,267,565,675
2076	8,267,565,675	324,915,331	(69,327,221)	-	8,523,153,785
2077	8,523,153,785	334,959,944	(71,354,568)	-	8,786,759,160
2078	8,786,759,160	345,319,635	(73,653,727)	-	9,058,425,068
2079	9,058,425,068	355,996,105	(76,029,769)	-	9,338,391,404
2080	9,338,391,404	366,998,782	(78,711,223)	-	9,626,678,964
2081	9,626,678,964	378,328,483	(81,022,185)	-	9,923,985,262
2082	9,923,985,262	390,012,621	(83,643,797)	-	10,230,354,086
2083	10,230,354,086	402,052,916	(86,353,837)	-	10,546,053,165
2084	10,546,053,165	414,459,889	(567,534,295)	-	10,392,978,759
2085	10,392,978,759	408,444,065	(347,546,617)	-	10,453,876,207
2086	10,453,876,207	410,837,335	(616,402,351)	-	10,248,311,191
2087	10,248,311,191	402,758,630	(1,062,121,939)	-	9,588,947,882
2088	9,588,947,882	376,845,652	(710,460,976)	-	9,255,332,558
2089	9,255,332,558	363,734,570	(694,244,980)	-	8,924,822,147
2090	8,924,822,147	350,745,510	(364,626,781)	-	8,910,940,877
2091	8,910,940,877	350,199,976	(301,011,158)	-	8,960,129,695
2092	8,960,129,695	352,133,097	(176,202,183)	-	9,136,060,609
2093	9,136,060,609	359,047,182	(80,927,342)	-	9,414,180,450
2094	9,414,180,450	369,977,292	(83,585,397)	-	9,700,572,344
2095	9,700,572,344	381,232,493	(128,826,282)	-	9,952,978,555
2096	9,952,978,555	391,152,057	(89,452,600)	-	10,254,678,012
2097	10,254,678,012	403,008,846	(92,111,488)	-	10,565,575,370
2098	10,565,575,370	415,227,112	(95,149,031)	-	10,885,653,451
2099	10,885,653,451	427,806,181	(98,290,044)	-	11,215,169,588
2100	11,215,169,588	440,756,165	(101,537,690)	-	11,554,388,063
2101	11,554,388,063	454,087,451	(104,896,175)	-	11,903,579,339
2102	11,903,579,339	467,810,668	(108,369,184)	-	12,263,020,823
2103	12,263,020,823	481,936,718	(111,960,718)	-	12,632,996,824
2104	12,632,996,824	496,476,775	(116,045,590)	-	13,013,428,009
2105	13,013,428,009	511,427,721	(119,515,981)	-	13,405,339,748
2106	13,405,339,748	526,829,852	(123,489,182)	-	13,808,680,418
2107	13,808,680,418	542,681,140	(127,598,272)	-	14,223,763,287
2108	14,223,763,287	558,993,897	(417,451,434)	-	14,365,305,750

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External Levelized	2109	14,365,305,750	564,556,516	(136,244,011)	-	14,793,618,255
	2110	14,793,618,255	581,389,197	(140,790,766)	-	15,234,216,686
	2111	15,234,216,686	598,704,716	(145,493,620)	-	15,687,427,783
	2112	15,687,427,783	616,515,912	(150,852,066)	-	16,153,091,629
	2113	16,153,091,629	634,816,501	(322,013,377)	-	16,465,894,753
	2114	16,465,894,753	647,109,664	(160,596,449)	-	16,952,407,967
	2115	16,952,407,967	666,229,633	(165,981,801)	-	17,452,655,799
	2116	17,452,655,799	685,889,373	(208,726,648)	-	17,929,818,523
	2117	17,929,818,523	704,641,868	(177,316,273)	-	18,457,144,119
	2118	18,457,144,119	725,365,764	(728,922,504)	-	18,453,587,379
	2119	18,453,587,379	725,225,984	(189,448,719)	-	18,989,364,644
	2120	18,989,364,644	746,282,031	(196,489,631)	-	19,539,157,043
	2121	19,539,157,043	767,888,872	(202,435,473)	-	20,104,610,442
	2122	20,104,610,442	790,111,190	(209,268,789)	-	20,685,452,844
	2123	20,685,452,844	812,938,297	(216,338,954)	-	21,282,052,186
	2124	21,282,052,186	836,384,651	(224,414,926)	-	21,894,021,911
	2125	21,894,021,911	860,435,061	(231,224,969)	-	22,523,232,004
	2126	22,523,232,004	885,163,018	(239,058,405)	-	23,169,336,617
	2127	23,169,336,617	910,554,929	(247,164,273)	-	23,832,727,273
	2128	23,832,727,273	936,626,182	(309,929,649)	-	24,459,423,805
	2129	24,459,423,805	961,255,356	(264,234,250)	-	25,156,444,911
	2130	25,156,444,911	988,648,285	(273,218,159)	-	25,871,875,037
	2131	25,871,875,037	1,016,764,689	(282,515,668)	-	26,606,124,058
	2132	26,606,124,058	1,045,620,675	(293,152,812)	-	27,358,591,922
	2133	27,358,591,922	1,075,192,663	(302,097,280)	-	28,131,687,305
	2134	28,131,687,305	1,105,575,311	(2,576,863,471)	-	26,660,399,144
	2135	26,660,399,144	1,047,753,686	(323,073,237)	-	27,385,079,594
	2136	27,385,079,594	1,076,233,628	(335,287,541)	-	28,126,025,681
	2137	28,126,025,681	1,105,352,809	(345,544,835)	-	28,885,833,655
	2138	28,885,833,655	1,135,213,263	(357,375,238)	-	29,663,671,680
	2139	29,663,671,680	1,165,782,297	(369,621,281)	-	30,459,832,695
	2140	30,459,832,695	1,197,071,425	(383,652,343)	-	31,273,251,777
	2141	31,273,251,777	1,229,038,795	(395,419,152)	-	32,106,871,420
	2142	32,106,871,420	1,261,800,047	(409,003,101)	-	32,959,668,367
	2143	32,959,668,367	1,295,314,967	(423,065,035)	-	33,831,918,299
	2144	33,831,918,299	1,329,594,389	(439,188,707)	-	34,722,323,980
	2145	34,722,323,980	1,364,587,332	(452,693,206)	-	35,634,218,107
	2146	35,634,218,107	1,400,424,772	(468,295,883)	-	36,566,346,996
	2147	36,566,346,996	1,437,057,437	(484,448,902)	-	37,518,955,530
	2148	37,518,955,530	1,474,494,952	(502,983,931)	-	38,490,466,552
	2149	38,490,466,552	1,512,675,336	(518,488,526)	-	39,484,653,362
	2150	39,484,653,362	1,551,746,877	(536,415,795)	-	40,499,984,444
	2151	40,499,984,444	1,591,649,389	(554,977,973)	-	41,536,655,859
	2152	41,536,655,859	1,632,390,575	(576,291,549)	-	42,592,754,885
	2153	42,592,754,885	1,673,895,267	(594,098,399)	-	43,672,551,753
	2154	43,672,551,753	1,716,331,284	(614,704,681)	-	44,774,178,356
	2155	44,774,178,356	1,759,625,209	(636,042,461)	-	45,897,761,105
	2156	45,897,761,105	1,803,782,011	(660,559,170)	-	47,040,983,946

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2157	47,040,983,946	1,848,710,669	(681,017,555)	-	48,208,677,060
2158	48,208,677,060	1,894,601,008	(2,110,724,076)	-	47,992,553,992
2159	47,992,553,992	1,886,107,372	(729,247,420)	-	49,149,413,944
2160	49,149,413,944	1,931,571,968	(757,457,918)	-	50,323,527,995
2161	50,323,527,995	1,977,714,650	(780,971,071)	-	51,520,271,574
2162	51,520,271,574	2,024,746,673	(808,222,993)	-	52,736,795,254
2163	52,736,795,254	2,072,556,053	(1,664,774,781)	-	53,144,576,526
2164	53,144,576,526	2,088,581,857	(868,916,824)	-	54,364,241,559
2165	54,364,241,559	2,136,514,693	(895,950,830)	-	55,604,805,423
2166	55,604,805,423	2,185,268,853	(1,110,175,134)	-	56,679,899,142
2167	56,679,899,142	2,227,520,036	(959,780,761)	-	57,947,638,417
2168	57,947,638,417	2,277,342,190	(3,927,610,515)	-	56,297,370,092
2169	56,297,370,092	2,212,486,645	(1,028,256,854)	-	57,481,599,882
2170	57,481,599,882	2,259,026,875	(1,064,343,574)	-	58,676,283,184
2171	58,676,283,184	2,305,977,929	(1,101,722,031)	-	59,880,539,082
2172	59,880,539,082	2,353,305,186	(1,144,776,887)	-	61,089,067,380
2173	61,089,067,380	2,400,800,348	(1,180,546,292)	-	62,309,321,436
2174	62,309,321,436	2,448,756,332	(1,222,091,347)	-	63,535,986,421
2175	63,535,986,421	2,496,964,266	(1,265,126,940)	-	64,767,823,748
2176	64,767,823,748	2,545,375,473	(1,314,725,349)	-	65,998,473,872
2177	65,998,473,872	2,593,740,023	(1,355,890,254)	-	67,236,323,642
2178	67,236,323,642	2,642,387,519	(1,403,732,507)	-	68,474,978,653
2179	68,474,978,653	2,691,066,661	(1,453,295,401)	-	69,712,749,914
2180	69,712,749,914	2,739,711,072	(1,510,448,193)	-	70,942,012,792
2181	70,942,012,792	2,788,021,103	(1,557,835,585)	-	72,172,198,310
2182	72,172,198,310	2,836,367,394	(1,612,945,738)	-	73,395,619,966
2183	73,395,619,966	2,884,447,865	(1,670,041,735)	-	74,610,026,096
2184	74,610,026,096	2,932,174,026	(13,381,397,471)	-	64,160,802,650
2185	64,160,802,650	2,521,519,544	(1,790,483,270)	-	64,891,838,924
2186	64,891,838,924	2,550,249,270	(1,853,982,215)	-	65,588,105,979
2187	65,588,105,979	2,577,612,565	(1,919,774,159)	-	66,245,944,385
2188	66,245,944,385	2,603,465,614	(1,995,721,269)	-	66,853,688,731
2189	66,853,688,731	2,627,349,967	(2,058,573,098)	-	67,422,465,600
2190	67,422,465,600	2,649,702,898	(2,131,757,324)	-	67,940,411,175
2191	67,940,411,175	2,670,058,159	(2,207,588,713)	-	68,402,880,621
2192	68,402,880,621	2,688,233,208	(2,731,299,814)	-	68,359,814,016
2193	68,359,814,016	2,686,540,691	(3,157,018,106)	-	67,889,336,600
2194	67,889,336,600	2,668,050,928	(2,568,604,349)	-	67,988,783,179
2195	67,988,783,179	2,671,959,179	(3,263,360,721)	-	67,397,381,637
2196	67,397,381,637	2,648,717,098	(3,638,934,779)	-	66,407,163,956
2197	66,407,163,956	2,609,801,543	(1,549,561,870)	-	67,467,403,630
2198	67,467,403,630	2,651,468,963	(1,606,361,170)	-	68,512,511,423
2199	68,512,511,423	2,692,541,699	(1,665,261,623)	-	69,539,791,499
2200	69,539,791,499	2,732,913,806	(1,726,341,366)	-	70,546,363,938
2201	70,546,363,938	2,772,472,103	(1,789,681,946)	-	71,529,154,095
2202	71,529,154,095	2,811,095,756	(1,855,367,215)	-	72,484,882,636
2203	72,484,882,636	2,848,655,888	(1,923,484,989)	-	73,410,053,535
2204	73,410,053,535	2,885,015,104	(2,008,101,554)	-	74,286,967,085

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2205	74,286,967,085	2,919,477,806	(2,067,382,801)	-	75,139,062,090
2206	75,139,062,090	2,952,965,140	(2,143,354,537)	-	75,948,672,692
2207	75,948,672,692	2,984,782,837	(2,222,141,747)	-	76,711,313,782
2208	76,711,313,782	3,014,754,632	(10,568,350,057)	-	69,157,718,358
2209	69,157,718,358	2,717,898,331	(2,388,587,282)	-	69,487,029,407
2210	69,487,029,407	2,730,840,256	(2,476,467,315)	-	69,741,402,347
2211	69,741,402,347	2,740,837,112	(2,567,606,955)	-	69,914,632,504
2212	69,914,632,504	2,747,645,057	(2,680,870,384)	-	69,981,407,177
2213	69,981,407,177	2,750,269,302	(7,208,976,432)	-	65,522,700,047
2214	65,522,700,047	2,575,042,112	(2,861,823,358)	-	65,235,918,801
2215	65,235,918,801	2,563,771,609	(2,967,264,540)	-	64,832,425,870
2216	64,832,425,870	2,547,914,337	(4,084,626,821)	-	63,295,713,385
2217	63,295,713,385	2,487,521,536	(3,190,038,317)	-	62,593,196,604
2218	62,593,196,604	2,459,912,627	(18,861,956,392)	-	46,191,152,839
2219	46,191,152,839	1,815,312,307	(4,377,074,330)	-	43,629,390,815
2220	43,629,390,815	1,714,635,059	(4,398,525,569)	-	40,945,500,306
2221	40,945,500,306	1,609,158,162	(4,533,288,092)	-	38,021,370,376
2222	38,021,370,376	1,494,239,856	(4,699,096,899)	-	34,816,513,333
2223	34,816,513,333	1,368,288,974	(5,052,289,919)	-	31,132,512,388
2224	31,132,512,388	1,223,507,737	(5,078,437,054)	-	27,277,583,071
2225	27,277,583,071	1,072,009,015	(5,234,189,399)	-	23,115,402,686
2226	23,115,402,686	908,435,326	(5,425,897,095)	-	18,597,940,917
2227	18,597,940,917	730,899,078	(5,832,844,051)	-	13,495,995,943
2228	13,495,995,943	530,392,641	(5,864,574,052)	-	8,161,814,532
2229	8,161,814,532	320,759,311	(6,044,613,263)	-	2,437,960,580
2230	2,437,960,580	95,811,851	(6,448,880,817)	-	(3,915,108,386)
2231	(3,915,108,386)	(153,863,760)	4,068,972,146	-	0

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Prairie Island Unit 1

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$437,068,622	$8,829,035	$0	$24,632	$445,922,289
2021	445,922,289	18,265,734	-	12,399,703	476,587,726
2022	476,587,726	20,462,143	-	59,801,929	556,851,798
2023	556,851,798	23,704,812	-	59,801,929	640,358,538
2024	640,358,538	27,078,484	-	59,801,929	727,238,951
2025	727,238,951	30,588,453	-	59,801,929	817,629,332
2026	817,629,332	34,240,224	-	59,801,929	911,671,485
2027	911,671,485	38,039,527	-	59,801,929	1,009,512,940
2028	1,009,512,940	41,992,322	-	59,801,929	1,111,307,191
2029	1,111,307,191	46,104,809	-	59,801,929	1,217,213,929
2030	1,217,213,929	50,383,442	-	59,801,929	1,327,399,299
2031	1,327,399,299	54,834,931	-	59,801,929	1,442,036,159
2032	1,442,036,159	59,466,260	-	59,801,929	1,561,304,347
2033	1,561,304,347	61,672,182	(28,675,993)	40,067,292	1,634,367,828
2034	1,634,367,828	63,740,345	(94,078,505)	-	1,604,029,668
2035	1,604,029,668	62,557,157	(40,726,070)	-	1,625,860,755
2036	1,625,860,755	63,408,569	(34,976,809)	-	1,654,292,516
2037	1,654,292,516	64,517,408	(59,454,853)	-	1,659,355,071
2038	1,659,355,071	64,714,848	(98,362,742)	-	1,625,707,176
2039	1,625,707,176	63,402,580	(14,771,643)	-	1,674,338,113
2040	1,674,338,113	65,299,186	(15,260,915)	-	1,724,376,385
2041	1,724,376,385	67,250,679	(11,860,847)	-	1,779,766,218
2042	1,779,766,218	69,410,882	(12,194,153)	-	1,836,982,948
2043	1,836,982,948	71,642,335	(12,538,000)	-	1,896,087,283
2044	1,896,087,283	73,947,404	(12,941,684)	-	1,957,093,002
2045	1,957,093,002	76,326,627	(22,312,509)	-	2,011,107,120
2046	2,011,107,120	78,433,178	(19,849,443)	-	2,069,690,855
2047	2,069,690,855	80,717,943	(20,422,825)	-	2,129,985,974
2048	2,129,985,974	83,069,453	(14,482,923)	-	2,198,572,503
2049	2,198,572,503	85,744,328	(21,622,844)	-	2,262,693,987
2050	2,262,693,987	88,245,065	(25,742,577)	-	2,325,196,475
2051	2,325,196,475	90,682,663	(26,104,211)	-	2,389,774,927
2052	2,389,774,927	93,201,222	(27,333,431)	-	2,455,642,718
2053	2,455,642,718	95,770,066	(16,636,298)	-	2,534,776,486
2054	2,534,776,486	98,856,283	(17,121,275)	-	2,616,511,495
2055	2,616,511,495	102,043,948	(29,746,097)	-	2,688,809,346
2056	2,688,809,346	104,863,564	(26,533,451)	-	2,767,139,459
2057	2,767,139,459	107,918,439	(27,243,480)	-	2,847,814,418
2058	2,847,814,418	111,064,762	(19,221,403)	-	2,939,657,777
2059	2,939,657,777	114,646,653	(28,387,884)	-	3,025,916,547
2060	3,025,916,547	118,010,745	(29,820,978)	-	3,114,106,314

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2061	3,114,106,314	121,450,146	(30,624,693)	-	3,204,931,767
2062	3,204,931,767	124,992,339	(21,604,866)	-	3,308,319,240
2063	3,308,319,240	129,024,450	(52,946,928)	-	3,384,396,761
2064	3,384,396,761	131,991,474	(43,514,655)	-	3,472,873,580
2065	3,472,873,580	135,442,070	(34,459,071)	-	3,573,856,578
2066	3,573,856,578	139,380,407	(24,310,639)	-	3,688,926,345
2067	3,688,926,345	143,868,127	(25,042,830)	-	3,807,751,643
2068	3,807,751,643	148,502,314	(49,641,577)	-	3,906,612,380
2069	3,906,612,380	152,357,883	(44,920,912)	-	4,014,049,351
2070	4,014,049,351	156,547,925	(27,384,722)	-	4,143,212,553
2071	4,143,212,553	161,585,290	(28,216,588)	-	4,276,581,254
2072	4,276,581,254	166,786,669	(61,900,626)	-	4,381,467,297
2073	4,381,467,297	170,877,225	(29,962,823)	-	4,522,381,699
2074	4,522,381,699	176,372,886	(30,879,142)	-	4,667,875,443
2075	4,667,875,443	182,047,142	(73,610,782)	-	4,776,311,803
2076	4,776,311,803	186,276,160	(32,937,508)	-	4,929,650,456
2077	4,929,650,456	192,256,368	(33,810,632)	-	5,088,096,191
2078	5,088,096,191	198,435,751	(74,871,473)	-	5,211,660,470
2079	5,211,660,470	203,254,758	(35,928,769)	-	5,378,986,459
2080	5,378,986,459	209,780,472	(37,194,459)	-	5,551,572,471
2081	5,551,572,471	216,511,326	(38,188,272)	-	5,729,895,526
2082	5,729,895,526	223,465,925	(82,560,229)	-	5,870,801,222
2083	5,870,801,222	228,961,248	(40,598,886)	-	6,059,163,583
2084	6,059,163,583	236,307,380	(42,039,833)	-	6,253,431,130
2085	6,253,431,130	243,883,814	(43,170,933)	-	6,454,144,012
2086	6,454,144,012	251,711,616	(44,521,096)	-	6,661,334,532
2087	6,661,334,532	259,792,047	(264,844,194)	-	6,656,282,385
2088	6,656,282,385	259,595,013	(839,713,063)	-	6,076,164,336
2089	6,076,164,336	236,970,409	(812,388,273)	-	5,500,746,472
2090	5,500,746,472	214,529,112	(603,281,636)	-	5,111,993,948
2091	5,111,993,948	199,367,764	(525,033,228)	-	4,786,328,484
2092	4,786,328,484	186,666,811	(92,856,867)	-	4,880,138,428
2093	4,880,138,428	190,325,399	(245,143,751)	-	4,825,320,076
2094	4,825,320,076	188,187,483	(213,237,957)	-	4,800,269,602
2095	4,800,269,602	187,210,514	(207,306,389)	-	4,780,173,727
2096	4,780,173,727	186,426,775	(55,620,905)	-	4,910,979,598
2097	4,910,979,598	191,528,204	(57,205,571)	-	5,045,302,231
2098	5,045,302,231	196,766,787	(29,526,939)	-	5,212,542,080
2099	5,212,542,080	203,289,141	(60,892,346)	-	5,354,938,875
2100	5,354,938,875	208,842,616	(78,510,034)	-	5,485,271,457
2101	5,485,271,457	213,925,587	(81,001,475)	-	5,618,195,569
2102	5,618,195,569	219,109,627	(83,575,647)	-	5,753,729,549
2103	5,753,729,549	224,395,452	(34,628,073)	-	5,943,496,928
2104	5,943,496,928	231,796,380	(35,978,836)	-	6,139,314,472
2105	6,139,314,472	239,433,264	(91,823,218)	-	6,286,924,519
2106	6,286,924,519	245,190,056	(75,881,855)	-	6,456,232,720
2107	6,456,232,720	251,793,076	(78,319,834)	-	6,629,705,961
2108	6,629,705,961	258,558,532	(40,925,086)	-	6,847,339,407

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External Levelized	2109	6,847,339,407	267,046,237	(83,444,379)	-	7,030,941,266
	2110	7,030,941,266	274,206,709	(86,136,713)	-	7,219,011,262
	2111	7,219,011,262	281,541,439	(88,919,658)	-	7,411,633,043
	2112	7,411,633,043	289,053,689	(46,591,572)	-	7,654,095,160
	2113	7,654,095,160	298,509,711	(188,652,906)	-	7,763,951,966
	2114	7,763,951,966	302,794,127	(146,276,654)	-	7,920,469,438
	2115	7,920,469,438	308,898,308	(118,778,854)	-	8,110,588,893
	2116	8,110,588,893	316,312,967	(53,085,603)	-	8,373,816,257
	2117	8,373,816,257	326,578,834	(54,504,474)	-	8,645,890,617
	2118	8,645,890,617	337,189,734	(166,120,261)	-	8,816,960,090
	2119	8,816,960,090	343,861,444	(143,178,890)	-	9,017,642,644
	2120	9,017,642,644	351,688,063	(60,531,451)	-	9,308,799,257
	2121	9,308,799,257	363,043,171	(62,158,292)	-	9,609,684,136
	2122	9,609,684,136	374,777,681	(219,905,592)	-	9,764,556,225
	2123	9,764,556,225	380,817,693	(66,397,363)	-	10,078,976,555
	2124	10,078,976,555	393,080,086	(69,071,844)	-	10,402,984,797
	2125	10,402,984,797	405,716,407	(242,077,610)	-	10,566,623,594
	2126	10,566,623,594	412,098,320	(73,328,014)	-	10,905,393,900
	2127	10,905,393,900	425,310,362	(75,801,760)	-	11,254,902,503
	2128	11,254,902,503	438,941,198	(267,082,541)	-	11,426,761,159
	2129	11,426,761,159	445,643,685	(81,012,766)	-	11,791,392,078
	2130	11,791,392,078	459,864,291	(83,756,151)	-	12,167,500,218
	2131	12,167,500,218	474,532,508	(86,595,870)	-	12,555,436,857
	2132	12,555,436,857	489,662,037	(303,871,103)	-	12,741,227,791
	2133	12,741,227,791	496,907,884	(92,578,429)	-	13,145,557,246
	2134	13,145,557,246	512,676,733	(95,728,383)	-	13,562,505,596
	2135	13,562,505,596	528,937,718	(98,989,534)	-	13,992,453,780
	2136	13,992,453,780	545,705,697	(103,037,778)	-	14,435,121,699
	2137	14,435,121,699	562,969,746	(105,860,447)	-	14,892,230,999
	2138	14,892,230,999	580,797,009	(1,663,257,316)	-	13,809,770,692
	2139	13,809,770,692	538,581,057	(113,224,900)	-	14,235,126,848
	2140	14,235,126,848	555,169,947	(117,876,464)	-	14,672,420,331
	2141	14,672,420,331	572,224,393	(121,118,898)	-	15,123,525,827
	2142	15,123,525,827	589,817,507	(125,276,675)	-	15,588,066,659
	2143	15,588,066,659	607,934,600	(129,581,556)	-	16,066,419,703
	2144	16,066,419,703	626,590,368	(134,928,178)	-	16,558,081,893
	2145	16,558,081,893	645,765,194	(333,307,991)	-	16,870,539,096
	2146	16,870,539,096	657,951,025	(277,466,221)	-	17,251,023,900
	2147	17,251,023,900	672,789,932	(286,822,888)	-	17,636,990,944
	2148	17,636,990,944	687,842,647	(154,529,919)	-	18,170,303,671
	2149	18,170,303,671	708,641,843	(306,524,651)	-	18,572,420,863
	2150	18,572,420,863	724,324,414	(393,184,482)	-	18,903,560,795
	2151	18,903,560,795	737,238,871	(406,433,392)	-	19,234,366,274
	2152	19,234,366,274	750,140,285	(421,319,862)	-	19,563,186,696
	2153	19,563,186,696	762,964,281	(181,996,101)	-	20,144,154,877
	2154	20,144,154,877	785,622,040	(188,316,870)	-	20,741,460,047
	2155	20,741,460,047	808,916,942	(527,993,336)	-	21,022,383,652
	2156	21,022,383,652	819,872,962	(388,513,064)	-	21,453,743,551

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2157	21,453,743,551	836,695,998	(400,342,180)	-	21,890,097,369
2158	21,890,097,369	853,713,797	(215,937,357)	-	22,527,873,809
2159	22,527,873,809	878,587,079	(428,114,309)	-	22,978,346,579
2160	22,978,346,579	896,155,517	(444,296,424)	-	23,430,205,671
2161	23,430,205,671	913,778,021	(457,868,919)	-	23,886,114,773
2162	23,886,114,773	931,558,476	(247,723,348)	-	24,569,949,901
2163	24,569,949,901	958,228,046	(956,465,997)	-	24,571,711,950
2164	24,571,711,950	958,296,766	(749,499,244)	-	24,780,509,472
2165	24,780,509,472	966,439,869	(523,915,455)	-	25,223,033,886
2166	25,223,033,886	983,698,322	(284,314,391)	-	25,922,417,816
2167	25,922,417,816	1,010,974,295	(294,296,981)	-	26,639,095,130
2168	26,639,095,130	1,038,924,710	(857,053,424)	-	26,820,966,416
2169	26,820,966,416	1,046,017,690	(741,981,175)	-	27,125,002,932
2170	27,125,002,932	1,057,875,114	(326,448,887)	-	27,856,429,159
2171	27,856,429,159	1,086,400,737	(337,945,817)	-	28,604,884,079
2172	28,604,884,079	1,115,590,479	(1,137,571,035)	-	28,582,903,523
2173	28,582,903,523	1,114,733,237	(362,196,181)	-	29,335,440,580
2174	29,335,440,580	1,144,082,183	(374,980,388)	-	30,104,542,374
2175	30,104,542,374	1,174,077,153	(1,255,822,132)	-	30,022,797,395
2176	30,022,797,395	1,170,889,098	(404,700,775)	-	30,788,985,719
2177	30,788,985,719	1,200,770,443	(416,165,016)	-	31,573,591,146
2178	31,573,591,146	1,231,370,055	(1,389,640,335)	-	31,415,320,866
2179	31,415,320,866	1,225,197,514	(446,157,985)	-	32,194,360,395
2180	32,194,360,395	1,255,580,055	(465,146,539)	-	32,984,793,911
2181	32,984,793,911	1,286,406,963	(478,357,043)	-	33,792,843,830
2182	33,792,843,830	1,317,920,909	(1,591,130,102)	-	33,519,634,637
2183	33,519,634,637	1,307,265,751	(512,926,831)	-	34,313,973,557
2184	34,313,973,557	1,338,244,969	(534,817,232)	-	35,117,401,294
2185	35,117,401,294	1,369,578,650	(550,043,998)	-	35,936,935,946
2186	35,936,935,946	1,401,540,502	(569,616,748)	-	36,768,859,700
2187	36,768,859,700	1,433,985,528	(589,898,971)	-	37,612,946,257
2188	37,612,946,257	1,466,904,904	(8,655,924,008)	-	30,423,927,153
2189	30,423,927,153	1,186,533,159	(632,696,164)	-	30,977,764,148
2190	30,977,764,148	1,208,132,802	(655,266,115)	-	31,530,630,835
2191	31,530,630,835	1,229,694,603	(678,655,451)	-	32,081,669,987
2192	32,081,669,987	1,251,185,129	(707,768,753)	-	32,625,086,363
2193	32,625,086,363	1,272,378,368	(793,049,110)	-	33,104,415,621
2194	33,104,415,621	1,291,072,209	(922,222,189)	-	33,473,265,641
2195	33,473,265,641	1,305,457,360	(2,214,399,512)	-	32,564,323,489
2196	32,564,323,489	1,270,008,616	(1,732,731,388)	-	32,101,600,718
2197	32,101,600,718	1,251,962,428	(1,676,023,518)	-	31,677,539,628
2198	31,677,539,628	1,235,424,045	(1,137,586,732)	-	31,775,376,941
2199	31,775,376,941	1,239,239,701	(1,795,991,513)	-	31,218,625,129
2200	31,218,625,129	1,217,526,380	(2,220,099,230)	-	30,216,052,278
2201	30,216,052,278	1,178,426,039	(2,426,001,310)	-	28,968,477,007
2202	28,968,477,007	1,129,770,603	(2,511,195,537)	-	27,587,052,073
2203	27,587,052,073	1,075,895,031	(1,172,326,464)	-	27,490,620,641
2204	27,490,620,641	1,072,134,205	(1,269,024,367)	-	27,293,730,479

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2205	27,293,730,479	1,064,455,489	(2,736,685,589)	-	25,621,500,379
2206	25,621,500,379	999,238,515	(2,289,310,476)	-	24,331,428,417
2207	24,331,428,417	948,925,708	(2,422,601,223)	-	22,857,752,903
2208	22,857,752,903	891,452,363	(1,460,829,942)	-	22,288,375,324
2209	22,288,375,324	869,246,638	(2,541,104,128)	-	20,616,517,833
2210	20,616,517,833	804,044,195	(2,689,123,989)	-	18,731,438,040
2211	18,731,438,040	730,526,084	(2,784,449,461)	-	16,677,514,662
2212	16,677,514,662	650,423,072	(1,682,134,069)	-	15,645,803,665
2213	15,645,803,665	610,186,343	(5,492,202,383)	-	10,763,787,625
2214	10,763,787,625	419,787,717	(4,388,654,289)	-	6,794,921,053
2215	6,794,921,053	265,001,921	(3,201,443,751)	-	3,858,479,224
2216	3,858,479,224	150,480,690	(1,937,528,803)	-	2,071,431,111
2217	2,071,431,111	80,785,813	(3,265,673,112)	-	(1,113,456,188)
2218	(1,113,456,188)	(43,424,791)	1,156,880,979	-	0

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Prairie Island Unit 2

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$487,163,479	$9,843,678	$0	$294,670	$497,301,828
2021	497,301,828	20,222,528	-	6,511,608	524,035,965
2022	524,035,965	22,217,792	-	51,818,766	598,072,523
2023	598,072,523	25,208,869	-	51,818,766	675,100,158
2024	675,100,158	28,320,785	-	51,818,766	755,239,709
2025	755,239,709	31,558,423	-	51,818,766	838,616,899
2026	838,616,899	34,926,862	-	51,818,766	925,362,527
2027	925,362,527	38,431,385	-	51,818,766	1,015,612,678
2028	1,015,612,678	42,077,491	-	51,818,766	1,109,508,935
2029	1,109,508,935	45,870,900	-	51,818,766	1,207,198,601
2030	1,207,198,601	49,817,563	-	51,818,766	1,308,834,930
2031	1,308,834,930	53,923,670	-	51,818,766	1,414,577,366
2032	1,414,577,366	58,195,665	-	51,818,766	1,524,591,797
2033	1,524,591,797	62,640,248	-	51,818,766	1,639,050,811
2034	1,639,050,811	64,927,724	(13,395,583)	43,009,576	1,733,592,528
2035	1,733,592,528	67,783,468	(97,831,438)	-	1,703,544,558
2036	1,703,544,558	66,608,592	(62,709,495)	-	1,707,443,655
2037	1,707,443,655	66,761,047	(64,798,117)	-	1,709,406,586
2038	1,709,406,586	66,837,797	(102,963,497)	-	1,673,280,886
2039	1,673,280,886	65,425,283	(14,861,556)	-	1,723,844,613
2040	1,723,844,613	67,402,324	(15,354,393)	-	1,775,892,544
2041	1,775,892,544	69,437,398	(15,774,683)	-	1,829,555,260
2042	1,829,555,260	71,535,611	(12,294,365)	-	1,888,796,506
2043	1,888,796,506	73,851,943	(12,641,904)	-	1,950,006,545
2044	1,950,006,545	76,245,256	(13,049,715)	-	2,013,202,085
2045	2,013,202,085	78,716,202	(22,424,217)	-	2,069,494,070
2046	2,069,494,070	80,917,218	(19,965,267)	-	2,130,446,021
2047	2,130,446,021	83,300,439	(20,542,922)	-	2,193,203,538
2048	2,193,203,538	85,754,258	(14,607,795)	-	2,264,350,002
2049	2,264,350,002	88,536,085	(21,751,969)	-	2,331,134,118
2050	2,331,134,118	91,147,344	(25,876,469)	-	2,396,404,993
2051	2,396,404,993	93,699,435	(26,243,045)	-	2,463,861,384
2052	2,463,861,384	96,336,980	(27,477,786)	-	2,532,720,577
2053	2,532,720,577	99,029,375	(16,785,576)	-	2,614,964,376
2054	2,614,964,376	102,245,107	(17,276,069)	-	2,699,933,415
2055	2,699,933,415	105,567,397	(29,906,614)	-	2,775,594,197
2056	2,775,594,197	108,525,733	(26,700,358)	-	2,857,419,573
2057	2,857,419,573	111,725,105	(27,416,084)	-	2,941,728,594
2058	2,941,728,594	115,021,588	(19,400,392)	-	3,037,349,791
2059	3,037,349,791	118,760,377	(28,573,494)	-	3,127,536,674
2060	3,127,536,674	122,286,684	(30,013,985)	-	3,219,809,373

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2061	3,219,809,373	125,894,546	(30,824,295)	-	3,314,879,624
2062	3,314,879,624	129,611,793	(21,811,859)	-	3,422,679,558
2063	3,422,679,558	133,826,771	(53,161,588)	-	3,503,344,742
2064	3,503,344,742	136,980,779	(43,737,872)	-	3,596,587,649
2065	3,596,587,649	140,626,577	(34,689,928)	-	3,702,524,298
2066	3,702,524,298	144,768,700	(24,550,048)	-	3,822,742,950
2067	3,822,742,950	149,469,249	(25,291,111)	-	3,946,921,089
2068	3,946,921,089	154,324,615	(49,899,768)	-	4,051,345,935
2069	4,051,345,935	158,407,626	(45,187,943)	-	4,164,565,618
2070	4,164,565,618	162,834,516	(27,661,657)	-	4,299,738,477
2071	4,299,738,477	168,119,774	(28,503,794)	-	4,439,354,458
2072	4,439,354,458	173,578,759	(62,199,306)	-	4,550,733,911
2073	4,550,733,911	177,933,696	(30,271,740)	-	4,698,395,867
2074	4,698,395,867	183,707,278	(31,199,526)	-	4,850,903,620
2075	4,850,903,620	189,670,332	(73,943,059)	-	4,966,630,892
2076	4,966,630,892	194,195,268	(33,283,068)	-	5,127,543,092
2077	5,127,543,092	200,486,935	(34,168,045)	-	5,293,861,981
2078	5,293,861,981	206,990,003	(75,242,162)	-	5,425,609,822
2079	5,425,609,822	212,141,344	(36,313,228)	-	5,601,437,938
2080	5,601,437,938	219,016,223	(37,594,301)	-	5,782,859,860
2081	5,782,859,860	226,109,821	(38,601,841)	-	5,970,367,840
2082	5,970,367,840	233,441,383	(82,989,171)	-	6,120,820,051
2083	6,120,820,051	239,324,064	(41,043,776)	-	6,319,100,339
2084	6,319,100,339	247,076,823	(42,502,532)	-	6,523,674,630
2085	6,523,674,630	255,075,678	(43,649,528)	-	6,735,100,780
2086	6,735,100,780	263,342,441	(45,017,496)	-	6,953,425,725
2087	6,953,425,725	271,878,946	(46,430,773)	-	7,178,873,898
2088	7,178,873,898	280,693,969	(583,329,954)	-	6,876,237,914
2089	6,876,237,914	268,860,902	(450,941,462)	-	6,694,157,355
2090	6,694,157,355	261,741,553	(842,185,994)	-	6,113,712,914
2091	6,113,712,914	239,046,175	(793,052,838)	-	5,559,706,251
2092	5,559,706,251	217,384,514	(746,293,834)	-	5,030,796,931
2093	5,030,796,931	196,704,160	(315,518,295)	-	4,911,982,797
2094	4,911,982,797	192,058,527	(280,729,340)	-	4,823,311,984
2095	4,823,311,984	188,591,499	(257,654,524)	-	4,754,248,959
2096	4,754,248,959	185,891,134	(55,620,901)	-	4,884,519,192
2097	4,884,519,192	190,984,700	(57,205,566)	-	5,018,298,326
2098	5,018,298,326	196,215,465	(29,526,934)	-	5,184,986,857
2099	5,184,986,857	202,732,986	(60,892,341)	-	5,326,827,502
2100	5,326,827,502	208,278,955	(78,510,029)	-	5,456,596,428
2101	5,456,596,428	213,352,920	(81,001,470)	-	5,588,947,879
2102	5,588,947,879	218,527,862	(83,575,642)	-	5,723,900,099
2103	5,723,900,099	223,804,494	(34,628,068)	-	5,913,076,525
2104	5,913,076,525	231,201,292	(35,978,830)	-	6,108,298,987
2105	6,108,298,987	238,834,490	(91,823,212)	-	6,255,310,265
2106	6,255,310,265	244,582,631	(75,881,849)	-	6,424,011,048
2107	6,424,011,048	251,178,832	(78,319,828)	-	6,596,870,052
2108	6,596,870,052	257,937,619	(40,925,080)	-	6,813,882,591

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External Levelized	2109	6,813,882,591	266,422,809	(83,444,372)	-	6,996,861,029
	2110	6,996,861,029	273,577,266	(86,136,706)	-	7,184,301,589
	2111	7,184,301,589	280,906,192	(88,919,651)	-	7,376,288,131
	2112	7,376,288,131	288,412,866	(46,591,564)	-	7,618,109,433
	2113	7,618,109,433	297,868,079	(188,652,898)	-	7,727,324,614
	2114	7,727,324,614	302,138,392	(146,276,646)	-	7,883,186,360
	2115	7,883,186,360	308,232,587	(118,778,845)	-	8,072,640,102
	2116	8,072,640,102	315,640,228	(53,085,594)	-	8,335,194,736
	2117	8,335,194,736	325,906,114	(54,504,464)	-	8,606,596,386
	2118	8,606,596,386	336,517,919	(166,120,251)	-	8,776,994,054
	2119	8,776,994,054	343,180,468	(143,178,880)	-	8,976,995,642
	2120	8,976,995,642	351,000,530	(60,531,440)	-	9,267,464,731
	2121	9,267,464,731	362,357,871	(62,158,281)	-	9,567,664,321
	2122	9,567,664,321	374,095,675	(219,905,581)	-	9,721,854,415
	2123	9,721,854,415	380,124,508	(66,397,351)	-	10,035,581,572
	2124	10,035,581,572	392,391,239	(69,071,832)	-	10,358,900,980
	2125	10,358,900,980	405,033,028	(242,077,597)	-	10,521,856,410
	2126	10,521,856,410	411,404,586	(73,328,001)	-	10,859,932,995
	2127	10,859,932,995	424,623,380	(75,801,746)	-	11,208,754,629
	2128	11,208,754,629	438,262,306	(267,082,527)	-	11,379,934,408
	2129	11,379,934,408	444,955,435	(81,012,752)	-	11,743,877,092
	2130	11,743,877,092	459,185,594	(83,756,136)	-	12,119,306,550
	2131	12,119,306,550	473,864,886	(86,595,854)	-	12,506,575,582
	2132	12,506,575,582	489,007,105	(303,871,087)	-	12,691,711,600
	2133	12,691,711,600	496,245,924	(92,578,412)	-	13,095,379,112
	2134	13,095,379,112	512,029,323	(95,728,365)	-	13,511,680,070
	2135	13,511,680,070	528,306,691	(98,989,516)	-	13,940,997,245
	2136	13,940,997,245	545,092,992	(103,037,759)	-	14,383,052,478
	2137	14,383,052,478	562,377,352	(105,860,427)	-	14,839,569,402
	2138	14,839,569,402	580,227,164	(1,663,257,295)	-	13,756,539,270
	2139	13,756,539,270	537,880,685	(113,224,879)	-	14,181,195,077
	2140	14,181,195,077	554,484,727	(117,876,442)	-	14,617,803,362
	2141	14,617,803,362	571,556,111	(121,118,875)	-	15,068,240,598
	2142	15,068,240,598	589,168,207	(125,276,651)	-	15,532,132,155
	2143	15,532,132,155	607,306,367	(129,581,531)	-	16,009,856,991
	2144	16,009,856,991	625,985,408	(134,928,153)	-	16,500,914,246
	2145	16,500,914,246	645,185,747	(333,307,965)	-	16,812,792,028
	2146	16,812,792,028	657,380,168	(277,466,194)	-	17,192,706,003
	2147	17,192,706,003	672,234,805	(286,822,860)	-	17,578,117,948
	2148	17,578,117,948	687,304,412	(154,529,890)	-	18,110,892,470
	2149	18,110,892,470	708,135,896	(306,524,621)	-	18,512,503,745
	2150	18,512,503,745	723,838,896	(393,184,450)	-	18,843,158,192
	2151	18,843,158,192	736,767,485	(406,433,359)	-	19,173,492,318
	2152	19,173,492,318	749,683,550	(421,319,828)	-	19,501,856,039
	2153	19,501,856,039	762,522,571	(181,996,065)	-	20,082,382,545
	2154	20,082,382,545	785,221,158	(188,316,833)	-	20,679,286,870
	2155	20,679,286,870	808,560,117	(527,993,298)	-	20,959,853,688
	2156	20,959,853,688	819,530,279	(388,513,025)	-	21,390,870,943

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2157	21,390,870,943	836,383,054	(400,342,139)	-	21,826,911,858
2158	21,826,911,858	853,432,254	(215,937,315)	-	22,464,406,797
2159	22,464,406,797	878,358,306	(428,114,265)	-	22,914,650,838
2160	22,914,650,838	895,962,848	(444,296,378)	-	23,366,317,307
2161	23,366,317,307	913,623,007	(457,868,871)	-	23,822,071,443
2162	23,822,071,443	931,442,993	(247,723,298)	-	24,505,791,138
2163	24,505,791,138	958,176,433	(956,465,946)	-	24,507,501,625
2164	24,507,501,625	958,243,314	(749,499,190)	-	24,716,245,748
2165	24,716,245,748	966,405,209	(523,915,400)	-	25,158,735,557
2166	25,158,735,557	983,706,560	(284,314,333)	-	25,858,127,784
2167	25,858,127,784	1,011,052,796	(294,296,921)	-	26,574,883,659
2168	26,574,883,659	1,039,077,951	(857,053,362)	-	26,756,908,248
2169	26,756,908,248	1,046,195,112	(741,981,110)	-	27,061,122,250
2170	27,061,122,250	1,058,089,880	(326,448,820)	-	27,792,763,310
2171	27,792,763,310	1,086,697,045	(337,945,748)	-	28,541,514,608
2172	28,541,514,608	1,115,973,221	(1,137,570,963)	-	28,519,916,865
2173	28,519,916,865	1,115,128,749	(362,196,106)	-	29,272,849,509
2174	29,272,849,509	1,144,568,416	(374,980,310)	-	30,042,437,614
2175	30,042,437,614	1,174,659,311	(1,255,822,051)	-	29,961,274,874
2176	29,961,274,874	1,171,485,848	(404,700,692)	-	30,728,060,030
2177	30,728,060,030	1,201,467,147	(416,164,929)	-	31,513,362,247
2178	31,513,362,247	1,232,172,464	(1,389,640,245)	-	31,355,894,466
2179	31,355,894,466	1,226,015,474	(446,157,892)	-	32,135,752,048
2180	32,135,752,048	1,256,507,905	(465,146,443)	-	32,927,113,511
2181	32,927,113,511	1,287,450,138	(478,356,942)	-	33,736,206,706
2182	33,736,206,706	1,319,085,682	(1,591,129,998)	-	33,464,162,391
2183	33,464,162,391	1,308,448,749	(512,926,723)	-	34,259,684,417
2184	34,259,684,417	1,339,553,661	(534,817,120)	-	35,064,420,958
2185	35,064,420,958	1,371,018,859	(550,043,881)	-	35,885,395,936
2186	35,885,395,936	1,403,118,981	(569,616,627)	-	36,718,898,290
2187	36,718,898,290	1,435,708,923	(589,898,845)	-	37,564,708,368
2188	37,564,708,368	1,468,780,097	(8,655,923,878)	-	30,377,564,587
2189	30,377,564,587	1,187,762,775	(632,696,029)	-	30,932,631,333
2190	30,932,631,333	1,209,465,885	(655,265,975)	-	31,486,831,244
2191	31,486,831,244	1,231,135,102	(678,655,305)	-	32,039,311,040
2192	32,039,311,040	1,252,737,062	(707,768,602)	-	32,584,279,500
2193	32,584,279,500	1,274,045,328	(793,048,953)	-	33,065,275,875
2194	33,065,275,875	1,292,852,287	(922,222,027)	-	33,435,906,135
2195	33,435,906,135	1,307,343,930	(2,214,399,343)	-	32,528,850,722
2196	32,528,850,722	1,271,878,063	(1,732,731,212)	-	32,067,997,573
2197	32,067,997,573	1,253,858,705	(1,676,023,336)	-	31,645,832,942
2198	31,645,832,942	1,237,352,068	(1,137,586,543)	-	31,745,598,467
2199	31,745,598,467	1,241,252,900	(1,795,991,317)	-	31,190,860,050
2200	31,190,860,050	1,219,562,628	(2,220,099,027)	-	30,190,323,651
2201	30,190,323,651	1,180,441,655	(2,426,001,099)	-	28,944,764,206
2202	28,944,764,206	1,131,740,280	(2,511,195,318)	-	27,565,309,169
2203	27,565,309,169	1,077,803,589	(1,172,326,236)	-	27,470,786,521
2204	27,470,786,521	1,074,107,753	(1,269,024,131)	-	27,275,870,143

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EXTERNAL FUND CALCULATION

2205	27,275,870,143	1,066,486,523	(2,736,685,344)	-	25,605,671,322
2206	25,605,671,322	1,001,181,749	(2,289,310,222)	-	24,317,542,848
2207	24,317,542,848	950,815,925	(2,422,600,959)	-	22,845,757,814
2208	22,845,757,814	893,269,131	(1,460,829,669)	-	22,278,197,276
2209	22,278,197,276	871,077,514	(2,541,103,844)	-	20,608,170,946
2210	20,608,170,946	805,779,484	(2,689,123,694)	-	18,724,826,736
2211	18,724,826,736	732,140,725	(2,784,449,155)	-	16,672,518,306
2212	16,672,518,306	651,895,466	(1,682,133,752)	-	15,642,280,020
2213	15,642,280,020	611,613,149	(5,492,202,054)	-	10,761,691,115
2214	10,761,691,115	420,782,123	(4,388,653,947)	-	6,793,819,290
2215	6,793,819,290	265,638,334	(3,201,443,396)	-	3,858,014,229
2216	3,858,014,229	150,848,356	(1,937,528,434)	-	2,071,334,151
2217	2,071,334,151	80,989,165	(3,265,672,729)	-	(1,113,349,413)
2218	(1,113,349,413)	(43,531,962)	1,156,881,375	-	(0)

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2022 ACCRUAL COMPARISON

	Present	Proposed	Difference
Monticello	$8,507,110	($1,716,403)	($10,223,513)
Prairie Island Unit 1	12,399,703	11,586,169	(813,534)
Prairie Island Unit 2	6,511,608	7,210,183	698,575
TOTAL	$27,418,421	$17,079,949	($10,338,472)

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2022 MN RETAIL SUMMARY

	Remaining Life (yrs)	Operational Earnings Rate	Post-Shutdown Earnings Rate	Market Value Balance 6/30/2020	Book Value 6/30/2020	Unrealized Gain/Loss 6/30/2020	Tax-Effect Adjustment	Tax-Adjusted Fund Balance 6/30/2020	2022-2024 Decommissioning Accrual
Monticello	19.67	3.93%	2.68%	$814,968,100	$610,109,002	$204,859,098	$57,032,773	$757,935,327	**$ (1,716,403)**
Prairie Island Unit 1	13.25	4.01%	2.68%	471,960,960	346,629,286	125,331,674	34,892,338	437,068,622	**11,586,169**
Prairie Island Unit 2	14.42	3.98%	2.60%	526,255,835	385,837,890	140,417,945	39,092,356	487,163,479	**7,210,183**
TOTAL DECOMMISSIONING ACCRUAL				**$1,813,184,895**	**$1,342,576,178**	**$470,608,717**	**$131,017,467**	**$1,682,167,428**	**$17,079,949**

INPUT DATA

Escalation Rate (Labor)	3.78%
Escalation Rate (Non-Labor)	2.58%
Escalation Rate (PIIC)	0.00%
Jurisdictional Factor	72.9219%
Tax Rate for tax-effect adjustment	27.84%

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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Monticello																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2040	$23,125,640	$0	$23,125,640	$16,863,656	2.1003	$35,418,737	$10,723,397	$0	$10,723,397	$7,819,705	1.6644	$13,015,117	$0	$0	1.0000	$0	$33,849,037	$24,683,361	$48,433,853
2041	78,418,635	-	78,418,635	$57,184,358	2.1797	124,644,746	49,717,458	-	49,717,458	36,254,915	1.7073	61,898,016	0	0	1.0000	0	128,136,092	93,439,273	186,542,762
2042	84,918,719	-	84,918,719	$61,924,343	2.2620	140,072,864	130,579,042	-	130,579,042	95,220,718	1.7514	166,769,566	0	0	1.0000	0	215,497,761	157,145,061	306,842,430
2043	95,735,724	-	95,735,724	$69,812,309	2.3475	163,884,395	152,078,524	-	152,078,524	110,898,549	1.7966	199,240,333	0	0	1.0000	0	247,814,248	180,710,858	363,124,729
2044	97,792,619	-	97,792,619	$71,312,236	2.4363	173,738,001	131,329,076	-	131,329,076	95,767,658	1.8429	176,490,216	0	0	1.0000	0	229,121,696	167,079,894	350,228,217
2045	52,982,987	-	52,982,987	$38,636,201	2.5284	97,687,770	22,577,494	-	22,577,494	16,463,937	1.8905	31,125,073	0	0	1.0000	0	75,560,481	55,100,138	128,812,844
2046	37,181,469	-	37,181,469	$27,113,433	2.6239	71,142,938	14,491,839	-	14,491,839	10,567,724	1.9392	20,492,931	0	0	1.0000	0	51,673,308	37,681,158	91,635,869
2047	32,119,269	-	32,119,269	$23,421,981	2.7231	63,780,397	15,432,079	-	15,432,079	11,253,365	1.9893	22,386,319	0	0	1.0000	0	47,551,348	34,675,346	86,166,716
2048	7,112,035	4,794,412	2,317,622	$1,690,054	2.8261	4,776,262	4,715,232	1,917,580	2,797,651	2,040,101	2.0406	4,163,029	0	0	1.0000	0	5,115,274	3,730,155	8,939,292
2049	6,375,083	4,794,412	1,580,670	$1,152,655	2.9329	3,380,622	2,549,788	1,917,580	632,208	461,018	2.0932	965,003	0	0	1.0000	0	2,212,878	1,613,673	4,345,624
2050	6,375,083	4,794,412	1,580,670	$1,152,655	3.0438	3,508,451	2,549,788	1,917,580	632,208	461,018	2.1472	989,898	0	0	1.0000	0	2,212,878	1,613,673	4,498,349
2051	6,375,083	4,794,412	1,580,670	$1,152,655	3.1588	3,641,006	2,549,788	1,917,580	632,208	461,018	2.2026	1,015,438	0	0	1.0000	0	2,212,878	1,613,673	4,656,445
2052	6,496,336	4,794,412	1,701,924	$1,241,075	3.2782	4,068,493	2,868,136	1,917,580	950,556	693,164	2.2595	1,566,203	0	0	1.0000	0	2,652,480	1,934,239	5,634,696
2053	6,686,445	4,794,412	1,892,033	$1,379,706	3.4021	4,693,899	3,483,876	1,917,580	1,566,295	1,142,172	2.3178	2,647,327	0	0	1.0000	0	3,458,328	2,521,879	7,341,226
2054	6,582,658	4,794,412	1,788,245	$1,304,023	3.5307	4,604,113	3,172,513	1,917,580	1,254,933	915,121	2.3776	2,175,791	0	0	1.0000	0	3,043,178	2,219,143	6,779,904
2055	6,582,658	4,794,412	1,788,245	$1,304,023	3.6642	4,778,200	3,172,513	1,917,580	1,254,933	915,121	2.4389	2,231,888	0	0	1.0000	0	3,043,178	2,219,143	7,010,088
2056	7,015,274	4,794,412	2,220,861	$1,619,494	3.8027	6,158,451	4,424,949	1,917,580	2,507,369	1,828,421	2.5018	4,574,343	0	0	1.0000	0	4,728,230	3,447,915	10,732,794
2057	6,894,020	4,794,412	2,099,608	$1,531,074	3.9464	6,042,231	4,106,601	1,917,580	2,189,020	1,596,275	2.5664	4,096,681	0	0	1.0000	0	4,288,628	3,127,349	10,138,911
2058	6,894,020	4,794,412	2,099,608	$1,531,074	4.0956	6,270,667	4,106,601	1,917,580	2,189,020	1,596,275	2.6326	4,202,354	0	0	1.0000	0	4,288,628	3,127,349	10,473,021
2059	6,894,020	4,794,412	2,099,608	$1,531,074	4.2504	6,507,677	4,106,601	1,917,580	2,189,020	1,596,275	2.7005	4,310,741	0	0	1.0000	0	4,288,628	3,127,349	10,818,418
2060	6,703,911	4,794,412	1,909,499	$1,392,443	4.4111	6,142,205	3,490,861	1,917,580	1,573,281	1,147,266	2.7702	3,178,157	0	0	1.0000	0	3,482,780	2,539,709	9,320,362
2061	6,582,658	4,794,412	1,788,245	$1,304,023	4.5778	5,969,555	3,172,513	1,917,580	1,254,933	915,121	2.8416	2,600,407	0	0	1.0000	0	3,043,178	2,219,143	8,569,962
2062	6,686,445	4,794,412	1,892,033	$1,379,706	4.7509	6,554,847	3,483,876	1,917,580	1,566,295	1,142,172	2.9150	3,329,432	0	0	1.0000	0	3,458,328	2,521,879	9,884,279
2063	6,582,658	4,794,412	1,788,245	$1,304,023	4.9305	6,429,483	3,172,513	1,917,580	1,254,933	915,121	2.9902	2,736,394	0	0	1.0000	0	3,043,178	2,219,143	9,165,878
2064	6,600,124	4,794,412	1,805,711	$1,316,759	5.1168	6,737,593	3,179,499	1,917,580	1,261,919	920,215	3.0673	2,822,575	0	0	1.0000	0	3,067,630	2,236,974	9,560,168
2065	6,686,445	4,794,412	1,892,033	$1,379,706	5.3103	7,326,655	3,483,876	1,917,580	1,566,295	1,142,172	3.1465	3,593,845	0	0	1.0000	0	3,458,328	2,521,879	10,920,500
2066	6,582,658	4,794,412	1,788,245	$1,304,023	5.5110	7,186,468	3,172,513	1,917,580	1,254,933	915,121	3.2276	2,953,644	0	0	1.0000	0	3,043,178	2,219,143	10,140,112
2067	6,582,658	4,794,412	1,788,245	$1,304,023	5.7193	7,458,096	3,172,513	1,917,580	1,254,933	915,121	3.3109	3,029,874	0	0	1.0000	0	3,043,178	2,219,143	10,487,970
2068	6,703,911	4,794,412	1,909,499	$1,392,443	5.9355	8,264,845	3,490,861	1,917,580	1,573,281	1,147,266	3.3963	3,896,461	0	0	1.0000	0	3,482,780	2,539,709	12,161,306
2069	6,790,233	4,794,412	1,995,820	$1,455,390	6.1598	8,964,913	3,795,238	1,917,580	1,877,658	1,369,224	3.4840	4,770,375	0	0	1.0000	0	3,873,478	2,824,614	13,735,288
2070	6,582,658	4,794,412	1,788,245	$1,304,023	6.3927	8,336,225	3,172,513	1,917,580	1,254,933	915,121	3.5738	3,270,459	0	0	1.0000	0	3,043,178	2,219,143	11,606,684
2071	6,790,233	4,794,412	1,995,820	$1,455,390	6.6343	9,655,495	3,795,238	1,917,580	1,877,658	1,369,224	3.6660	5,019,574	0	0	1.0000	0	3,873,478	2,824,614	14,675,070
2072	6,703,911	4,794,412	1,909,499	$1,392,443	6.8851	9,587,109	3,490,861	1,917,580	1,573,281	1,147,266	3.7606	4,314,410	0	0	1.0000	0	3,482,780	2,539,709	13,901,519
2073	6,478,870	4,794,412	1,684,458	$1,228,339	7.1454	8,776,972	2,861,151	1,917,580	943,570	688,069	3.8576	2,654,296	0	0	1.0000	0	2,628,028	1,916,408	11,431,268
2074	6,478,870	4,794,412	1,684,458	$1,228,339	7.4155	9,108,746	2,861,151	1,917,580	943,570	688,069	3.9572	2,722,828	0	0	1.0000	0	2,628,028	1,916,408	11,831,574
2075	6,582,658	4,794,412	1,788,245	$1,304,023	7.6958	10,035,497	3,172,513	1,917,580	1,254,933	915,121	4.0593	3,714,750	0	0	1.0000	0	3,043,178	2,219,143	13,750,247
2076	6,496,336	4,794,412	1,701,924	$1,241,075	7.9867	9,912,096	2,868,136	1,917,580	950,556	693,164	4.1640	2,886,333	0	0	1.0000	0	2,652,480	1,934,239	12,798,429
2077	6,478,870	4,794,412	1,684,458	$1,228,339	8.2886	10,181,209	2,861,151	1,917,580	943,570	688,069	4.2714	2,939,020	0	0	1.0000	0	2,628,028	1,916,408	13,120,228
2078	6,582,658	4,794,412	1,788,245	$1,304,023	8.6019	11,217,072	3,172,513	1,917,580	1,254,933	915,121	4.3816	4,009,693	0	0	1.0000	0	3,043,178	2,219,143	15,226,765
2079	6,478,870	4,794,412	1,684,458	$1,228,339	8.9270	10,965,380	2,861,151	1,917,580	943,570	688,069	4.4947	3,092,665	0	0	1.0000	0	2,628,028	1,916,408	14,058,046
2080	6,496,336	4,794,412	1,701,924	$1,241,075	9.2645	11,497,942	2,868,136	1,917,580	950,556	693,164	4.6106	3,195,900	0	0	1.0000	0	2,652,480	1,934,239	14,693,842
2081	6,582,658	4,794,412	1,788,245	$1,304,023	9.6147	12,537,786	3,172,513	1,917,580	1,254,933	915,121	4.7296	4,328,155	0	0	1.0000	0	3,043,178	2,219,143	16,865,941
2082	6,582,658	4,794,412	1,788,245	$1,304,023	9.9781	13,011,668	9,476,819	1,917,580	7,559,239	5,512,340	4.8516	26,743,671	0	0	1.0000	0	9,347,484	6,816,363	39,755,339
2083	2,095,521	4,794,412	(2,698,891)	($1,968,083)	10.3553	(20,380,085)	14,016,783	1,917,580	12,099,202	8,822,968	4.9768	43,910,149	0	0	1.0000	0	9,400,312	6,854,886	23,530,064
	$736,470,587	$172,598,844	$563,871,742	$411,185,988		$1,114,277,693	$663,000,188	$69,032,894	$593,967,294	$433,132,236		$870,069,338	$0	$0		$0	$1,157,839,036	$844,318,224	$1,984,347,030

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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 1																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2033	$23,781,625	$0	$23,781,625	$17,342,013	1.6199	$28,092,326	$10,730,370	$0	$10,730,370	$7,824,790	1.3926	$10,896,802	$1,250,000	$911,524	1.0000	$911,524	$35,761,995	$26,078,326	$39,900,652
2034	67,414,177	-	67,414,177	$49,159,699	1.6811	82,642,369	37,794,295	-	37,794,295	$27,560,318	1.4285	39,369,914	1,250,000	911,524	1.0000	911,524	106,458,472	77,631,540	122,923,807
2035	68,590,730	-	68,590,730	$50,017,664	1.7446	87,260,816	77,836,646	-	77,836,646	$56,759,961	1.4653	83,170,371	1,250,000	911,524	1.0000	911,524	147,677,376	107,689,149	171,342,711
2036	64,154,194	-	64,154,194	$46,782,457	1.8106	84,704,317	79,888,287	-	79,888,287	$58,256,057	1.5032	87,570,505	1,250,000	911,524	1.0000	911,524	145,292,481	105,950,038	173,186,345
2037	45,558,348	-	45,558,348	$33,222,013	1.8790	62,424,163	66,524,694	-	66,524,694	$48,511,071	1.5419	74,799,220	1,250,000	911,524	1.0000	911,524	113,333,042	82,644,608	138,134,907
2038	25,711,788	-	25,711,788	$18,749,524	1.9501	36,563,447	43,716,000	-	43,716,000	$31,878,537	1.5817	50,422,283	1,250,000	911,524	1.0000	911,524	70,677,787	51,539,585	87,897,254
2039	34,084,468	-	34,084,468	$24,855,041	2.0238	50,301,633	15,248,152	-	15,248,152	$11,119,242	1.6225	18,040,971	1,250,000	911,524	1.0000	911,524	50,582,620	36,885,807	69,254,127
2040	20,888,933	-	20,888,933	$15,232,607	2.1003	31,993,044	10,148,162	-	10,148,162	$7,400,233	1.6644	12,316,947	1,250,000	911,524	1.0000	911,524	32,287,095	23,544,363	45,221,514
2041	15,746,873	2,455,937	13,290,937	$9,692,004	2.1797	21,125,660	12,162,642	1,636,181	10,526,461	$7,676,095	1.7073	13,105,397	1,250,000	911,524	1.0000	911,524	25,067,398	18,279,623	35,142,581
2042	9,316,574	2,455,937	6,860,638	$5,002,907	2.2620	11,316,576	7,378,445	1,636,181	5,742,263	$4,187,368	1.7514	7,333,756	1,250,000	911,524	1.0000	911,524	13,852,901	10,101,799	19,561,856
2043	3,430,264	2,455,937	974,327	$710,498	2.3475	1,667,893	2,647,764	1,636,181	1,011,583	$737,665	1.7966	1,325,289	1,250,000	911,524	1.0000	911,524	3,235,910	2,359,687	3,904,707
2044	3,387,341	2,455,937	931,405	$679,198	2.4363	1,654,730	2,501,482	1,636,181	865,301	$630,994	1.8429	1,162,858	1,250,000	911,524	1.0000	911,524	3,046,705	2,221,715	3,729,112
2045	3,482,157	2,455,937	1,026,221	$748,340	2.5284	1,892,102	2,803,445	1,636,181	1,167,264	$851,191	1.8905	1,609,177	1,250,000	911,524	1.0000	911,524	3,443,485	2,511,054	4,412,802
2046	3,482,157	2,455,937	1,026,221	$748,340	2.6239	1,963,568	2,803,445	1,636,181	1,167,264	$851,191	1.9392	1,650,630	1,250,000	911,524	1.0000	911,524	3,443,485	2,511,054	4,525,722
2047	3,430,264	2,455,937	974,327	$710,498	2.7231	1,934,756	2,647,764	1,636,181	1,011,583	$737,665	1.9893	1,467,438	1,250,000	911,524	1.0000	911,524	3,235,910	2,359,687	4,313,718
2048	3,491,129	2,455,937	1,035,192	$754,882	2.8261	2,133,372	2,812,844	1,636,181	1,176,663	$858,045	2.0406	1,750,927	1,250,000	911,524	1.0000	911,524	3,461,855	2,524,451	4,795,822
2049	3,482,157	2,455,937	1,026,221	$748,340	2.9329	2,194,805	2,803,445	1,636,181	1,167,264	$851,191	2.0932	1,781,713	1,250,000	911,524	1.0000	911,524	3,443,485	2,511,054	4,888,042
2050	3,430,264	2,455,937	974,327	$710,498	3.0438	2,162,613	2,647,764	1,636,181	1,011,583	$737,665	2.1472	1,583,915	1,250,000	911,524	1.0000	911,524	3,235,910	2,359,687	4,658,052
2051	3,482,157	2,455,937	1,026,221	$748,340	3.1588	2,363,855	2,803,445	1,636,181	1,167,264	$851,191	2.2026	1,874,833	1,250,000	911,524	1.0000	911,524	3,443,485	2,511,054	5,150,212
2052	3,439,235	2,455,937	983,298	$717,040	3.2782	2,350,600	2,657,163	1,636,181	1,020,982	$744,519	2.2595	1,682,242	1,250,000	911,524	1.0000	911,524	3,254,280	2,373,083	4,944,366
2053	3,378,370	2,455,937	922,433	$672,656	3.4021	2,288,442	2,492,083	1,636,181	855,901	$624,140	2.3178	1,446,631	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	4,646,597
2054	3,378,370	2,455,937	922,433	$672,656	3.5307	2,374,946	2,492,083	1,636,181	855,901	$624,140	2.3776	1,483,954	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	4,770,424
2055	3,378,370	2,455,937	922,433	$672,656	3.6642	2,464,746	2,492,083	1,636,181	855,901	$624,140	2.4389	1,522,214	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	4,898,483
2056	3,283,554	2,455,937	827,617	$603,514	3.8027	2,294,983	2,190,119	1,636,181	553,938	$403,942	2.5018	1,010,583	1,250,000	911,524	1.0000	911,524	2,631,555	1,918,980	4,217,090
2057	3,274,582	2,455,937	818,646	$596,972	3.9464	2,355,890	2,180,720	1,636,181	544,539	$397,088	2.5664	1,019,087	1,250,000	911,524	1.0000	911,524	2,613,185	1,905,584	4,286,501
2058	3,274,582	2,455,937	818,646	$596,972	4.0956	2,444,959	2,180,720	1,636,181	544,539	$397,088	2.6326	1,045,374	1,250,000	911,524	1.0000	911,524	2,613,185	1,905,584	4,401,857
2059	3,274,582	2,455,937	818,646	$596,972	4.2504	2,537,370	2,180,720	1,636,181	544,539	$397,088	2.7005	1,072,336	1,250,000	911,524	1.0000	911,524	2,613,185	1,905,584	4,521,230
2060	3,387,341	2,455,937	931,405	$679,198	4.4111	2,996,010	2,501,482	1,636,181	865,301	$630,994	2.7702	1,747,979	1,250,000	911,524	1.0000	911,524	3,046,705	2,221,715	5,655,513
2061	3,378,370	2,455,937	922,433	$672,656	4.5778	3,079,284	2,492,083	1,636,181	855,901	$624,140	2.8416	1,773,555	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	5,764,363
2062	3,378,370	2,455,937	922,433	$672,656	4.7509	3,195,721	2,492,083	1,636,181	855,901	$624,140	2.9150	1,819,367	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	5,926,611
2063	3,378,370	2,455,937	922,433	$672,656	4.9305	3,316,530	2,492,083	1,636,181	855,901	$624,140	2.9902	1,866,302	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	6,094,356
2064	3,387,341	2,455,937	931,405	$679,198	5.1168	3,475,320	2,501,482	1,636,181	865,301	$630,994	3.0673	1,935,447	1,250,000	911,524	1.0000	911,524	3,046,705	2,221,715	6,322,291
2065	3,378,370	2,455,937	922,433	$672,656	5.3103	3,572,004	2,492,083	1,636,181	855,901	$624,140	3.1465	1,963,855	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	6,447,383
2066	3,378,370	2,455,937	922,433	$672,656	5.5110	3,707,006	2,492,083	1,636,181	855,901	$624,140	3.2276	2,014,473	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	6,633,003
2067	3,378,370	2,455,937	922,433	$672,656	5.7193	3,847,121	2,492,083	1,636,181	855,901	$624,140	3.3109	2,066,464	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	6,825,108
2068	3,387,341	2,455,937	931,405	$679,198	5.9355	4,031,380	2,501,482	1,636,181	865,301	$630,994	3.3963	2,143,044	1,250,000	911,524	1.0000	911,524	3,046,705	2,221,715	7,085,947
2069	3,378,370	2,455,937	922,433	$672,656	6.1598	4,143,425	2,492,083	1,636,181	855,901	$624,140	3.4840	2,174,502	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	7,229,452
2070	3,378,370	2,455,937	922,433	$672,656	6.3927	4,300,087	2,492,083	1,636,181	855,901	$624,140	3.5738	2,230,550	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	7,442,161
2071	3,378,370	2,455,937	922,433	$672,656	6.6343	4,462,601	2,492,083	1,636,181	855,901	$624,140	3.6660	2,288,096	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	7,662,220
2072	3,387,341	2,455,937	931,405	$679,198	6.8851	4,676,346	2,501,482	1,636,181	865,301	$630,994	3.7606	2,372,915	1,250,000	911,524	1.0000	911,524	3,046,705	2,221,715	7,960,785
2073	3,378,370	2,455,937	922,433	$672,656	7.1454	4,806,395	2,492,083	1,636,181	855,901	$624,140	3.8576	2,407,681	1,250,000	911,524	1.0000	911,524	3,028,335	2,208,319	8,125,600
2074	3,378,370	2,455,937	922,433	$672,656	7.4155	4,988,079	14,274,093	1,636,181	12,637,912	$9,215,806	3.9572	36,468,786	1,250,000	911,524	1.0000	911,524	14,810,345	10,799,985	42,368,389
2075	885,735	2,455,937	(1,570,201)	($1,145,021)	7.6958	(8,811,850)	4,413,185	1,636,181	2,777,004	$2,025,044	4.0593	8,220,260	1,250,000	911,524	1.0000	911,524	2,456,802	1,791,547	319,934
	$484,624,416	$85,957,783	$398,666,633	$290,715,283		$583,289,444	$458,378,810	$57,266,339	$401,112,471	$292,498,835		$495,008,642	$53,750,000	$39,195,521		$39,195,521	$853,529,104	$622,409,640	$1,117,493,606

Xcel Energy
Nuclear Decommissioning Accrual
42-Year Decommissioning Period
DECON Method - No Recasking

Docket No. E002/M-20-___
Schedule E.9
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 2																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2034	$8,345,549	$0	$8,345,549	$6,085,733	1.6811	$10,230,726	$4,974,446	$0	$4,974,446	$3,627,461	1.4285	$5,181,828	$1,250,000	$911,524	1.0000	$911,524	$14,569,995	$10,624,717	$16,324,077
2035	49,894,469	-	49,894,469	$36,383,994	1.7446	63,475,517	37,951,792	-	37,951,792	$27,675,168	1.4653	40,552,423	1,250,000	911,524	1.0000	911,524	89,096,260	64,970,686	104,939,464
2036	67,056,940	-	67,056,940	$48,899,195	1.8106	88,536,882	73,743,397	-	73,743,397	$53,775,086	1.5032	80,834,709	1,250,000	911,524	1.0000	911,524	142,050,336	103,585,804	170,283,115
2037	75,292,006	-	75,292,006	$54,904,361	1.8790	103,165,294	91,702,704	-	91,702,704	$66,871,354	1.5419	103,108,941	1,250,000	911,524	1.0000	911,524	168,244,709	122,687,239	207,185,759
2038	82,522,109	-	82,522,109	$60,176,690	1.9501	117,350,563	102,667,333	-	102,667,333	$74,866,970	1.5817	118,417,086	1,250,000	911,524	1.0000	911,524	186,439,442	135,955,184	236,679,173
2039	39,422,933	-	39,422,933	$28,747,952	2.0238	58,180,105	16,666,675	-	16,666,675	$12,153,656	1.6225	19,719,307	1,250,000	911,524	1.0000	911,524	57,339,608	41,813,132	78,810,936
2040	25,047,260	-	25,047,260	$18,264,938	2.1003	38,361,849	15,041,293	-	15,041,293	$10,968,396	1.6644	18,255,799	1,250,000	911,524	1.0000	911,524	41,338,552	30,144,858	57,529,171
2041	18,516,011	-	18,516,011	$13,502,227	2.1797	29,430,805	19,635,276	-	19,635,276	$14,318,416	1.7073	24,445,832	1,250,000	911,524	1.0000	911,524	39,401,287	28,732,167	54,788,161
2042	10,621,483	2,462,665	8,158,818	$5,949,565	2.2620	13,457,916	10,899,795	1,640,664	9,259,132	$6,751,935	1.7514	11,825,338	1,250,000	911,524	1.0000	911,524	18,667,949	13,613,023	26,194,778
2043	3,430,264	2,462,665	967,598	$705,591	2.3475	1,656,375	2,647,764	1,640,664	1,007,100	$734,396	1.7966	1,319,417	1,250,000	911,524	1.0000	911,524	3,224,698	2,351,511	3,887,316
2044	3,387,341	2,462,665	924,676	$674,291	2.4363	1,642,776	2,501,482	1,640,664	860,818	$627,725	1.8429	1,156,834	1,250,000	911,524	1.0000	911,524	3,035,494	2,213,540	3,711,134
2045	3,482,157	2,462,665	1,019,492	$743,433	2.5284	1,879,696	2,803,445	1,640,664	1,162,781	$847,922	1.8905	1,602,997	1,250,000	911,524	1.0000	911,524	3,432,273	2,502,879	4,394,217
2046	3,482,157	2,462,665	1,019,492	$743,433	2.6239	1,950,694	2,803,445	1,640,664	1,162,781	$847,922	1.9392	1,644,291	1,250,000	911,524	1.0000	911,524	3,432,273	2,502,879	4,506,508
2047	3,430,264	2,462,665	967,598	$705,591	2.7231	1,921,395	2,647,764	1,640,664	1,007,100	$734,396	1.9893	1,460,935	1,250,000	911,524	1.0000	911,524	3,224,698	2,351,511	4,293,854
2048	3,491,129	2,462,665	1,028,464	$749,975	2.8261	2,119,505	2,812,844	1,640,664	1,172,180	$854,776	2.0406	1,744,256	1,250,000	911,524	1.0000	911,524	3,450,644	2,516,275	4,775,285
2049	3,482,157	2,462,665	1,019,492	$743,433	2.9329	2,180,415	2,803,445	1,640,664	1,162,781	$847,922	2.0932	1,774,871	1,250,000	911,524	1.0000	911,524	3,432,273	2,502,879	4,866,809
2050	3,430,264	2,462,665	967,598	$705,591	3.0438	2,147,678	2,647,764	1,640,664	1,007,100	$734,396	2.1472	1,576,896	1,250,000	911,524	1.0000	911,524	3,224,698	2,351,511	4,636,098
2051	3,482,157	2,462,665	1,019,492	$743,433	3.1588	2,348,356	2,803,445	1,640,664	1,162,781	$847,922	2.2026	1,867,633	1,250,000	911,524	1.0000	911,524	3,432,273	2,502,879	5,127,513
2052	3,439,235	2,462,665	976,570	$712,133	3.2782	2,334,515	2,657,163	1,640,664	1,016,499	$741,251	2.2595	1,674,856	1,250,000	911,524	1.0000	911,524	3,243,069	2,364,908	4,920,895
2053	3,378,370	2,462,665	915,705	$667,749	3.4021	2,271,750	2,492,083	1,640,664	851,419	$620,871	2.3178	1,439,054	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	4,622,328
2054	3,378,370	2,462,665	915,705	$667,749	3.5307	2,357,622	2,492,083	1,640,664	851,419	$620,871	2.3776	1,476,182	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	4,745,328
2055	3,378,370	2,462,665	915,705	$667,749	3.6642	2,446,767	2,492,083	1,640,664	851,419	$620,871	2.4389	1,514,242	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	4,872,532
2056	3,283,554	2,462,665	820,889	$598,608	3.8027	2,276,325	2,190,119	1,640,664	549,455	$400,673	2.5018	1,002,405	1,250,000	911,524	1.0000	911,524	2,620,344	1,910,805	4,190,253
2057	3,274,582	2,462,665	811,917	$592,065	3.9464	2,336,527	2,180,720	1,640,664	540,056	$393,819	2.5664	1,010,698	1,250,000	911,524	1.0000	911,524	2,601,973	1,897,408	4,258,748
2058	3,274,582	2,462,665	811,917	$592,065	4.0956	2,424,863	2,180,720	1,640,664	540,056	$393,819	2.6326	1,036,769	1,250,000	911,524	1.0000	911,524	2,601,973	1,897,408	4,373,155
2059	3,274,582	2,462,665	811,917	$592,065	4.2504	2,516,515	2,180,720	1,640,664	540,056	$393,819	2.7005	1,063,509	1,250,000	911,524	1.0000	911,524	2,601,973	1,897,408	4,491,547
2060	3,387,341	2,462,665	924,676	$674,291	4.4111	2,974,367	2,501,482	1,640,664	860,818	$627,725	2.7702	1,738,923	1,250,000	911,524	1.0000	911,524	3,035,494	2,213,540	5,624,814
2061	3,378,370	2,462,665	915,705	$667,749	4.5778	3,056,822	2,492,083	1,640,664	851,419	$620,871	2.8416	1,764,266	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	5,732,612
2062	3,378,370	2,462,665	915,705	$667,749	4.7509	3,172,410	2,492,083	1,640,664	851,419	$620,871	2.9150	1,809,838	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	5,893,772
2063	3,378,370	2,462,665	915,705	$667,749	4.9305	3,292,338	2,492,083	1,640,664	851,419	$620,871	2.9902	1,856,528	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	6,060,389
2064	3,387,341	2,462,665	924,676	$674,291	5.1168	3,450,214	2,501,482	1,640,664	860,818	$627,725	3.0673	1,925,420	1,250,000	911,524	1.0000	911,524	3,035,494	2,213,540	6,287,158
2065	3,378,370	2,462,665	915,705	$667,749	5.3103	3,545,949	2,492,083	1,640,664	851,419	$620,871	3.1465	1,953,570	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	6,411,042
2066	3,378,370	2,462,665	915,705	$667,749	5.5110	3,679,966	2,492,083	1,640,664	851,419	$620,871	3.2276	2,003,922	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	6,595,412
2067	3,378,370	2,462,665	915,705	$667,749	5.7193	3,819,058	2,492,083	1,640,664	851,419	$620,871	3.3109	2,055,641	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	6,786,223
2068	3,387,341	2,462,665	924,676	$674,291	5.9355	4,002,257	2,501,482	1,640,664	860,818	$627,725	3.3963	2,131,942	1,250,000	911,524	1.0000	911,524	3,035,494	2,213,540	7,045,722
2069	3,378,370	2,462,665	915,705	$667,749	6.1598	4,113,202	2,492,083	1,640,664	851,419	$620,871	3.4840	2,163,114	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	7,187,839
2070	3,378,370	2,462,665	915,705	$667,749	6.3927	4,268,720	2,492,083	1,640,664	851,419	$620,871	3.5738	2,218,868	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	7,399,112
2071	3,378,370	2,462,665	915,705	$667,749	6.6343	4,430,049	2,492,083	1,640,664	851,419	$620,871	3.6660	2,276,112	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	7,617,684
2072	3,387,341	2,462,665	924,676	$674,291	6.8851	4,642,564	2,501,482	1,640,664	860,818	$627,725	3.7606	2,360,622	1,250,000	911,524	1.0000	911,524	3,035,494	2,213,540	7,914,709
2073	3,378,370	2,462,665	915,705	$667,749	7.1454	4,771,335	2,492,083	1,640,664	851,419	$620,871	3.8576	2,395,071	1,250,000	911,524	1.0000	911,524	3,017,123	2,200,144	8,077,930
2074	3,378,370	2,462,665	915,705	$667,749	7.4155	4,951,694	14,274,093	1,640,664	12,633,429	$9,212,537	3.9572	36,455,851	1,250,000	911,524	1.0000	911,524	14,799,134	10,791,810	42,319,069
2075	885,735	2,462,665	(1,576,930)	($1,149,927)	7.6958	(8,849,610)	4,413,185	1,640,664	2,772,521	$2,021,775	4.0593	8,206,991	1,250,000	911,524	1.0000	911,524	2,445,591	1,783,371	268,905
	$486,095,466	$83,730,618	$402,364,847	$293,412,092		$608,322,765	$470,233,829	$55,782,569	$414,451,259	$302,225,733		$520,023,785	$52,500,000	$38,283,998		$38,283,998	$869,316,107	$633,921,822	$1,166,630,547
	$1,707,190,468	$342,287,245	$1,364,903,223	$995,313,363		$2,305,889,901	$1,591,612,827	$182,081,803	$1,409,531,024	$1,027,856,804		$1,885,101,764	$106,250,000	$77,479,519		$77,479,519	$2,880,684,247	$2,100,649,686	$4,268,471,184

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	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$757,935,327	$14,959,218	$0	$6,696,113	$779,590,658
2021	779,590,658	30,805,078	-	8,507,110	818,902,846
2022	818,902,846	32,149,155	-	(1,716,403)	849,335,597
2023	849,335,597	33,345,162	-	(1,716,403)	880,964,356
2024	880,964,356	34,588,172	-	(1,716,403)	913,836,125
2025	913,836,125	35,880,032	-	(1,716,403)	947,999,755
2026	947,999,755	37,222,663	-	(1,716,403)	983,506,015
2027	983,506,015	38,618,059	-	(1,716,403)	1,020,407,672
2028	1,020,407,672	40,068,294	-	(1,716,403)	1,058,759,563
2029	1,058,759,563	41,575,524	-	(1,716,403)	1,098,618,684
2030	1,098,618,684	43,141,987	-	(1,716,403)	1,140,044,268
2031	1,140,044,268	44,770,012	-	(1,716,403)	1,183,097,877
2032	1,183,097,877	46,462,019	-	(1,716,403)	1,227,843,494
2033	1,227,843,494	48,220,522	-	(1,716,403)	1,274,347,613
2034	1,274,347,613	50,048,134	-	(1,716,403)	1,322,679,344
2035	1,322,679,344	51,947,571	-	(1,716,403)	1,372,910,512
2036	1,372,910,512	53,921,656	-	(1,716,403)	1,425,115,765
2037	1,425,115,765	55,973,322	-	(1,716,403)	1,479,372,685
2038	1,479,372,685	58,105,619	-	(1,716,403)	1,535,761,901
2039	1,535,761,901	60,321,715	-	(1,716,403)	1,594,367,214
2040	1,594,367,214	42,711,791	(48,433,853)	(1,287,302)	1,587,357,850
2041	1,587,357,850	42,541,190	(186,542,762)	-	1,443,356,278
2042	1,443,356,278	38,681,948	(306,842,430)	-	1,175,195,796
2043	1,175,195,796	31,495,247	(363,124,729)	-	843,566,315
2044	843,566,315	22,607,577	(350,228,217)	-	515,945,675
2045	515,945,675	13,827,344	(128,812,844)	-	400,960,175
2046	400,960,175	10,745,733	(91,635,869)	-	320,070,039
2047	320,070,039	8,577,877	(86,166,716)	-	242,481,200
2048	242,481,200	6,498,496	(8,939,292)	-	240,040,404
2049	240,040,404	6,433,083	(4,345,624)	-	242,127,863
2050	242,127,863	6,489,027	(4,498,349)	-	244,118,540
2051	244,118,540	6,542,377	(4,656,445)	-	246,004,473
2052	246,004,473	6,592,920	(5,634,696)	-	246,962,697
2053	246,962,697	6,618,600	(7,341,226)	-	246,240,071
2054	246,240,071	6,599,234	(6,779,904)	-	246,059,401
2055	246,059,401	6,594,392	(7,010,088)	-	245,643,705
2056	245,643,705	6,583,251	(10,732,794)	-	241,494,162
2057	241,494,162	6,472,044	(10,138,911)	-	237,827,294
2058	237,827,294	6,373,771	(10,473,021)	-	233,728,045
2059	233,728,045	6,263,912	(10,818,418)	-	229,173,538
2060	229,173,538	6,141,851	(9,320,362)	-	225,995,027

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2062	223,481,731	5,989,310	(9,884,279)	-	219,586,763
2063	219,586,763	5,884,925	(9,165,878)	-	216,305,810
2064	216,305,810	5,796,996	(9,560,168)	-	212,542,637
2065	212,542,637	5,696,143	(10,920,500)	-	207,318,280
2066	207,318,280	5,556,130	(10,140,112)	-	202,734,298
2067	202,734,298	5,433,279	(10,487,970)	-	197,679,607
2068	197,679,607	5,297,813	(12,161,306)	-	190,816,114
2069	190,816,114	5,113,872	(13,735,288)	-	182,194,698
2070	182,194,698	4,882,818	(11,606,684)	-	175,470,832
2071	175,470,832	4,702,618	(14,675,070)	-	165,498,381
2072	165,498,381	4,435,357	(13,901,519)	-	156,032,218
2073	156,032,218	4,181,663	(11,431,268)	-	148,782,614
2074	148,782,614	3,987,374	(11,831,574)	-	140,938,413
2075	140,938,413	3,777,149	(13,750,247)	-	130,965,316
2076	130,965,316	3,509,870	(12,798,429)	-	121,676,757
2077	121,676,757	3,260,937	(13,120,228)	-	111,817,466
2078	111,817,466	2,996,708	(15,226,765)	-	99,587,409
2079	99,587,409	2,668,943	(14,058,046)	-	88,198,306
2080	88,198,306	2,363,715	(14,693,842)	-	75,868,179
2081	75,868,179	2,033,267	(16,865,941)	-	61,035,504
2082	61,035,504	1,635,752	(39,755,339)	-	22,915,917
2083	22,915,917	614,147	(23,530,064)	-	(0)

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Prairie Island Unit 1

External Levelized

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$437,068,622	$8,763,473	$0	$24,632	$445,856,727
2021	445,856,727	18,127,469	-	12,399,703	476,383,899
2022	476,383,899	19,335,297	-	11,586,169	507,305,365
2023	507,305,365	20,575,248	-	11,586,169	539,466,781
2024	539,466,781	21,864,921	-	11,586,169	572,917,871
2025	572,917,871	23,206,309	-	11,586,169	607,710,349
2026	607,710,349	24,601,488	-	11,586,169	643,898,006
2027	643,898,006	26,052,613	-	11,586,169	681,536,787
2028	681,536,787	27,561,928	-	11,586,169	720,684,884
2029	720,684,884	29,131,767	-	11,586,169	761,402,820
2030	761,402,820	30,764,556	-	11,586,169	803,753,544
2031	803,753,544	32,462,820	-	11,586,169	847,802,533
2032	847,802,533	34,229,184	-	11,586,169	893,617,886
2033	893,617,886	24,052,980	(39,900,652)	7,762,733	885,532,947
2034	885,532,947	23,732,283	(122,923,807)	-	786,341,423
2035	786,341,423	21,073,950	(171,342,711)	-	636,072,662
2036	636,072,662	17,046,747	(173,186,345)	-	479,933,064
2037	479,933,064	12,862,206	(138,134,907)	-	354,660,364
2038	354,660,364	9,504,898	(87,897,254)	-	276,268,008
2039	276,268,008	7,403,983	(69,254,127)	-	214,417,863
2040	214,417,863	5,746,399	(45,221,514)	-	174,942,748
2041	174,942,748	4,688,466	(35,142,581)	-	144,488,632
2042	144,488,632	3,872,295	(19,561,856)	-	128,799,072
2043	128,799,072	3,451,815	(3,904,707)	-	128,346,180
2044	128,346,180	3,439,678	(3,729,112)	-	128,056,746
2045	128,056,746	3,431,921	(4,412,802)	-	127,075,864
2046	127,075,864	3,405,633	(4,525,722)	-	125,955,775
2047	125,955,775	3,375,615	(4,313,718)	-	125,017,672
2048	125,017,672	3,350,474	(4,795,822)	-	123,572,324
2049	123,572,324	3,311,738	(4,888,042)	-	121,996,020
2050	121,996,020	3,269,493	(4,658,052)	-	120,607,461
2051	120,607,461	3,232,280	(5,150,212)	-	118,689,529
2052	118,689,529	3,180,879	(4,944,366)	-	116,926,043
2053	116,926,043	3,133,618	(4,646,597)	-	115,413,064
2054	115,413,064	3,093,070	(4,770,424)	-	113,735,710
2055	113,735,710	3,048,117	(4,898,483)	-	111,885,344
2056	111,885,344	2,998,527	(4,217,090)	-	110,666,781
2057	110,666,781	2,965,870	(4,286,501)	-	109,346,150
2058	109,346,150	2,930,477	(4,401,857)	-	107,874,770
2059	107,874,770	2,891,044	(4,521,230)	-	106,244,584
2060	106,244,584	2,847,355	(5,655,513)	-	103,436,426

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2061	103,436,426	2,772,096	(5,764,363)	-	100,444,159
2062	100,444,159	2,691,903	(5,926,611)	-	97,209,451
2063	97,209,451	2,605,213	(6,094,356)	-	93,720,309
2064	93,720,309	2,511,704	(6,322,291)	-	89,909,722
2065	89,909,722	2,409,581	(6,447,383)	-	85,871,920
2066	85,871,920	2,301,367	(6,633,003)	-	81,540,284
2067	81,540,284	2,185,280	(6,825,108)	-	76,900,456
2068	76,900,456	2,060,932	(7,085,947)	-	71,875,441
2069	71,875,441	1,926,262	(7,229,452)	-	66,572,251
2070	66,572,251	1,784,136	(7,442,161)	-	60,914,227
2071	60,914,227	1,632,501	(7,662,220)	-	54,884,508
2072	54,884,508	1,470,905	(7,960,785)	-	48,394,628
2073	48,394,628	1,296,976	(8,125,600)	-	41,566,004
2074	41,566,004	1,113,969	(42,368,389)	-	311,584
2075	311,584	8,350	(319,934)	-	0

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Prairie Island Unit 2

External Levelized

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$487,163,479	$9,697,485	$0	$294,670	$497,155,635
2021	497,155,635	19,916,375	-	6,511,608	523,583,618
2022	523,583,618	20,982,111	-	7,210,183	551,775,912
2023	551,775,912	22,104,164	-	7,210,183	581,090,259
2024	581,090,259	23,270,875	-	7,210,183	611,571,317
2025	611,571,317	24,484,021	-	7,210,183	643,265,522
2026	643,265,522	25,745,450	-	7,210,183	676,221,155
2027	676,221,155	27,057,085	-	7,210,183	710,488,423
2028	710,488,423	28,420,922	-	7,210,183	746,119,528
2029	746,119,528	29,839,040	-	7,210,183	783,168,751
2030	783,168,751	31,313,599	-	7,210,183	821,692,533
2031	821,692,533	32,846,845	-	7,210,183	861,749,562
2032	861,749,562	34,441,115	-	7,210,183	903,400,860
2033	903,400,860	36,098,837	-	7,210,183	946,709,880
2034	946,709,880	24,692,255	(16,324,077)	5,984,452	961,062,510
2035	961,062,510	24,987,625	(104,939,464)	-	881,110,671
2036	881,110,671	22,908,877	(170,283,115)	-	733,736,434
2037	733,736,434	19,077,147	(207,185,759)	-	545,627,822
2038	545,627,822	14,186,323	(236,679,173)	-	323,134,973
2039	323,134,973	8,401,509	(78,810,936)	-	252,725,546
2040	252,725,546	6,570,864	(57,529,171)	-	201,767,239
2041	201,767,239	5,245,948	(54,788,161)	-	152,225,026
2042	152,225,026	3,957,851	(26,194,778)	-	129,988,099
2043	129,988,099	3,379,691	(3,887,316)	-	129,480,474
2044	129,480,474	3,366,492	(3,711,134)	-	129,135,832
2045	129,135,832	3,357,532	(4,394,217)	-	128,099,147
2046	128,099,147	3,330,578	(4,506,508)	-	126,923,217
2047	126,923,217	3,300,004	(4,293,854)	-	125,929,366
2048	125,929,366	3,274,164	(4,775,285)	-	124,428,245
2049	124,428,245	3,235,134	(4,866,809)	-	122,796,570
2050	122,796,570	3,192,711	(4,636,098)	-	121,353,183
2051	121,353,183	3,155,183	(5,127,513)	-	119,380,852
2052	119,380,852	3,103,902	(4,920,895)	-	117,563,859
2053	117,563,859	3,056,660	(4,622,328)	-	115,998,192
2054	115,998,192	3,015,953	(4,745,328)	-	114,268,817
2055	114,268,817	2,970,989	(4,872,532)	-	112,367,274
2056	112,367,274	2,921,549	(4,190,253)	-	111,098,570
2057	111,098,570	2,888,563	(4,258,748)	-	109,728,384
2058	109,728,384	2,852,938	(4,373,155)	-	108,208,167
2059	108,208,167	2,813,412	(4,491,547)	-	106,530,032
2060	106,530,032	2,769,781	(5,624,814)	-	103,674,999

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2061	103,674,999	2,695,550	(5,732,612)	-	100,637,936
2062	100,637,936	2,616,586	(5,893,772)	-	97,360,751
2063	97,360,751	2,531,380	(6,060,389)	-	93,831,742
2064	93,831,742	2,439,625	(6,287,158)	-	89,984,209
2065	89,984,209	2,339,589	(6,411,042)	-	85,912,756
2066	85,912,756	2,233,732	(6,595,412)	-	81,551,076
2067	81,551,076	2,120,328	(6,786,223)	-	76,885,181
2068	76,885,181	1,999,015	(7,045,722)	-	71,838,473
2069	71,838,473	1,867,800	(7,187,839)	-	66,518,435
2070	66,518,435	1,729,479	(7,399,112)	-	60,848,802
2071	60,848,802	1,582,069	(7,617,684)	-	54,813,186
2072	54,813,186	1,425,143	(7,914,709)	-	48,323,620
2073	48,323,620	1,256,414	(8,077,930)	-	41,502,104
2074	41,502,104	1,079,055	(42,319,069)	-	262,090
2075	262,090	6,814	(268,905)	-	(0)

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2022 ACCRUAL COMPARISON

	Present	Proposed	Difference
Monticello	$8,507,110	$2,142,669	($6,364,441)
Prairie Island Unit 1	12,399,703	11,721,046	(678,657)
Prairie Island Unit 2	6,511,608	7,358,104	846,496
TOTAL	$27,418,421	$21,221,819	($6,196,602)

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2022 MN RETAIL SUMMARY

	Remaining Life (yrs)	Operational Earnings Rate	Post-Shutdown Earnings Rate	Market Value Balance 6/30/2020	Book Value 6/30/2020	Unrealized Gain/Loss 6/30/2020	Tax-Effect Adjustment	Tax-Adjusted Fund Balance 6/30/2020	2022-2024 Decommissioning Accrual
Monticello	19.67	3.94%	3.05%	$814,968,100	$610,109,002	$204,859,098	$57,032,773	$757,935,327	**$ 2,142,669**
Prairie Island Unit 1	13.25	4.01%	2.80%	471,960,960	346,629,286	125,331,674	34,892,338	437,068,622	**11,721,046**
Prairie Island Unit 2	14.42	3.98%	2.72%	526,255,835	385,837,890	140,417,945	39,092,356	487,163,479	**7,358,104**
TOTAL DECOMMISSIONING ACCRUAL				**$1,813,184,895**	**$1,342,576,178**	**$470,608,717**	**$131,017,467**	**$1,682,167,428**	**$21,221,819**

INPUT DATA

Escalation Rate (Labor)	3.78%
Escalation Rate (Non-Labor)	2.58%
Escalation Rate (PIIC)	0.00%
Jurisdictional Factor	72.9219%
Tax Rate for tax-effect adjustment	27.84%

Xcel Energy
Nuclear Decommissioning Accrual
60-Year Decommissioning Period
DECON Method - No Recasking

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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Monticello																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2040	$22,675,886	$0	$22,675,886	$16,535,687	2.1003	$34,729,903	$9,374,135	$0	$9,374,135	$6,835,797	1.6644	$11,377,501	$0	$0	1.0000	$0	$32,050,021	$23,371,484	$46,107,404
2041	77,446,576	-	77,446,576	$56,475,515	2.1797	123,099,680	$46,801,281	-	46,801,281	$34,128,384	1.7073	58,267,389	0	0	1.0000	0	124,247,858	90,603,899	181,367,069
2042	84,936,724	-	84,936,724	$61,937,473	2.2620	140,102,563	$130,633,005	-	130,633,005	$95,260,069	1.7514	166,838,485	0	0	1.0000	0	215,569,729	157,197,542	306,941,049
2043	95,755,683	-	95,755,683	$69,826,864	2.3475	163,918,562	$152,138,362	-	152,138,362	$110,942,185	1.7966	199,318,729	0	0	1.0000	0	247,894,046	180,769,048	363,237,291
2044	97,811,957	-	97,811,957	$71,326,337	2.4363	173,772,356	$131,387,082	-	131,387,082	$95,809,956	1.8429	176,568,169	0	0	1.0000	0	229,199,039	167,136,294	350,340,524
2045	52,997,679	-	52,997,679	$38,646,914	2.5284	97,714,858	$22,621,563	-	22,621,563	$16,496,074	1.8905	31,185,827	0	0	1.0000	0	75,619,242	55,142,988	128,900,685
2046	37,199,458	-	37,199,458	$27,126,552	2.6239	71,177,359	$14,545,801	-	14,545,801	$10,607,074	1.9392	20,569,238	0	0	1.0000	0	51,745,259	37,733,626	91,746,597
2047	32,137,259	-	32,137,259	$23,435,100	2.7231	63,816,121	$15,479,756	-	15,479,756	$11,288,133	1.9893	22,455,482	0	0	1.0000	0	47,617,016	34,723,233	86,271,603
2048	7,130,022	4,794,411	2,335,611	$1,703,172	2.8261	4,813,334	$4,684,016	1,853,697	2,830,319	$2,063,922	2.0406	4,211,640	0	0	1.0000	0	5,165,929	3,767,094	9,024,973
2049	6,393,070	4,794,411	1,598,659	$1,165,772	2.9329	3,419,094	$2,518,805	1,853,697	665,108	$485,009	2.0932	1,015,221	0	0	1.0000	0	2,263,767	1,650,782	4,434,315
2050	8,011,913	4,794,411	3,217,502	$2,346,264	3.0438	7,141,558	$7,375,335	1,853,697	5,521,638	$4,026,483	2.1472	8,645,665	0	0	1.0000	0	8,739,140	6,372,747	15,787,223
2051	8,011,913	4,794,411	3,217,502	$2,346,264	3.1588	7,411,378	$7,375,335	1,853,697	5,521,638	$4,026,483	2.2026	8,868,732	0	0	1.0000	0	8,739,140	6,372,747	16,280,110
2052	8,749,279	4,794,411	3,954,868	$2,883,965	3.2782	9,454,214	$9,541,788	1,853,697	7,688,091	$5,606,302	2.2595	12,667,440	0	0	1.0000	0	11,642,959	8,490,267	22,121,654
2053	9,271,738	4,794,411	4,477,327	$3,264,952	3.4021	11,107,694	$11,154,810	1,853,697	9,301,113	$6,782,548	2.3178	15,720,591	0	0	1.0000	0	13,778,440	10,047,500	26,828,284
2054	8,191,888	4,794,411	3,397,477	$2,477,505	3.5307	8,747,327	$7,915,260	1,853,697	6,061,563	$4,420,207	2.3776	10,509,484	0	0	1.0000	0	9,459,040	6,897,712	19,256,811
2055	9,091,763	4,794,411	4,297,352	$3,133,711	3.6642	11,482,544	$10,614,885	1,853,697	8,761,188	$6,388,825	2.4389	15,581,705	0	0	1.0000	0	13,058,540	9,522,536	27,064,248
2056	9,469,179	4,794,411	4,674,768	$3,408,930	3.8027	12,963,137	$11,701,488	1,853,697	9,847,791	$7,181,196	2.5018	17,965,917	0	0	1.0000	0	14,522,559	10,590,126	30,929,054
2057	6,375,083	4,794,411	1,580,672	$1,152,656	3.9464	4,548,841	$2,464,844	1,853,697	611,146	$445,660	2.5664	1,143,741	0	0	1.0000	0	2,191,818	1,598,315	5,692,582
2058	6,375,083	4,794,411	1,580,672	$1,152,656	4.0956	4,720,817	$2,464,844	1,853,697	611,146	$445,660	2.6326	1,173,243	0	0	1.0000	0	2,191,818	1,598,315	5,894,061
2059	6,375,083	4,794,411	1,580,672	$1,152,656	4.2504	4,899,248	$2,464,844	1,853,697	611,146	$445,660	2.7005	1,203,504	0	0	1.0000	0	2,191,818	1,598,315	6,102,752
2060	6,392,549	4,794,411	1,598,138	$1,165,392	4.4111	5,140,662	$2,471,597	1,853,697	617,899	$450,584	2.7702	1,248,208	0	0	1.0000	0	2,216,037	1,615,976	6,388,870
2061	6,375,083	4,794,411	1,580,672	$1,152,656	4.5778	5,276,628	$2,464,844	1,853,697	611,146	$445,660	2.8416	1,266,386	0	0	1.0000	0	2,191,818	1,598,315	6,543,014
2062	6,375,083	4,794,411	1,580,672	$1,152,656	4.7509	5,476,153	$2,464,844	1,853,697	611,146	$445,660	2.9150	1,299,098	0	0	1.0000	0	2,191,818	1,598,315	6,775,250
2063	6,375,083	4,794,411	1,580,672	$1,152,656	4.9305	5,683,170	$2,464,844	1,853,697	611,146	$445,660	2.9902	1,332,611	0	0	1.0000	0	2,191,818	1,598,315	7,015,781
2064	6,392,549	4,794,411	1,598,138	$1,165,392	5.1168	5,963,080	$2,471,597	1,853,697	617,899	$450,584	3.0673	1,382,076	0	0	1.0000	0	2,216,037	1,615,976	7,345,156
2065	6,375,083	4,794,411	1,580,672	$1,152,656	5.3103	6,120,948	$2,464,844	1,853,697	611,146	$445,660	3.1465	1,402,268	0	0	1.0000	0	2,191,818	1,598,315	7,523,216
2066	6,375,083	4,794,411	1,580,672	$1,152,656	5.5110	6,352,286	$2,464,844	1,853,697	611,146	$445,660	3.2276	1,438,411	0	0	1.0000	0	2,191,818	1,598,315	7,790,697
2067	6,375,083	4,794,411	1,580,672	$1,152,656	5.7193	6,592,384	$2,464,844	1,853,697	611,146	$445,660	3.3109	1,475,534	0	0	1.0000	0	2,191,818	1,598,315	8,067,919
2068	6,392,549	4,794,411	1,598,138	$1,165,392	5.9355	6,917,186	$2,471,597	1,853,697	617,899	$450,584	3.3963	1,530,318	0	0	1.0000	0	2,216,037	1,615,976	8,447,505
2069	6,375,083	4,794,411	1,580,672	$1,152,656	6.1598	7,100,129	$2,464,844	1,853,697	611,146	$445,660	3.4840	1,552,678	0	0	1.0000	0	2,191,818	1,598,315	8,652,807
2070	6,375,083	4,794,411	1,580,672	$1,152,656	6.3927	7,368,583	$2,464,844	1,853,697	611,146	$445,660	3.5738	1,592,698	0	0	1.0000	0	2,191,818	1,598,315	8,961,281
2071	6,375,083	4,794,411	1,580,672	$1,152,656	6.6343	7,647,065	$2,464,844	1,853,697	611,146	$445,660	3.6660	1,633,788	0	0	1.0000	0	2,191,818	1,598,315	9,280,852
2072	6,392,549	4,794,411	1,598,138	$1,165,392	6.8851	8,023,843	$2,471,597	1,853,697	617,899	$450,584	3.7606	1,694,466	0	0	1.0000	0	2,216,037	1,615,976	9,718,309
2073	6,375,083	4,794,411	1,580,672	$1,152,656	7.1454	8,236,187	$2,464,844	1,853,697	611,146	$445,660	3.8576	1,719,176	0	0	1.0000	0	2,191,818	1,598,315	9,955,363
2074	6,375,083	4,794,411	1,580,672	$1,152,656	7.4155	8,547,519	$2,464,844	1,853,697	611,146	$445,660	3.9572	1,763,564	0	0	1.0000	0	2,191,818	1,598,315	10,311,083
2075	6,375,083	4,794,411	1,580,672	$1,152,656	7.6958	8,870,609	$2,464,844	1,853,697	611,146	$445,660	4.0593	1,809,066	0	0	1.0000	0	2,191,818	1,598,315	10,679,675
2076	6,392,549	4,794,411	1,598,138	$1,165,392	7.9867	9,307,639	$2,471,597	1,853,697	617,899	$450,584	4.1640	1,876,232	0	0	1.0000	0	2,216,037	1,615,976	11,183,871
2077	6,375,083	4,794,411	1,580,672	$1,152,656	8.2886	9,553,903	$2,464,844	1,853,697	611,146	$445,660	4.2714	1,903,590	0	0	1.0000	0	2,191,818	1,598,315	11,457,493
2078	6,894,020	4,794,411	2,099,609	$1,531,075	8.6019	13,170,153	$4,021,656	1,853,697	2,167,959	$1,580,917	4.3816	6,926,945	0	0	1.0000	0	4,267,568	3,111,992	20,097,098
2079	6,997,808	4,794,411	2,203,397	$1,606,759	8.9270	14,343,535	$4,333,019	1,853,697	2,479,321	$1,807,968	4.4947	8,126,275	0	0	1.0000	0	4,682,718	3,414,727	22,469,810
2080	6,911,486	4,794,411	2,117,075	$1,543,811	9.2645	14,302,641	$4,028,409	1,853,697	2,174,712	$1,585,841	4.6106	7,311,680	0	0	1.0000	0	4,291,787	3,129,653	21,614,321
2081	6,894,020	4,794,411	2,099,609	$1,531,075	9.6147	14,720,826	$4,021,656	1,853,697	2,167,959	$1,580,917	4.7296	7,477,104	0	0	1.0000	0	4,267,568	3,111,992	22,197,930
2082	6,894,020	4,794,411	2,099,609	$1,531,075	9.9781	15,277,219	$4,021,656	1,853,697	2,167,959	$1,580,917	4.8516	7,669,976	0	0	1.0000	0	4,267,568	3,111,992	22,947,195
2083	6,997,808	4,794,411	2,203,397	$1,606,759	10.3553	16,638,469	$4,333,019	1,853,697	2,479,321	$1,807,968	4.9768	8,997,896	0	0	1.0000	0	4,682,718	3,414,727	25,636,365
2084	6,911,486	4,794,411	2,117,075	$1,543,811	10.7467	16,590,878	$4,028,409	1,853,697	2,174,712	$1,585,841	5.1052	8,096,037	0	0	1.0000	0	4,291,787	3,129,653	24,686,915
2085	6,894,020	4,794,411	2,099,609	$1,531,075	11.1529	17,075,925	$4,021,656	1,853,697	2,167,959	$1,580,917	5.2369	8,279,103	0	0	1.0000	0	4,267,568	3,111,992	25,355,029
2086	6,894,020	4,794,411	2,099,609	$1,531,075	11.5745	17,721,427	$4,021,656	1,853,697	2,167,959	$1,580,917	5.3720	8,492,685	0	0	1.0000	0	4,267,568	3,111,992	26,214,112
2087	6,997,808	4,794,411	2,203,397	$1,606,759	12.0120	19,300,386	$4,333,019	1,853,697	2,479,321	$1,807,968	5.5106	9,962,990	0	0	1.0000	0	4,682,718	3,414,727	29,263,376
2088	7,630,972	4,794,411	2,836,561	$2,068,474	12.4661	25,785,807	$6,186,867	1,853,697	4,333,170	$3,159,830	5.6528	17,861,885	0	0	1.0000	0	7,169,731	5,228,304	43,647,693
2089	6,894,020	4,794,411	2,099,609	$1,531,075	12.9373	19,807,975	$4,021,656	1,853,697	2,167,959	$1,580,917	5.7986	9,167,104	0	0	1.0000	0	4,267,568	3,111,992	28,975,080
2090	6,478,870	4,794,411	1,684,459	$1,228,340	13.4263	16,492,057	$2,776,206	1,853,697	922,509	$672,711	5.9482	4,001,420	0	0	1.0000	0	2,606,968	1,901,051	20,493,476
2091	6,478,870	4,794,411	1,684,459	$1,228,340	13.9338	17,115,439	$2,776,206	1,853,697	922,509	$672,711	6.1017	4,104,681	0	0	1.0000	0	2,606,968	1,901,051	21,220,120
2092	6,496,336	4,794,411	1,701,925	$1,241,076	14.4605	17,946,582	$2,782,959	1,853,697	929,262	$677,635	6.2591	4,241,388	0	0	1.0000	0	2,631,187	1,918,712	22,187,970
2093	6,582,658	4,794,411	1,788,247	$1,304,023	15.0071	19,569,610	$3,087,569	1,853,697	1,233,871	$899,762	6.4206	5,777,015	0	0	1.0000	0	3,022,118	2,203,786	25,346,625
2094	6,478,870	4,794,411	1,684,459	$1,228,340	15.5744	19,130,653	$2,776,206	1,853,697	922,509	$672,711	6.5863	4,430,676	0	0	1.0000	0	2,606,968	1,901,051	23,561,329
2095	6,478,870	4,794,411	1,684,459	$1,228,340	16.1631	19,853,777	$2,776,206	1,853,697	922,509	$672,711	6.7562	4,544,970	0	0	1.0000	0	2,606,968	1,901,051	24,398,747
2096	6,600,124	4,794,411	1,805,713	$1,316,760	16.7741	22,087,464	$3,094,322	1,853,697	1,240,624	$904,687	6.9305	6,269,932	0	0	1.0000	0	3,046,337	2,221,447	28,357,396
2097	6,478,870	4,794,411	1,684,459	$1,228,340	17.4081	21,383,059	$2,776,206	1,853,697	922,509	$672,711	7.1093	4,782,504	0	0	1.0000	0	2,606,968	1,901,051	26,165,564
2098	6,478,870	4,794,411	1,684,459	$1,228,340	18.0662	22,191,430	$2,776,206	1,853,697	922,509	$672,711	7.2927	4,905,880	0	0	1.0000	0	2,606,968	1,901,051	27,097,309
2099	6,582,658	4,794,411	1,788,247	$1,304,023	18.7491	24,449,266	$3,087,569	1,853,697	1,233,871	$899,762	7.4809	6,731,033	0	0	1.0000	0	3,022,118	2,203,786	31,180,299
2100	6,582,658	4,794,411	1,788,247	$1,304,023	19.4578	25,373,428	$9,395,133	1,853,697	7,541,435	$5,499,358	7.6739	42,201,523	0	0	1.0000	0	9,329,682	6,803,381	67,574,951
2101	2,095,521	4,794,411	(2,698,890)	($1,968,082)	20.1933	(39,742,061)	$14,016,783	1,853,697	12,163,086	$8,869,553	7.8719	69,820,235	0	0	1.0000	0	9,464,196	6,901,471	30,078,174
	$866,870,717	$258,898,192	$607,972,525	$443,345,117		$1,477,804,506	$751,152,447	$100,099,659	$651,052,788	$474,760,063		$1,083,388,808	$0	$0		$0	$1,259,025,313	$918,105,180	$2,561,193,314

Xcel Energy
Nuclear Decommissioning Accrual
60-Year Decommissioning Period
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Prairie Island Unit 1

Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2033	$23,781,625	$0	$23,781,625	$17,342,013	1.6199	$28,092,326	$10,730,370	$0	$10,730,370	$7,824,790	1.3926	$10,896,802	$1,250,000	$911,524	1.0000	$911,524	$35,761,995	$26,078,326	$39,900,652
2034	67,414,177	-	67,414,177	49,159,699	1.6811	82,642,369	37,794,295	-	37,794,295	27,560,318	1.4285	39,369,914	1,250,000	911,524	1.0000	911,524	106,458,472	77,631,540	122,923,807
2035	68,590,730	-	68,590,730	50,017,664	1.7446	87,260,816	77,836,646	-	77,836,646	56,759,961	1.4653	83,170,371	1,250,000	911,524	1.0000	911,524	147,677,376	107,689,149	171,342,711
2036	64,126,566	-	64,126,566	46,762,310	1.8106	84,667,839	79,805,408	-	79,805,408	58,195,619	1.5032	87,479,655	1,250,000	911,524	1.0000	911,524	145,181,973	105,869,453	173,059,018
2037	45,510,012	-	45,510,012	33,186,765	1.8790	62,357,932	66,379,691	-	66,379,691	48,405,332	1.5419	74,636,181	1,250,000	911,524	1.0000	911,524	113,139,703	82,503,621	137,905,637
2038	25,609,125	-	25,609,125	18,674,660	1.9501	36,417,455	43,408,012	-	43,408,012	31,653,947	1.5817	50,067,049	1,250,000	911,524	1.0000	911,524	70,267,137	51,240,132	87,396,028
2039	33,734,608	-	33,734,608	24,599,917	2.0238	49,785,312	14,198,587	-	14,198,587	10,353,879	1.6225	16,799,169	1,250,000	911,524	1.0000	911,524	49,183,194	35,865,320	67,496,004
2040	20,662,977	-	20,662,977	15,067,835	2.1003	31,646,974	9,470,300	-	9,470,300	6,905,922	1.6644	11,494,217	1,250,000	911,524	1.0000	911,524	31,383,276	22,885,281	44,052,715
2041	15,525,034	2,455,937	13,069,098	9,530,234	2.1797	20,773,052	11,497,122	1,626,430	9,870,693	7,197,897	1.7073	12,288,969	1,250,000	911,524	1.0000	911,524	24,189,791	17,639,655	33,973,545
2042	9,047,398	2,455,937	6,591,461	4,806,619	2.2620	10,872,572	6,564,040	1,626,430	4,937,611	3,600,600	1.7514	6,306,090	1,250,000	911,524	1.0000	911,524	12,779,072	9,318,742	18,090,185
2043	3,274,582	2,455,937	818,645	596,972	2.3475	1,401,391	2,167,718	1,626,430	541,289	394,718	1.7966	709,150	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,022,065
2044	3,283,554	2,455,937	827,617	603,514	2.4363	1,470,341	2,177,082	1,626,430	550,652	401,546	1.8429	740,009	1,250,000	911,524	1.0000	911,524	2,628,269	1,916,584	3,121,874
2045	3,274,582	2,455,937	818,645	596,972	2.5284	1,509,383	2,167,718	1,626,430	541,289	394,718	1.8905	746,214	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,167,122
2046	3,274,582	2,455,937	818,645	596,972	2.6239	1,566,394	2,167,718	1,626,430	541,289	394,718	1.9392	765,437	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,243,355
2047	3,274,582	2,455,937	818,645	596,972	2.7231	1,625,614	2,167,718	1,626,430	541,289	394,718	1.9893	785,213	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,322,350
2048	3,283,554	2,455,937	827,617	603,514	2.8261	1,705,591	2,177,082	1,626,430	550,652	401,546	2.0406	819,395	1,250,000	911,524	1.0000	911,524	2,628,269	1,916,584	3,436,509
2049	3,274,582	2,455,937	818,645	596,972	2.9329	1,750,858	2,167,718	1,626,430	541,289	394,718	2.0932	826,224	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,488,606
2050	3,274,582	2,455,937	818,645	596,972	3.0438	1,817,063	2,167,718	1,626,430	541,289	394,718	2.1472	847,539	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,576,125
2051	3,274,582	2,455,937	818,645	596,972	3.1588	1,885,714	2,167,718	1,626,430	541,289	394,718	2.2026	869,406	1,250,000	911,524	1.0000	911,524	2,609,934	1,903,214	3,666,644
2052	3,283,554	2,455,937	827,617	603,514	3.2782	1,978,439	2,177,082	1,626,430	550,652	401,546	2.2595	907,294	1,250,000	911,524	1.0000	911,524	2,628,269	1,916,584	3,797,257
2053	3,378,370	2,455,937	922,433	672,656	3.4021	2,288,441	2,479,081	1,626,430	852,651	621,769	2.3178	1,441,137	1,250,000	911,524	1.0000	911,524	3,025,084	2,205,949	4,641,103
2054	3,482,157	2,455,937	1,026,220	748,339	3.5307	2,642,162	2,790,443	1,626,430	1,164,014	848,821	2.3776	2,018,157	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	5,571,842
2055	3,482,157	2,455,937	1,026,220	748,339	3.6642	2,742,065	2,790,443	1,626,430	1,164,014	848,821	2.4389	2,070,189	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	5,723,778
2056	3,543,022	2,455,937	1,087,086	792,723	3.8027	3,014,489	2,955,488	1,626,430	1,329,059	969,175	2.5018	2,424,681	1,250,000	911,524	1.0000	911,524	3,666,144	2,673,422	6,350,695
2057	3,430,263	2,455,937	974,327	710,497	3.9464	2,803,907	2,634,762	1,626,430	1,008,332	735,295	2.5664	1,887,062	1,250,000	911,524	1.0000	911,524	3,232,659	2,357,316	5,602,493
2058	3,585,945	2,455,937	1,130,008	824,023	4.0956	3,374,869	3,101,806	1,626,430	1,475,376	1,075,872	2.6326	2,832,342	1,250,000	911,524	1.0000	911,524	3,855,384	2,811,419	7,118,735
2059	3,430,263	2,455,937	974,327	710,497	4.2504	3,019,898	2,634,762	1,626,430	1,008,332	735,295	2.7005	1,985,665	1,250,000	911,524	1.0000	911,524	3,232,659	2,357,316	5,917,087
2060	3,387,341	2,455,937	931,404	679,198	4.4111	2,996,009	2,488,444	1,626,430	862,015	628,598	2.7702	1,741,341	1,250,000	911,524	1.0000	911,524	3,043,419	2,219,319	5,648,874
2061	3,482,157	2,455,937	1,026,220	748,339	4.5778	3,425,748	2,790,443	1,626,430	1,164,014	848,821	2.8416	2,412,010	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	6,749,281
2062	3,482,157	2,455,937	1,026,220	748,339	4.7509	3,555,286	2,790,443	1,626,430	1,164,014	848,821	2.9150	2,474,313	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	6,941,122
2063	3,430,263	2,455,937	974,327	710,497	4.9305	3,503,108	2,634,762	1,626,430	1,008,332	735,295	2.9902	2,198,680	1,250,000	911,524	1.0000	911,524	3,232,659	2,357,316	6,613,311
2064	3,491,129	2,455,937	1,035,192	754,882	5.1168	3,862,578	2,799,807	1,626,430	1,173,377	855,649	3.0673	2,624,532	1,250,000	911,524	1.0000	911,524	3,458,569	2,522,054	7,398,634
2065	3,482,157	2,455,937	1,026,220	748,339	5.3103	3,973,907	2,790,443	1,626,430	1,164,014	848,821	3.1465	2,670,815	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	7,556,245
2066	3,430,263	2,455,937	974,327	710,497	5.5110	3,915,552	2,634,762	1,626,430	1,008,332	735,295	3.2276	2,373,239	1,250,000	911,524	1.0000	911,524	3,232,659	2,357,316	7,200,314
2067	3,482,157	2,455,937	1,026,220	748,339	5.7193	4,279,977	2,790,443	1,626,430	1,164,014	848,821	3.3109	2,810,361	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	8,001,862
2068	3,491,129	2,455,937	1,035,192	754,882	5.9355	4,480,599	2,799,807	1,626,430	1,173,377	855,649	3.3963	2,906,041	1,250,000	911,524	1.0000	911,524	3,458,569	2,522,054	8,298,164
2069	3,430,263	2,455,937	974,327	710,497	6.1598	4,376,522	2,634,762	1,626,430	1,008,332	735,295	3.4840	2,561,768	1,250,000	911,524	1.0000	911,524	3,232,659	2,357,316	7,849,815
2070	3,482,157	2,455,937	1,026,220	748,339	6.3927	4,783,909	2,790,443	1,626,430	1,164,014	848,821	3.5738	3,033,516	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	8,728,949
2071	3,482,157	2,455,937	1,026,220	748,339	6.6343	4,964,708	2,790,443	1,626,430	1,164,014	848,821	3.6660	3,111,777	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	8,988,009
2072	3,491,129	2,455,937	1,035,192	754,882	6.8851	5,197,435	2,799,807	1,626,430	1,173,377	855,649	3.7606	3,217,754	1,250,000	911,524	1.0000	911,524	3,458,569	2,522,054	9,326,712
2073	3,482,157	2,455,937	1,026,220	748,339	7.1454	5,347,184	2,790,443	1,626,430	1,164,014	848,821	3.8576	3,274,412	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	9,533,120
2074	3,482,157	2,455,937	1,026,220	748,339	7.4155	5,549,311	2,790,443	1,626,430	1,164,014	848,821	3.9572	3,358,954	1,250,000	911,524	1.0000	911,524	3,440,234	2,508,684	9,819,789
2075	3,841,900	2,455,937	1,385,963	1,010,671	7.6958	7,777,920	3,869,672	1,626,430	2,243,243	1,635,815	4.0593	6,640,265	1,250,000	911,524	1.0000	911,524	4,879,206	3,558,010	15,329,709
2076	3,491,129	2,455,937	1,035,192	754,882	7.9867	6,029,012	2,799,807	1,626,430	1,173,377	855,649	4.1640	3,562,923	1,250,000	911,524	1.0000	911,524	3,458,569	2,522,054	10,503,459
2077	3,482,157	2,455,937	1,026,220	748,339	8.2886	6,202,686	14,572,953	1,626,430	12,946,523	9,440,851	4.2714	40,325,650	1,250,000	911,524	1.0000	911,524	15,222,744	11,100,714	47,439,859
2078	885,735	2,455,937	(1,570,201)	(1,145,021)	8.6019	(9,849,354)	5,663,185	1,626,430	4,036,755	2,943,679	4.3816	12,898,022	0	0	1.0000	0	2,466,554	1,798,658	3,048,669
	$494,816,858	$93,325,595	$401,491,262	$292,775,057		$605,485,367	$466,797,843	$61,804,324	$404,993,520	$295,328,970		$519,379,902	$56,250,000	$41,018,569		$41,018,569	$862,734,782	$629,122,595	$1,165,883,838

Xcel Energy
Nuclear Decommissioning Accrual
60-Year Decommissioning Period
DECON Method - No Recasking

Docket No. E002/M-20-___
Schedule E.10
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Prairie Island Unit 2

Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2034	$8,345,549	$0	$8,345,549	$6,085,733	1.6811	$10,230,726	$4,974,446	$0	$4,974,446	$3,627,461	1.4285	$5,181,828	$1,250,000	$911,524	1.0000	$911,524	$14,569,995	$10,624,717	$16,324,077
2035	49,894,469	-	49,894,469	36,383,994	1.7446	63,475,517	37,951,792	-	37,951,792	27,675,168	1.4653	40,552,423	1,250,000	911,524	1.0000	911,524	89,096,260	64,970,686	104,939,464
2036	67,020,055	-	67,020,055	48,872,297	1.8106	88,488,181	73,632,736	-	73,632,736	53,694,390	1.5032	80,713,407	1,250,000	911,524	1.0000	911,524	141,902,791	103,478,211	170,113,112
2037	75,245,310	-	75,245,310	54,870,310	1.8790	103,101,312	91,562,609	-	91,562,609	66,769,194	1.5419	102,951,421	1,250,000	911,524	1.0000	911,524	168,057,919	122,551,028	206,964,256
2038	82,427,075	-	82,427,075	60,107,389	1.9501	117,215,420	102,382,218	-	102,382,218	74,659,059	1.5817	118,088,233	1,250,000	911,524	1.0000	911,524	186,059,293	135,677,971	236,215,176
2039	39,073,086	-	39,073,086	28,492,837	2.0238	57,663,803	15,617,110	-	15,617,110	11,388,293	1.6225	18,477,506	1,250,000	911,524	1.0000	911,524	55,940,196	40,792,654	77,052,832
2040	24,821,306	-	24,821,306	18,100,168	2.1003	38,015,782	14,363,430	-	14,363,430	10,474,086	1.6644	17,433,069	1,250,000	911,524	1.0000	911,524	40,434,736	29,485,778	56,360,375
2041	18,294,168	-	18,294,168	13,340,455	2.1797	29,078,189	18,969,757	-	18,969,757	13,833,107	1.7073	23,617,263	1,250,000	911,524	1.0000	911,524	38,513,924	28,085,085	53,606,976
2042	10,352,305	2,462,665	7,889,639	5,753,275	2.2620	13,013,908	10,085,391	1,630,886	8,454,506	6,165,186	1.7514	10,797,707	1,250,000	911,524	1.0000	911,524	17,594,145	12,829,985	24,723,139
2043	3,274,582	2,462,665	811,917	592,065	2.3475	1,389,873	2,167,718	1,630,886	536,833	391,469	1.7966	703,313	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,004,709
2044	3,283,554	2,462,665	820,888	598,607	2.4363	1,458,387	2,177,082	1,630,886	546,196	398,297	1.8429	734,021	1,250,000	911,524	1.0000	911,524	2,617,085	1,908,428	3,103,932
2045	3,274,582	2,462,665	811,917	592,065	2.5284	1,496,977	2,167,718	1,630,886	536,833	391,469	1.8905	740,071	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,148,573
2046	3,274,582	2,462,665	811,917	592,065	2.6239	1,553,520	2,167,718	1,630,886	536,833	391,469	1.9392	759,136	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,224,179
2047	3,274,582	2,462,665	811,917	592,065	2.7231	1,612,253	2,167,718	1,630,886	536,833	391,469	1.9893	778,749	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,302,525
2048	3,283,554	2,462,665	820,888	598,607	2.8261	1,691,724	2,177,082	1,630,886	546,196	398,297	2.0406	812,764	1,250,000	911,524	1.0000	911,524	2,617,085	1,908,428	3,416,012
2049	3,274,582	2,462,665	811,917	592,065	2.9329	1,736,468	2,167,718	1,630,886	536,833	391,469	2.0932	819,422	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,467,414
2050	3,274,582	2,462,665	811,917	592,065	3.0438	1,802,128	2,167,718	1,630,886	536,833	391,469	2.1472	840,561	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,554,213
2051	3,274,582	2,462,665	811,917	592,065	3.1588	1,870,215	2,167,718	1,630,886	536,833	391,469	2.2026	862,249	1,250,000	911,524	1.0000	911,524	2,598,750	1,895,058	3,643,988
2052	3,283,554	2,462,665	820,888	598,607	3.2782	1,962,354	2,177,082	1,630,886	546,196	398,297	2.2595	899,952	1,250,000	911,524	1.0000	911,524	2,617,085	1,908,428	3,773,830
2053	3,378,370	2,462,665	915,704	667,749	3.4021	2,271,749	2,479,081	1,630,886	848,195	618,520	2.3178	1,433,606	1,250,000	911,524	1.0000	911,524	3,013,900	2,197,793	4,616,878
2054	3,482,157	2,462,665	1,019,492	743,433	3.5307	2,624,838	2,790,443	1,630,886	1,159,558	845,572	2.3776	2,010,431	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	5,546,793
2055	3,482,157	2,462,665	1,019,492	743,433	3.6642	2,724,086	2,790,443	1,630,886	1,159,558	845,572	2.4389	2,062,264	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	5,697,874
2056	3,543,022	2,462,665	1,080,357	787,817	3.8027	2,995,831	2,955,488	1,630,886	1,324,603	965,925	2.5018	2,416,552	1,250,000	911,524	1.0000	911,524	3,654,960	2,665,266	6,323,907
2057	3,430,263	2,462,665	967,598	705,591	3.9464	2,784,544	2,634,762	1,630,886	1,003,876	732,046	2.5664	1,878,722	1,250,000	911,524	1.0000	911,524	3,221,475	2,349,160	5,574,790
2058	3,585,945	2,462,665	1,123,279	819,117	4.0956	3,354,774	3,101,806	1,630,886	1,470,920	1,072,623	2.6326	2,823,787	1,250,000	911,524	1.0000	911,524	3,844,200	2,803,263	7,090,085
2059	3,430,263	2,462,665	967,598	705,591	4.2504	2,999,043	2,634,762	1,630,886	1,003,876	732,046	2.7005	1,976,890	1,250,000	911,524	1.0000	911,524	3,221,475	2,349,160	5,887,457
2060	3,387,341	2,462,665	924,676	674,291	4.4111	2,974,365	2,488,444	1,630,886	857,559	625,348	2.7702	1,732,340	1,250,000	911,524	1.0000	911,524	3,032,235	2,211,163	5,618,229
2061	3,482,157	2,462,665	1,019,492	743,433	4.5778	3,403,286	2,790,443	1,630,886	1,159,558	845,572	2.8416	2,402,776	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	6,717,586
2062	3,482,157	2,462,665	1,019,492	743,433	4.7509	3,531,975	2,790,443	1,630,886	1,159,558	845,572	2.9150	2,464,841	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	6,908,339
2063	3,430,263	2,462,665	967,598	705,591	4.9305	3,478,916	2,634,762	1,630,886	1,003,876	732,046	2.9902	2,188,963	1,250,000	911,524	1.0000	911,524	3,221,475	2,349,160	6,579,403
2064	3,491,129	2,462,665	1,028,463	749,975	5.1168	3,837,472	2,799,807	1,630,886	1,168,921	852,400	3.0673	2,614,565	1,250,000	911,524	1.0000	911,524	3,447,385	2,513,898	7,363,561
2065	3,482,157	2,462,665	1,019,492	743,433	5.3103	3,947,851	2,790,443	1,630,886	1,159,558	845,572	3.1465	2,660,591	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	7,519,966
2066	3,430,263	2,462,665	967,598	705,591	5.5110	3,888,511	2,634,762	1,630,886	1,003,876	732,046	3.2276	2,362,751	1,250,000	911,524	1.0000	911,524	3,221,475	2,349,160	7,162,786
2067	3,482,157	2,462,665	1,019,492	743,433	5.7193	4,251,915	2,790,443	1,630,886	1,159,558	845,572	3.3109	2,799,603	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	7,963,042
2068	3,491,129	2,462,665	1,028,463	749,975	5.9355	4,451,476	2,799,807	1,630,886	1,168,921	852,400	3.3963	2,895,005	1,250,000	911,524	1.0000	911,524	3,447,385	2,513,898	8,258,005
2069	3,430,263	2,462,665	967,598	705,591	6.1598	4,346,299	2,634,762	1,630,886	1,003,876	732,046	3.4840	2,550,448	1,250,000	911,524	1.0000	911,524	3,221,475	2,349,160	7,808,270
2070	3,482,157	2,462,665	1,019,492	743,433	6.3927	4,752,543	2,790,443	1,630,886	1,159,558	845,572	3.5738	3,021,904	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	8,685,970
2071	3,482,157	2,462,665	1,019,492	743,433	6.6343	4,932,156	2,790,443	1,630,886	1,159,558	845,572	3.6660	3,099,865	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	8,943,545
2072	3,491,129	2,462,665	1,028,463	749,975	6.8851	5,163,652	2,799,807	1,630,886	1,168,921	852,400	3.7606	3,205,534	1,250,000	911,524	1.0000	911,524	3,447,385	2,513,898	9,280,710
2073	3,482,157	2,462,665	1,019,492	743,433	7.1454	5,312,124	2,790,443	1,630,886	1,159,558	845,572	3.8576	3,261,877	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	9,485,525
2074	3,482,157	2,462,665	1,019,492	743,433	7.4155	5,512,926	2,790,443	1,630,886	1,159,558	845,572	3.9572	3,346,096	1,250,000	911,524	1.0000	911,524	3,429,050	2,500,528	9,770,545
2075	3,841,900	2,462,665	1,379,235	1,005,764	7.6958	7,740,160	3,869,672	1,630,886	2,238,787	1,632,566	4.0593	6,627,074	1,250,000	911,524	1.0000	911,524	4,868,021	3,549,854	15,278,758
2076	3,491,129	2,462,665	1,028,463	749,975	7.9867	5,989,825	2,799,807	1,630,886	1,168,921	852,400	4.1640	3,549,392	1,250,000	911,524	1.0000	911,524	3,447,385	2,513,898	10,450,741
2077	3,482,157	2,462,665	1,019,492	743,433	8.2886	6,162,017	14,572,953	1,630,886	12,942,067	9,437,601	4.2714	40,311,770	1,250,000	911,524	1.0000	911,524	15,211,559	11,092,558	47,385,311
2078	885,735	2,462,665	(1,576,930)	(1,149,927)	8.6019	(9,891,560)	5,663,185	1,630,886	4,032,299	2,940,429	4.3816	12,883,785	0	0	1.0000	-	2,455,369	1,790,502	2,992,225
	$496,287,928	$91,118,616	$405,169,311	$295,457,160		$630,397,510	$478,652,862	$60,342,765	$418,310,097	$305,039,670		$544,344,527	$55,000,000	$40,107,045		$40,107,045	$878,479,408	$640,603,875	$1,214,849,082
	$1,857,975,502	$443,342,403	$1,414,633,099	$1,031,577,334		$2,713,687,383	$1,696,603,153	$222,246,748	$1,474,356,405	$1,075,128,703		$2,147,113,237	$111,250,000	$81,125,614		$81,125,614	$3,000,239,503	$2,187,831,650	$4,941,926,234

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EXTERNAL FUND CALCULATION

Monticello

External Levelized

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$757,935,327	$14,997,283	$0	$6,696,113	$779,628,722
2021	779,628,722	30,884,962	-	8,507,110	819,020,794
2022	819,020,794	32,311,630	-	2,142,669	853,475,093
2023	853,475,093	33,669,129	-	2,142,669	889,286,891
2024	889,286,891	35,080,114	-	2,142,669	926,509,675
2025	926,509,675	36,546,692	-	2,142,669	965,199,035
2026	965,199,035	38,071,053	-	2,142,669	1,005,412,757
2027	1,005,412,757	39,655,473	-	2,142,669	1,047,210,899
2028	1,047,210,899	41,302,320	-	2,142,669	1,090,655,889
2029	1,090,655,889	43,014,053	-	2,142,669	1,135,812,610
2030	1,135,812,610	44,793,227	-	2,142,669	1,182,748,507
2031	1,182,748,507	46,642,502	-	2,142,669	1,231,533,678
2032	1,231,533,678	48,564,637	-	2,142,669	1,282,240,984
2033	1,282,240,984	50,562,505	-	2,142,669	1,334,946,159
2034	1,334,946,159	52,639,089	-	2,142,669	1,389,727,917
2035	1,389,727,917	54,797,491	-	2,142,669	1,446,668,077
2036	1,446,668,077	57,040,933	-	2,142,669	1,505,851,679
2037	1,505,851,679	59,372,767	-	2,142,669	1,567,367,114
2038	1,567,367,114	61,796,475	-	2,142,669	1,631,306,258
2039	1,631,306,258	64,315,677	-	2,142,669	1,697,764,605
2040	1,697,764,605	51,806,327	(46,107,404)	1,607,002	1,705,070,529
2041	1,705,070,529	52,004,651	(181,367,069)	-	1,575,708,111
2042	1,575,708,111	48,059,097	(306,941,049)	-	1,316,826,160
2043	1,316,826,160	40,163,198	(363,237,291)	-	993,752,067
2044	993,752,067	30,309,438	(350,340,524)	-	673,720,981
2045	673,720,981	20,548,490	(128,900,685)	-	565,368,786
2046	565,368,786	17,243,748	(91,746,597)	-	490,865,937
2047	490,865,937	14,971,411	(86,271,603)	-	419,565,745
2048	419,565,745	12,796,755	(9,024,973)	-	423,337,526
2049	423,337,526	12,911,795	(4,434,315)	-	431,815,006
2050	431,815,006	13,170,358	(15,787,223)	-	429,198,141
2051	429,198,141	13,090,543	(16,280,110)	-	426,008,574
2052	426,008,574	12,993,261	(22,121,654)	-	416,880,181
2053	416,880,181	12,714,846	(26,828,284)	-	402,766,743
2054	402,766,743	12,284,386	(19,256,811)	-	395,794,317
2055	395,794,317	12,071,727	(27,064,248)	-	380,801,796
2056	380,801,796	11,614,455	(30,929,054)	-	361,487,196
2057	361,487,196	11,025,359	(5,692,582)	-	366,819,974
2058	366,819,974	11,188,009	(5,894,061)	-	372,113,922
2059	372,113,922	11,349,475	(6,102,752)	-	377,360,645
2060	377,360,645	11,509,500	(6,388,870)	-	382,481,275
2061	382,481,275	11,665,679	(6,543,014)	-	387,603,940
2062	387,603,940	11,821,920	(6,775,250)	-	392,650,610
2063	392,650,610	11,975,844	(7,015,781)	-	397,610,672
2064	397,610,672	12,127,126	(7,345,156)	-	402,392,642
2065	402,392,642	12,272,976	(7,523,216)	-	407,142,402
2066	407,142,402	12,417,843	(7,790,697)	-	411,769,548
2067	411,769,548	12,558,971	(8,067,919)	-	416,260,600
2068	416,260,600	12,695,948	(8,447,505)	-	420,509,044
2069	420,509,044	12,825,526	(8,652,807)	-	424,681,763
2070	424,681,763	12,952,794	(8,961,281)	-	428,673,275
2071	428,673,275	13,074,535	(9,280,852)	-	432,466,958
2072	432,466,958	13,190,242	(9,718,309)	-	435,938,891
2073	435,938,891	13,296,136	(9,955,363)	-	439,279,664
2074	439,279,664	13,398,030	(10,311,083)	-	442,366,611
2075	442,366,611	13,492,182	(10,679,675)	-	445,179,118
2076	445,179,118	13,577,963	(11,183,871)	-	447,573,210
2077	447,573,210	13,650,983	(11,457,493)	-	449,766,700
2078	449,766,700	13,717,884	(20,097,098)	-	443,387,486
2079	443,387,486	13,523,318	(22,469,810)	-	434,440,994
2080	434,440,994	13,250,450	(21,614,321)	-	426,077,123
2081	426,077,123	12,995,352	(22,197,930)	-	416,874,546
2082	416,874,546	12,714,674	(22,947,195)	-	406,642,025
2083	406,642,025	12,402,582	(25,636,365)	-	393,408,241
2084	393,408,241	11,998,951	(24,686,915)	-	380,720,278
2085	380,720,278	11,611,968	(25,355,029)	-	366,977,218
2086	366,977,218	11,192,805	(26,214,112)	-	351,955,911
2087	351,955,911	10,734,655	(29,263,376)	-	333,427,191
2088	333,427,191	10,169,529	(43,647,693)	-	299,949,027
2089	299,949,027	9,148,445	(28,975,080)	-	280,122,393
2090	280,122,393	8,543,733	(20,493,476)	-	268,172,650
2091	268,172,650	8,179,266	(21,220,120)	-	255,131,796
2092	255,131,796	7,781,520	(22,187,970)	-	240,725,346
2093	240,725,346	7,342,123	(25,346,625)	-	222,720,844
2094	222,720,844	6,792,986	(23,561,329)	-	205,952,500
2095	205,952,500	6,281,551	(24,398,747)	-	187,835,305
2096	187,835,305	5,728,977	(28,357,396)	-	165,206,885
2097	165,206,885	5,038,810	(26,165,564)	-	144,080,132
2098	144,080,132	4,394,444	(27,097,309)	-	121,377,266
2099	121,377,266	3,702,007	(31,180,299)	-	93,898,974
2100	93,898,974	2,863,919	(67,574,951)	-	29,187,941
2101	29,187,941	890,232	(30,078,174)	-	(0)

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Prairie Island Unit 1

External Levelized

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$437,068,622	$8,763,473	$0	$24,632	$445,856,727
2021	445,856,727	18,127,469	-	12,399,703	476,383,899
2022	476,383,899	19,338,001	-	11,721,046	507,442,946
2023	507,442,946	20,583,469	-	11,721,046	539,747,461
2024	539,747,461	21,878,880	-	11,721,046	573,347,387
2025	573,347,387	23,226,237	-	11,721,046	608,294,670
2026	608,294,670	24,627,623	-	11,721,046	644,643,339
2027	644,643,339	26,085,205	-	11,721,046	682,449,590
2028	682,449,590	27,601,236	-	11,721,046	721,771,872
2029	721,771,872	29,178,059	-	11,721,046	762,670,976
2030	762,670,976	30,818,113	-	11,721,046	805,210,136
2031	805,210,136	32,523,933	-	11,721,046	849,455,115
2032	849,455,115	34,298,157	-	11,721,046	895,474,318
2033	895,474,318	25,183,224	(39,900,652)	7,853,101	888,609,991
2034	888,609,991	24,881,080	(122,923,807)	-	790,567,263
2035	790,567,263	22,135,883	(171,342,711)	-	641,360,436
2036	641,360,436	17,958,092	(173,059,018)	-	486,259,510
2037	486,259,510	13,615,266	(137,905,637)	-	361,969,139
2038	361,969,139	10,135,136	(87,396,028)	-	284,708,248
2039	284,708,248	7,971,831	(67,496,004)	-	225,184,074
2040	225,184,074	6,305,154	(44,052,715)	-	187,436,513
2041	187,436,513	5,248,222	(33,973,545)	-	158,711,191
2042	158,711,191	4,443,913	(18,090,185)	-	145,064,919
2043	145,064,919	4,061,818	(3,022,065)	-	146,104,671
2044	146,104,671	4,090,931	(3,121,874)	-	147,073,728
2045	147,073,728	4,118,064	(3,167,122)	-	148,024,671
2046	148,024,671	4,144,691	(3,243,355)	-	148,926,006
2047	148,926,006	4,169,928	(3,322,350)	-	149,773,584
2048	149,773,584	4,193,660	(3,436,509)	-	150,530,735
2049	150,530,735	4,214,861	(3,488,606)	-	151,256,990
2050	151,256,990	4,235,196	(3,576,125)	-	151,916,061
2051	151,916,061	4,253,650	(3,666,644)	-	152,503,066
2052	152,503,066	4,270,086	(3,797,257)	-	152,975,896
2053	152,975,896	4,283,325	(4,641,103)	-	152,618,118
2054	152,618,118	4,273,307	(5,571,842)	-	151,319,583
2055	151,319,583	4,236,948	(5,723,778)	-	149,832,754
2056	149,832,754	4,195,317	(6,350,695)	-	147,677,376
2057	147,677,376	4,134,967	(5,602,493)	-	146,209,850
2058	146,209,850	4,093,876	(7,118,735)	-	143,184,991
2059	143,184,991	4,009,180	(5,917,087)	-	141,277,084
2060	141,277,084	3,955,758	(5,648,874)	-	139,583,968
2061	139,583,968	3,908,351	(6,749,281)	-	136,743,038
2062	136,743,038	3,828,805	(6,941,122)	-	133,630,721
2063	133,630,721	3,741,660	(6,613,311)	-	130,759,070
2064	130,759,070	3,661,254	(7,398,634)	-	127,021,690
2065	127,021,690	3,556,607	(7,556,245)	-	123,022,052
2066	123,022,052	3,444,617	(7,200,314)	-	119,266,355
2067	119,266,355	3,339,458	(8,001,862)	-	114,603,951
2068	114,603,951	3,208,911	(8,298,164)	-	109,514,698
2069	109,514,698	3,066,412	(7,849,815)	-	104,731,295
2070	104,731,295	2,932,476	(8,728,949)	-	98,934,822
2071	98,934,822	2,770,175	(8,988,009)	-	92,716,988
2072	92,716,988	2,596,076	(9,326,712)	-	85,986,351
2073	85,986,351	2,407,618	(9,533,120)	-	78,860,849
2074	78,860,849	2,208,104	(9,819,789)	-	71,249,164
2075	71,249,164	1,994,977	(15,329,709)	-	57,914,432
2076	57,914,432	1,621,604	(10,503,459)	-	49,032,578
2077	49,032,578	1,372,912	(47,439,859)	-	2,965,631
2078	2,965,631	83,038	(3,048,669)	-	0

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Prairie Island Unit 2

External Levelized

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$487,163,479	$9,697,485	$0	$294,670	$497,155,635
2021	497,155,635	19,916,375	-	6,511,608	523,583,618
2022	523,583,618	20,985,054	-	7,358,104	551,926,777
2023	551,926,777	22,113,112	-	7,358,104	581,397,993
2024	581,397,993	23,286,066	-	7,358,104	612,042,164
2025	612,042,164	24,505,704	-	7,358,104	643,905,972
2026	643,905,972	25,773,884	-	7,358,104	677,037,960
2027	677,037,960	27,092,537	-	7,358,104	711,488,602
2028	711,488,602	28,463,673	-	7,358,104	747,310,379
2029	747,310,379	29,889,379	-	7,358,104	784,557,862
2030	784,557,862	31,371,829	-	7,358,104	823,287,796
2031	823,287,796	32,913,281	-	7,358,104	863,559,180
2032	863,559,180	34,516,082	-	7,358,104	905,433,366
2033	905,433,366	36,182,674	-	7,358,104	948,974,145
2034	948,974,145	25,895,155	(16,324,077)	6,107,226	964,652,449
2035	964,652,449	26,238,547	(104,939,464)	-	885,951,532
2036	885,951,532	24,097,882	(170,113,112)	-	739,936,301
2037	739,936,301	20,126,267	(206,964,256)	-	553,098,312
2038	553,098,312	15,044,274	(236,215,176)	-	331,927,410
2039	331,927,410	9,028,426	(77,052,832)	-	263,903,004
2040	263,903,004	7,178,162	(56,360,375)	-	214,720,790
2041	214,720,790	5,840,405	(53,606,976)	-	166,954,219
2042	166,954,219	4,541,155	(24,723,139)	-	146,772,235
2043	146,772,235	3,992,205	(3,004,709)	-	147,759,731
2044	147,759,731	4,019,065	(3,103,932)	-	148,674,864
2045	148,674,864	4,043,956	(3,148,573)	-	149,570,248
2046	149,570,248	4,068,311	(3,224,179)	-	150,414,379
2047	150,414,379	4,091,271	(3,302,525)	-	151,203,125
2048	151,203,125	4,112,725	(3,416,012)	-	151,899,838
2049	151,899,838	4,131,676	(3,467,414)	-	152,564,100
2050	152,564,100	4,149,744	(3,554,213)	-	153,159,630
2051	153,159,630	4,165,942	(3,643,988)	-	153,681,584
2052	153,681,584	4,180,139	(3,773,830)	-	154,087,894
2053	154,087,894	4,191,191	(4,616,878)	-	153,662,206
2054	153,662,206	4,179,612	(5,546,793)	-	152,295,026
2055	152,295,026	4,142,425	(5,697,874)	-	150,739,576
2056	150,739,576	4,100,116	(6,323,907)	-	148,515,785
2057	148,515,785	4,039,629	(5,574,790)	-	146,980,625
2058	146,980,625	3,997,873	(7,090,085)	-	143,888,413
2059	143,888,413	3,913,765	(5,887,457)	-	141,914,721
2060	141,914,721	3,860,080	(5,618,229)	-	140,156,572
2061	140,156,572	3,812,259	(6,717,586)	-	137,251,245
2062	137,251,245	3,733,234	(6,908,339)	-	134,076,139
2063	134,076,139	3,646,871	(6,579,403)	-	131,143,607
2064	131,143,607	3,567,106	(7,363,561)	-	127,347,153
2065	127,347,153	3,463,843	(7,519,966)	-	123,291,030
2066	123,291,030	3,353,516	(7,162,786)	-	119,481,760
2067	119,481,760	3,249,904	(7,963,042)	-	114,768,622
2068	114,768,622	3,121,707	(8,258,005)	-	109,632,324
2069	109,632,324	2,981,999	(7,808,270)	-	104,806,053
2070	104,806,053	2,850,725	(8,685,970)	-	98,970,808
2071	98,970,808	2,692,006	(8,943,545)	-	92,719,269
2072	92,719,269	2,521,964	(9,280,710)	-	85,960,523
2073	85,960,523	2,338,126	(9,485,525)	-	78,813,124
2074	78,813,124	2,143,717	(9,770,545)	-	71,186,296
2075	71,186,296	1,936,267	(15,278,758)	-	57,843,805
2076	57,843,805	1,573,351	(10,450,741)	-	48,966,416
2077	48,966,416	1,331,887	(47,385,311)	-	2,912,991
2078	2,912,991	79,233	(2,992,225)	-	0

Xcel Energy
Nuclear Decommissioning Accrual
100-Year Decommissioning Period
DECON Method

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Proposed

2022 ACCRUAL COMPARISON

	Present	Proposed	Difference
Monticello	$8,507,110	$26,877,367	$18,370,257
Prairie Island Unit 1	12,399,703	29,514,299	17,114,596
Prairie Island Unit 2	6,511,608	23,764,067	17,252,459
TOTAL	$27,418,421	$80,155,734	$52,737,313

Xcel Energy
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2022 MN RETAIL SUMMARY

	Remaining Life (yrs)	Operational Earnings Rate	Post-Shutdown Earnings Rate	Market Value Balance 6/30/2020	Book Value 6/30/2020	Unrealized Gain/Loss 6/30/2020	Tax-Effect Adjustment	Tax-Adjusted Fund Balance 6/30/2020	2022-2024 Decommissioning Accrual
Monticello	19.67	3.96%	3.64%	$814,968,100	$610,109,002	$204,859,098	$57,032,773	$757,935,327	**$ 26,877,367**
Prairie Island Unit 1	13.25	4.02%	3.56%	471,960,960	346,629,286	125,331,674	34,892,338	437,068,622	**29,514,299**
Prairie Island Unit 2	14.42	3.99%	3.54%	526,255,835	385,837,890	140,417,945	39,092,356	487,163,479	**23,764,067**
TOTAL DECOMMISSIONING ACCRUAL				**$1,813,184,895**	**$1,342,576,178**	**$470,608,717**	**$131,017,467**	**$1,682,167,428**	**$80,155,734**

INPUT DATA

Escalation Rate (Labor)	3.78%
Escalation Rate (Non-Labor)	2.58%
Escalation Rate (PIIC)	0.00%
Jurisdictional Factor	72.9219%
Tax Rate for tax-effect adjustment	27.84%

Xcel Energy
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Monticello																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2040	$22,675,886	$0	$22,675,886	$16,535,687	2.1003	$34,729,903	$9,374,135	$0	$9,374,135	$6,835,797	1.6644	$11,377,501	$0	$0	1.0000	$0	$32,050,021	$23,371,484	$46,107,404
2041	77,873,473	-	77,873,473	56,786,816	2.1797	123,778,223	48,081,975	-	48,081,975	35,062,290	1.7073	59,861,847	0	0	1.0000	0	125,955,448	91,849,106	183,640,070
2042	86,878,179	-	86,878,179	63,353,219	2.2620	143,304,981	136,457,474	-	136,457,474	99,507,383	1.7514	174,277,230	0	0	1.0000	0	223,335,652	162,860,601	317,582,210
2043	97,067,842	-	97,067,842	70,783,715	2.3475	166,164,770	156,074,917	-	156,074,917	113,812,795	1.7966	204,476,067	0	0	1.0000	0	253,142,759	184,596,509	370,640,837
2044	97,811,957	-	97,811,957	71,326,337	2.4363	173,772,356	131,387,082	-	131,387,082	95,809,956	1.8429	176,568,169	0	0	1.0000	0	229,199,039	167,136,294	350,340,524
2045	52,997,679	-	52,997,679	38,646,914	2.5284	97,714,858	22,621,563	-	22,621,563	16,496,074	1.8905	31,185,827	0	0	1.0000	0	75,619,242	55,142,988	128,900,685
2046	37,374,011	-	37,374,011	27,253,839	2.6239	71,511,349	18,500,781	-	18,500,781	13,491,121	1.9392	26,161,982	0	0	1.0000	0	55,874,793	40,744,960	97,673,331
2047	32,437,139	-	32,437,139	23,653,778	2.7231	64,411,604	20,006,249	-	20,006,249	14,588,937	1.9893	29,021,772	0	0	1.0000	0	52,443,388	38,242,715	93,433,376
2048	8,502,035	5,823,411	2,678,624	1,953,303	2.8261	5,520,230	4,670,660	1,843,649	2,827,011	2,061,510	2.0406	4,206,717	0	0	1.0000	0	5,505,635	4,014,813	9,726,948
2049	7,761,334	5,823,411	1,937,923	1,413,170	2.9329	4,144,687	2,505,486	1,843,649	661,836	482,624	2.0932	1,010,228	0	0	1.0000	0	2,599,760	1,895,794	5,154,915
2050	9,380,178	5,823,411	3,556,766	2,593,662	3.0438	7,894,587	7,362,016	1,843,649	5,518,367	4,024,098	2.1472	8,640,543	0	0	1.0000	0	9,075,133	6,617,760	16,535,130
2051	9,380,178	5,823,411	3,556,766	2,593,662	3.1588	8,192,859	7,362,016	1,843,649	5,518,367	4,024,098	2.2026	8,863,478	0	0	1.0000	0	9,075,133	6,617,760	17,056,336
2052	9,401,392	5,823,411	3,577,981	2,609,132	3.2782	8,553,256	7,368,732	1,843,649	5,525,083	4,028,996	2.2595	9,103,516	0	0	1.0000	0	9,103,064	6,638,127	17,656,772
2053	9,380,178	5,823,411	3,556,766	2,593,662	3.4021	8,823,896	7,362,016	1,843,649	5,518,367	4,024,098	2.3178	9,327,054	0	0	1.0000	0	9,075,133	6,617,760	18,150,950
2054	9,380,178	5,823,411	3,556,766	2,593,662	3.5307	9,157,441	7,362,016	1,843,649	5,518,367	4,024,098	2.3776	9,567,695	0	0	1.0000	0	9,075,133	6,617,760	18,725,136
2055	9,380,178	5,823,411	3,556,766	2,593,662	3.6642	9,503,695	7,362,016	1,843,649	5,518,367	4,024,098	2.4389	9,814,372	0	0	1.0000	0	9,075,133	6,617,760	19,318,067
2056	9,401,392	5,823,411	3,577,981	2,609,132	3.8027	9,921,746	7,368,732	1,843,649	5,525,083	4,028,996	2.5018	10,079,741	0	0	1.0000	0	9,103,064	6,638,127	20,001,487
2057	9,380,178	5,823,411	3,556,766	2,593,662	3.9464	10,235,626	7,362,016	1,843,649	5,518,367	4,024,098	2.5664	10,327,445	0	0	1.0000	0	9,075,133	6,617,760	20,563,071
2058	16,558,284	5,823,411	10,734,873	7,828,073	4.0956	32,060,656	28,896,334	1,843,649	27,052,685	19,727,332	2.6326	51,934,175	0	0	1.0000	0	37,787,558	27,555,405	83,994,831
2059	9,380,178	5,823,411	3,556,766	2,593,662	4.2504	11,024,100	7,362,016	1,843,649	5,518,367	4,024,098	2.7005	10,867,076	0	0	1.0000	0	9,075,133	6,617,760	21,891,176
2060	9,401,392	5,823,411	3,577,981	2,609,132	4.4111	11,509,141	7,368,732	1,843,649	5,525,083	4,028,996	2.7702	11,161,124	0	0	1.0000	0	9,103,064	6,638,127	22,670,265
2061	9,380,178	5,823,411	3,556,766	2,593,662	4.5778	11,873,264	7,362,016	1,843,649	5,518,367	4,024,098	2.8416	11,434,876	0	0	1.0000	0	9,075,133	6,617,760	23,308,141
2062	9,380,178	5,823,411	3,556,766	2,593,662	4.7509	12,322,227	7,362,016	1,843,649	5,518,367	4,024,098	2.9150	11,730,245	0	0	1.0000	0	9,075,133	6,617,760	24,052,473
2063	12,969,231	5,823,411	7,145,820	5,210,867	4.9305	25,692,182	18,129,175	1,843,649	16,285,526	11,875,715	2.9902	35,510,763	0	0	1.0000	0	23,431,346	17,086,582	61,202,945
2064	9,401,392	5,823,411	3,577,981	2,609,132	5.1168	13,350,406	7,368,732	1,843,649	5,525,083	4,028,996	3.0673	12,358,138	0	0	1.0000	0	9,103,064	6,638,127	25,708,544
2065	9,380,178	5,823,411	3,556,766	2,593,662	5.3103	13,773,122	7,362,016	1,843,649	5,518,367	4,024,098	3.1465	12,661,824	0	0	1.0000	0	9,075,133	6,617,760	26,434,946
2066	10,097,988	5,823,411	4,274,577	3,117,103	5.5110	17,178,354	9,515,448	1,843,649	7,671,799	5,594,421	3.2276	18,056,554	0	0	1.0000	0	11,946,376	8,711,524	35,234,908
2067	9,380,178	5,823,411	3,556,766	2,593,662	5.7193	14,833,929	7,362,016	1,843,649	5,518,367	4,024,098	3.3109	13,323,386	0	0	1.0000	0	9,075,133	6,617,760	28,157,315
2068	19,450,741	5,823,411	13,627,330	9,937,308	5.9355	58,982,890	37,516,778	1,843,649	35,673,129	26,013,524	3.3963	88,349,730	0	0	1.0000	0	49,300,459	35,950,831	147,332,621
2069	9,380,178	5,823,411	3,556,766	2,593,662	6.1598	15,976,437	7,362,016	1,843,649	5,518,367	4,024,098	3.4840	14,019,957	0	0	1.0000	0	9,075,133	6,617,760	29,996,394
2070	9,380,178	5,823,411	3,556,766	2,593,662	6.3927	16,580,501	7,362,016	1,843,649	5,518,367	4,024,098	3.5738	14,381,321	0	0	1.0000	0	9,075,133	6,617,760	30,961,822
2071	9,380,178	5,823,411	3,556,766	2,593,662	6.6343	17,207,130	7,362,016	1,843,649	5,518,367	4,024,098	3.6660	14,752,343	0	0	1.0000	0	9,075,133	6,617,760	31,959,473
2072	9,401,392	5,823,411	3,577,981	2,609,132	6.8851	17,964,133	7,368,732	1,843,649	5,525,083	4,028,996	3.7606	15,151,441	0	0	1.0000	0	9,103,064	6,638,127	33,115,575
2073	9,380,178	5,823,411	3,556,766	2,593,662	7.1454	18,532,750	7,362,016	1,843,649	5,518,367	4,024,098	3.8576	15,523,360	0	0	1.0000	0	9,075,133	6,617,760	34,056,110
2074	9,380,178	5,823,411	3,556,766	2,593,662	7.4155	19,233,298	7,362,016	1,843,649	5,518,367	4,024,098	3.9572	15,924,160	0	0	1.0000	0	9,075,133	6,617,760	35,157,458
2075	9,380,178	5,823,411	3,556,766	2,593,662	7.6958	19,960,302	7,362,016	1,843,649	5,518,367	4,024,098	4.0593	16,335,020	0	0	1.0000	0	9,075,133	6,617,760	36,295,322
2076	9,401,392	5,823,411	3,577,981	2,609,132	7.9867	20,838,353	7,368,732	1,843,649	5,525,083	4,028,996	4.1640	16,776,738	0	0	1.0000	0	9,103,064	6,638,127	37,615,091
2077	9,380,178	5,823,411	3,556,766	2,593,662	8.2886	21,497,824	7,362,016	1,843,649	5,518,367	4,024,098	4.2714	17,188,532	0	0	1.0000	0	9,075,133	6,617,760	38,686,356
2078	9,380,178	5,823,411	3,556,766	2,593,662	8.6019	22,310,418	7,362,016	1,843,649	5,518,367	4,024,098	4.3816	17,631,987	0	0	1.0000	0	9,075,133	6,617,760	39,942,406
2079	9,380,178	5,823,411	3,556,766	2,593,662	8.9270	23,153,618	7,362,016	1,843,649	5,518,367	4,024,098	4.4947	18,087,113	0	0	1.0000	0	9,075,133	6,617,760	41,240,731
2080	12,990,445	5,823,411	7,167,034	5,226,338	9.2645	48,419,404	18,135,892	1,843,649	16,292,243	11,880,613	4.6106	54,776,753	0	0	1.0000	0	23,459,277	17,106,950	103,196,157
2081	9,380,178	5,823,411	3,556,766	2,593,662	9.6147	24,937,279	7,362,016	1,843,649	5,518,367	4,024,098	4.7296	19,032,373	0	0	1.0000	0	9,075,133	6,617,760	43,969,652
2082	9,380,178	5,823,411	3,556,766	2,593,662	9.9781	25,879,816	7,362,016	1,843,649	5,518,367	4,024,098	4.8516	19,523,313	0	0	1.0000	0	9,075,133	6,617,760	45,403,129
2083	9,380,178	5,823,411	3,556,766	2,593,662	10.3553	26,858,145	7,362,016	1,843,649	5,518,367	4,024,098	4.9768	20,027,130	0	0	1.0000	0	9,075,133	6,617,760	46,885,275
2084	9,401,392	5,823,411	3,577,981	2,609,132	10.7467	28,039,557	7,368,732	1,843,649	5,525,083	4,028,996	5.1052	20,568,829	0	0	1.0000	0	9,103,064	6,638,127	48,608,386
2085	12,969,231	5,823,411	7,145,820	5,210,867	11.1529	58,116,283	18,129,175	1,843,649	16,285,526	11,875,715	5.2369	62,191,932	0	0	1.0000	0	23,431,346	17,086,582	120,308,215
2086	9,380,178	5,823,411	3,556,766	2,593,662	11.5745	30,020,337	7,362,016	1,843,649	5,518,367	4,024,098	5.3720	21,617,454	0	0	1.0000	0	9,075,133	6,617,760	51,637,791
2087	11,533,610	5,823,411	5,710,198	4,163,985	12.0120	50,017,789	13,822,311	1,843,649	11,978,662	8,735,068	5.5106	48,135,466	0	0	1.0000	0	17,688,861	12,899,053	98,153,256
2088	10,120,878	5,823,411	4,297,467	3,133,795	12.4661	39,066,197	9,527,190	1,843,649	7,683,541	5,602,984	5.6528	31,672,549	0	0	1.0000	0	11,981,008	8,736,779	70,738,746
2089	9,380,178	5,823,411	3,556,766	2,593,662	12.9373	33,554,979	7,362,016	1,843,649	5,518,367	4,024,098	5.7986	23,334,134	0	0	1.0000	0	9,075,133	6,617,760	56,889,113
2090	9,380,178	5,823,411	3,556,766	2,593,662	13.4263	34,823,280	7,362,016	1,843,649	5,518,367	4,024,098	5.9482	23,936,139	0	0	1.0000	0	9,075,133	6,617,760	58,759,419
2091	9,380,178	5,823,411	3,556,766	2,593,662	13.9338	36,139,563	7,362,016	1,843,649	5,518,367	4,024,098	6.1017	24,553,838	0	0	1.0000	0	9,075,133	6,617,760	60,693,401
2092	10,121,292	5,823,411	4,297,881	3,134,097	14.4605	45,320,604	9,528,432	1,843,649	7,684,783	5,603,890	6.2591	35,075,307	0	0	1.0000	0	11,982,664	8,737,987	80,395,911
2093	10,640,003	5,823,411	4,816,591	3,512,350	15.0071	52,710,188	11,141,491	1,843,649	9,297,842	6,780,163	6.4206	43,532,714	0	0	1.0000	0	14,114,433	10,292,513	96,242,901
2094	34,683,524	5,823,411	28,860,113	21,045,343	15.5744	327,768,588	83,272,056	1,843,649	81,428,407	59,379,141	6.5863	391,088,839	0	0	1.0000	0	110,288,520	80,424,484	718,857,426
2095	10,460,028	5,823,411	4,636,616	3,381,109	16.1631	54,649,200	10,601,566	1,843,649	8,757,917	6,386,439	6.7562	43,148,061	0	0	1.0000	0	13,394,533	9,767,548	97,797,261
2096	10,841,192	5,823,411	5,017,781	3,659,061	16.7741	61,377,461	11,688,132	1,843,649	9,844,483	7,178,784	6.9305	49,752,564	0	0	1.0000	0	14,862,264	10,837,846	111,130,025
2097	7,743,347	5,823,411	1,919,936	1,400,054	17.4081	24,372,276	2,451,524	1,843,649	607,875	443,274	7.1093	3,151,368	0	0	1.0000	0	2,527,811	1,843,328	27,523,643
2098	7,743,347	5,823,411	1,919,936	1,400,054	18.0662	25,293,651	2,451,524	1,843,649	607,875	443,274	7.2927	3,232,664	0	0	1.0000	0	2,527,811	1,843,328	28,526,315
2099	7,743,347	5,823,411	1,919,936	1,400,054	18.7491	26,249,748	2,451,524	1,843,649	607,875	443,274	7.4809	3,316,089	0	0	1.0000	0	2,527,811	1,843,328	29,565,836
2100	7,743,347	5,823,411	1,919,936	1,400,054	19.4578	27,241,966	2,451,524	1,843,649	607,875	443,274	7.6739	3,401,640	0	0	1.0000	0	2,527,811	1,843,328	30,643,606
2101	7,743,347	5,823,411	1,919,936	1,400,054	20.1933	28,271,705	2,451,524	1,843,649	607,875	443,274	7.8719	3,489,409	0	0	1.0000	0	2,527,811	1,843,328	31,761,114
2102	7,743,347	5,823,411	1,919,936	1,400,054	20.9566	29,340,366	2,451,524	1,843,649	607,875	443,274	8.0750	3,579,438	0	0	1.0000	0	2,527,811	1,843,328	32,919,804
2103	7,743,347	5,823,411	1,919,936	1,400,054	21.7488	30,449,489	2,451,524	1,843,649	607,875	443,274	8.2833	3,671,772	0	0	1.0000	0	2,527,811	1,843,328	34,121,260
2104	7,764,562	5,823,411	1,941,151	1,415,524	22.5709	31,949,648	2,458,241	1,843,649	614,592	448,172	8.4970	3,808,116	0	0	1.0000	0	2,555,742	1,863,696	35,757,764
2105	7,743,347	5,823,411	1,919,936	1,400,054	23.4240	32,794,859	2,451,524	1,843,649	607,875	443,274	8.7162	3,863,665	0	0	1.0000	0	2,527,811	1,843,328	36,658,524
2106	7,743,347	5,823,411	1,919,936	1,400,054	24.3095	34,034,606	2,451,524	1,843,649	607,875	443,274	8.9411	3,963,357	0	0	1.0000	0	2,527,811	1,843,328	37,997,964
2107	7,743,347	5,823,411	1,919,936	1,400,054	25.2284	35,321,116	2,451,524	1,843,649	607,875	443,274	9.1718	4,065,621	0	0	1.0000	0	2,527,811	1,843,328	39,386,736
2108	14,942,668	5,823,411	9,119,257	6,649,935	26.1820	174,108,606	23,992,559	1,843,649	22,148,910	16,151,406	9.4084	151,958,889	0	0	1.0000	0	31,268,167	22,801,341	326,067,495
2109	7,743,347	5,823,411	1,919,936	1,400,054	27.1717	38,041,840	2,451,524	1,843,649	607,875	443,274	9.6512	4,278,126	0	0	1.0000	0	2,527,811	1,843,328	42,319,966

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	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2110	7,743,347	5,823,411	1,919,936	1,400,054	28.1988	39,479,835	2,451,524	1,843,649	607,875	443,274	9.9002	4,388,501	0	0	1.0000	0	2,527,811	1,843,328	43,868,337
2111	7,743,347	5,823,411	1,919,936	1,400,054	29.2647	40,972,153	2,451,524	1,843,649	607,875	443,274	10.1556	4,501,714	0	0	1.0000	0	2,527,811	1,843,328	45,473,866
2112	7,764,562	5,823,411	1,941,151	1,415,524	30.3709	42,990,734	2,458,241	1,843,649	614,592	448,172	10.4176	4,668,875	0	0	1.0000	0	2,555,742	1,863,696	47,659,608
2113	11,332,400	5,823,411	5,508,989	4,017,259	31.5189	126,619,599	13,218,683	1,843,649	11,375,034	8,294,891	10.6864	88,642,525	0	0	1.0000	0	16,884,023	12,312,151	215,262,124
2114	7,743,347	5,823,411	1,919,936	1,400,054	32.7103	45,796,178	2,451,524	1,843,649	607,875	443,274	10.9621	4,859,214	0	0	1.0000	0	2,527,811	1,843,328	50,655,392
2115	7,743,347	5,823,411	1,919,936	1,400,054	33.9468	47,527,344	2,451,524	1,843,649	607,875	443,274	11.2449	4,984,572	0	0	1.0000	0	2,527,811	1,843,328	52,511,916
2116	8,482,372	5,823,411	2,658,961	1,938,965	35.2299	68,309,543	4,611,672	1,843,649	2,768,023	2,018,495	11.5350	23,283,343	0	0	1.0000	0	5,426,985	3,957,460	91,592,886
2117	7,743,347	5,823,411	1,919,936	1,400,054	36.5616	51,188,205	2,451,524	1,843,649	607,875	443,274	11.8326	5,245,084	0	0	1.0000	0	2,527,811	1,843,328	56,433,289
2118	18,311,633	5,823,411	12,488,222	9,106,649	37.9437	345,539,951	34,156,383	1,843,649	32,312,734	23,563,059	12.1379	286,006,057	0	0	1.0000	0	44,800,956	32,669,708	631,546,007
2119	8,366,072	5,823,411	2,542,661	1,854,157	39.3779	73,012,795	4,319,699	1,843,649	2,476,050	1,805,583	12.4511	22,481,491	0	0	1.0000	0	5,018,711	3,659,739	95,494,286
2120	8,283,499	5,823,411	2,460,088	1,793,943	40.8664	73,311,990	4,015,053	1,843,649	2,171,404	1,583,429	12.7723	20,224,031	0	0	1.0000	0	4,631,492	3,377,372	93,536,021
2121	8,262,285	5,823,411	2,438,873	1,778,473	42.4112	75,427,167	4,008,337	1,843,649	2,164,688	1,578,531	13.1018	20,681,601	0	0	1.0000	0	4,603,561	3,357,004	96,108,768
2122	8,262,285	5,823,411	2,438,873	1,778,473	44.0143	78,278,236	4,008,337	1,843,649	2,164,688	1,578,531	13.4399	21,215,302	0	0	1.0000	0	4,603,561	3,357,004	99,493,539
2123	8,366,072	5,823,411	2,542,661	1,854,157	45.6781	84,694,353	4,319,699	1,843,649	2,476,050	1,805,583	13.7866	24,892,847	0	0	1.0000	0	5,018,711	3,659,739	109,587,199
2124	8,283,499	5,823,411	2,460,088	1,793,943	47.4047	85,041,327	4,015,053	1,843,649	2,171,404	1,583,429	14.1423	22,393,329	0	0	1.0000	0	4,631,492	3,377,372	107,434,656
2125	8,262,285	5,823,411	2,438,873	1,778,473	49.1966	87,494,816	4,008,337	1,843,649	2,164,688	1,578,531	14.5072	22,900,069	0	0	1.0000	0	4,603,561	3,357,004	110,394,885
2126	8,262,285	5,823,411	2,438,873	1,778,473	51.0562	90,802,064	4,008,337	1,843,649	2,164,688	1,578,531	14.8815	23,490,913	0	0	1.0000	0	4,603,561	3,357,004	114,292,977
2127	8,366,072	5,823,411	2,542,661	1,854,157	52.9861	98,244,529	4,319,699	1,843,649	2,476,050	1,805,583	15.2654	27,562,942	0	0	1.0000	0	5,018,711	3,659,739	125,807,472
2128	9,002,985	5,823,411	3,179,574	2,318,606	54.9890	127,497,814	6,173,511	1,843,649	4,329,862	3,157,418	15.6593	49,442,949	0	0	1.0000	0	7,509,436	5,476,023	176,940,763
2129	8,262,285	5,823,411	2,438,873	1,778,473	57.0676	101,493,176	4,008,337	1,843,649	2,164,688	1,578,531	16.0633	25,356,421	0	0	1.0000	0	4,603,561	3,357,004	126,849,597
2130	11,436,188	5,823,411	5,612,777	4,092,943	59.2248	242,403,746	13,530,046	1,843,649	11,686,397	8,521,943	16.4777	140,422,013	0	0	1.0000	0	17,299,173	12,614,886	382,825,760
2131	7,847,135	5,823,411	2,023,723	1,475,738	61.4635	90,703,995	2,762,887	1,843,649	919,238	670,325	16.9028	11,330,377	0	0	1.0000	0	2,942,961	2,146,063	102,034,373
2132	7,868,349	5,823,411	2,044,938	1,491,208	63.7868	95,119,366	2,769,603	1,843,649	925,954	675,223	17.3389	11,707,629	0	0	1.0000	0	2,970,892	2,166,431	106,826,995
2133	7,950,922	5,823,411	2,127,511	1,551,421	66.1979	102,700,837	3,074,249	1,843,649	1,230,600	897,377	17.7863	15,961,015	0	0	1.0000	0	3,358,111	2,448,798	118,661,852
2134	7,847,135	5,823,411	2,023,723	1,475,738	68.7002	101,383,465	2,762,887	1,843,649	919,238	670,325	18.2451	12,230,155	0	0	1.0000	0	2,942,961	2,146,063	113,613,620
2135	11,436,188	5,823,411	5,612,777	4,092,943	71.2971	291,814,985	13,530,046	1,843,649	11,686,397	8,521,943	18.7159	159,495,825	0	0	1.0000	0	17,299,173	12,614,886	451,310,811
2136	7,972,137	5,823,411	2,148,726	1,566,892	73.9921	115,937,593	3,080,966	1,843,649	1,237,317	902,275	19.1987	17,322,502	0	0	1.0000	0	3,386,042	2,469,166	133,260,094
2137	10,000,566	5,823,411	4,177,155	3,046,061	76.7890	233,903,977	9,223,182	1,843,649	7,379,533	5,381,296	19.6941	105,979,776	0	0	1.0000	0	11,556,688	8,427,357	339,883,753
2138	7,847,135	5,823,411	2,023,723	1,475,738	79.6916	117,603,887	2,762,887	1,843,649	919,238	670,325	20.2022	13,542,049	0	0	1.0000	0	2,942,961	2,146,063	131,145,936
2139	7,950,922	5,823,411	2,127,511	1,551,421	82.7040	128,308,753	3,074,249	1,843,649	1,230,600	897,377	20.7234	18,596,701	0	0	1.0000	0	3,358,111	2,448,798	146,905,454
2140	7,919,655	5,823,411	2,096,244	1,528,621	85.8302	131,201,850	9,388,936	1,843,649	7,545,286	5,502,166	21.2580	116,965,050	0	0	1.0000	0	9,641,531	7,030,787	248,166,900
2141	2,074,007	5,823,411	(3,749,404)	(2,734,137)	89.0745	(243,541,875)	5,654,893	1,843,649	3,811,244	2,779,231	21.8065	60,605,306	0	0	1.0000	0	61,839	45,094	(182,936,569)
	$1,406,512,241	$547,400,656	$859,111,585	$626,480,491		$6,099,622,038	$1,318,879,244	$173,303,012	$1,145,576,232	$835,375,954		$3,766,158,773	$0	$0		$0	$2,004,687,817	$1,461,856,445	$9,865,780,811

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	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 1																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2033	$23,781,621	$0	$23,781,621	$17,342,010	1.6199	$28,092,322	$10,730,367	$0	$10,730,367	$7,824,788	1.3926	$10,896,799	$1,250,000	$911,524	1.0000	$911,524	$35,761,989	$26,078,322	$39,900,645
2034	67,414,165	-	67,414,165	49,159,690	1.6811	82,642,355	37,794,291	-	37,794,291	27,560,315	1.4285	39,369,910	1,250,000	911,524	1.0000	911,524	106,458,456	77,631,529	122,923,789
2035	68,590,728	-	68,590,728	50,017,662	1.7446	87,260,813	77,836,645	-	77,836,645	56,759,960	1.4653	83,170,370	1,250,000	911,524	1.0000	911,524	147,677,372	107,689,146	171,342,706
2036	64,616,422	-	64,616,422	47,119,523	1.8106	85,314,608	81,274,975	-	81,274,975	59,267,256	1.5032	89,090,539	1,250,000	911,524	1.0000	911,524	147,141,397	107,298,302	175,316,670
2037	46,367,050	-	46,367,050	33,811,734	1.8790	63,532,248	68,950,805	-	68,950,805	50,280,237	1.5419	77,527,098	1,250,000	911,524	1.0000	911,524	116,567,855	85,003,495	141,970,869
2038	26,102,517	-	26,102,517	19,034,451	1.9501	37,119,083	44,888,187	-	44,888,187	32,733,319	1.5817	51,774,290	1,250,000	911,524	1.0000	911,524	72,240,703	52,679,293	89,804,897
2039	33,734,614	-	33,734,614	24,599,921	2.0238	49,785,321	14,198,586	-	14,198,586	10,353,879	1.6225	16,799,168	1,250,000	911,524	1.0000	911,524	49,183,200	35,865,324	67,496,013
2040	20,721,562	-	20,721,562	15,110,557	2.1003	31,736,703	9,470,370	-	9,470,370	6,905,974	1.6644	11,494,303	1,250,000	911,524	1.0000	911,524	31,441,932	22,928,054	44,142,529
2041	15,615,259	2,964,152	12,651,106	9,225,427	2.1797	20,108,663	11,497,230	1,606,902	9,890,328	7,212,215	1.7073	12,313,415	1,250,000	911,524	1.0000	911,524	23,791,434	17,349,166	33,333,602
2042	9,448,219	2,964,152	6,484,066	4,728,304	2.2620	10,695,424	6,550,324	1,606,902	4,943,422	3,604,837	1.7514	6,313,512	1,250,000	911,524	1.0000	911,524	12,677,488	9,244,665	17,920,460
2043	3,952,203	2,964,152	988,051	720,506	2.3475	1,691,387	2,141,682	1,606,902	534,779	389,971	1.7966	700,622	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	3,303,533
2044	3,963,031	2,964,152	998,879	728,402	2.4363	1,774,605	2,150,974	1,606,902	544,072	396,747	1.8429	731,166	1,250,000	911,524	1.0000	911,524	2,792,951	2,036,673	3,417,294
2045	5,466,341	2,964,152	2,502,189	1,824,644	2.5284	4,613,429	6,684,095	1,606,902	5,077,193	3,702,386	1.8905	6,999,360	1,250,000	911,524	1.0000	911,524	8,829,382	6,438,553	12,524,313
2046	4,961,629	2,964,152	1,997,476	1,456,598	2.6239	3,821,967	5,169,957	1,606,902	3,563,055	2,598,247	1.9392	5,038,521	1,250,000	911,524	1.0000	911,524	6,810,531	4,966,369	9,772,012
2047	4,961,629	2,964,152	1,997,476	1,456,598	2.7231	3,966,461	5,169,957	1,606,902	3,563,055	2,598,247	1.9893	5,168,694	1,250,000	911,524	1.0000	911,524	6,810,531	4,966,369	10,046,679
2048	3,963,031	2,964,152	998,879	728,402	2.8261	2,058,536	2,150,974	1,606,902	544,072	396,747	2.0406	809,603	1,250,000	911,524	1.0000	911,524	2,792,951	2,036,673	3,779,662
2049	4,961,629	2,964,152	1,997,476	1,456,598	2.9329	4,272,055	5,169,957	1,606,902	3,563,055	2,598,247	2.0932	5,438,652	1,250,000	911,524	1.0000	911,524	6,810,531	4,966,369	10,622,231
2050	5,466,341	2,964,152	2,502,189	1,824,644	3.0438	5,553,851	6,684,095	1,606,902	5,077,193	3,702,386	2.1472	7,949,762	1,250,000	911,524	1.0000	911,524	8,829,382	6,438,553	14,415,137
2051	5,411,566	2,964,152	2,447,414	1,784,701	3.1588	5,637,512	6,519,770	1,606,902	4,912,868	3,582,556	2.2026	7,890,939	1,250,000	911,524	1.0000	911,524	8,610,281	6,278,781	14,439,975
2052	5,477,169	2,964,152	2,513,017	1,832,540	3.2782	6,007,432	6,693,388	1,606,902	5,086,485	3,709,162	2.2595	8,380,851	1,250,000	911,524	1.0000	911,524	8,849,502	6,453,225	15,299,806
2053	3,952,203	2,964,152	988,051	720,506	3.4021	2,451,232	2,141,682	1,606,902	534,779	389,971	2.3178	903,875	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	4,266,631
2054	3,952,203	2,964,152	988,051	720,506	3.5307	2,543,889	2,141,682	1,606,902	534,779	389,971	2.3776	927,195	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	4,382,608
2055	5,466,341	2,964,152	2,502,189	1,824,644	3.6642	6,685,860	6,684,095	1,606,902	5,077,193	3,702,386	2.4389	9,029,748	1,250,000	911,524	1.0000	911,524	8,829,382	6,438,553	16,627,132
2056	4,972,457	2,964,152	2,008,304	1,464,494	3.8027	5,569,030	5,179,250	1,606,902	3,572,347	2,605,024	2.5018	6,517,248	1,250,000	911,524	1.0000	911,524	6,830,652	4,981,041	12,997,802
2057	4,961,629	2,964,152	1,997,476	1,456,598	3.9464	5,748,317	5,169,957	1,606,902	3,563,055	2,598,247	2.5664	6,668,142	1,250,000	911,524	1.0000	911,524	6,810,531	4,966,369	13,327,983
2058	3,952,203	2,964,152	988,051	720,506	4.0956	2,950,903	2,141,682	1,606,902	534,779	389,971	2.6326	1,026,638	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	4,889,065
2059	4,906,854	2,964,152	1,942,701	1,416,655	4.2504	6,021,349	5,005,632	1,606,902	3,398,730	2,478,418	2.7005	6,692,968	1,250,000	911,524	1.0000	911,524	6,591,431	4,806,597	13,625,841
2060	4,972,457	2,964,152	2,008,304	1,464,494	4.4111	6,460,028	5,179,250	1,606,902	3,572,347	2,605,024	2.7702	7,216,436	1,250,000	911,524	1.0000	911,524	6,830,652	4,981,041	14,587,988
2061	4,961,629	2,964,152	1,997,476	1,456,598	4.5778	6,668,013	5,169,957	1,606,902	3,563,055	2,598,247	2.8416	7,383,180	1,250,000	911,524	1.0000	911,524	6,810,531	4,966,369	14,962,717
2062	3,952,203	2,964,152	988,051	720,506	4.7509	3,423,050	2,141,682	1,606,902	534,779	389,971	2.9150	1,136,766	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	5,471,340
2063	6,980,479	2,964,152	4,016,327	2,928,782	4.9305	14,440,359	11,226,509	1,606,902	9,619,607	7,014,800	2.9902	20,975,655	1,250,000	911,524	1.0000	911,524	14,885,934	10,855,106	36,327,538
2064	5,927,107	2,964,152	2,962,954	2,160,643	5.1168	11,055,576	8,043,200	1,606,902	6,436,298	4,693,471	3.0673	14,396,282	1,250,000	911,524	1.0000	911,524	10,649,252	7,765,637	26,363,383
2065	4,961,629	2,964,152	1,997,476	1,456,598	5.3103	7,734,971	5,169,957	1,606,902	3,563,055	2,598,247	3.1465	8,175,386	1,250,000	911,524	1.0000	911,524	6,810,531	4,966,369	16,821,880
2066	3,952,203	2,964,152	988,051	720,506	5.5110	3,970,706	2,141,682	1,606,902	534,779	389,971	3.2276	1,258,671	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	6,140,901
2067	3,952,203	2,964,152	988,051	720,506	5.7193	4,120,788	2,141,682	1,606,902	534,779	389,971	3.3109	1,291,156	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	6,323,467
2068	5,981,882	2,964,152	3,017,730	2,200,586	5.9355	13,061,577	8,207,526	1,606,902	6,600,623	4,813,300	3.3963	16,347,410	1,250,000	911,524	1.0000	911,524	10,868,353	7,925,409	30,320,511
2069	5,466,341	2,964,152	2,502,189	1,824,644	6.1598	11,239,440	6,684,095	1,606,902	5,077,193	3,702,386	3.4840	12,899,111	1,250,000	911,524	1.0000	911,524	8,829,382	6,438,553	25,050,076
2070	3,952,203	2,964,152	988,051	720,506	6.3927	4,605,976	2,141,682	1,606,902	534,779	389,971	3.5738	1,393,679	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	6,911,179
2071	3,952,203	2,964,152	988,051	720,506	6.6343	4,780,050	2,141,682	1,606,902	534,779	389,971	3.6660	1,429,634	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	7,121,208
2072	6,431,819	2,964,152	3,467,667	2,528,689	6.8851	17,410,275	9,557,338	1,606,902	7,950,436	5,797,609	3.7606	21,802,488	1,250,000	911,524	1.0000	911,524	12,668,103	9,237,821	40,124,286
2073	3,952,203	2,964,152	988,051	720,506	7.1454	5,148,301	2,141,682	1,606,902	534,779	389,971	3.8576	1,504,353	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	7,564,177
2074	3,952,203	2,964,152	988,051	720,506	7.4155	5,342,909	2,141,682	1,606,902	534,779	389,971	3.9572	1,543,194	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	7,797,627
2075	6,835,510	2,964,152	3,871,357	2,823,067	7.6958	21,725,761	10,791,600	1,606,902	9,184,698	6,697,656	4.0593	27,187,796	1,250,000	911,524	1.0000	911,524	14,306,055	10,432,247	49,825,080
2076	3,963,031	2,964,152	998,879	728,402	7.9867	5,817,525	2,150,974	1,606,902	544,072	396,747	4.1640	1,652,056	1,250,000	911,524	1.0000	911,524	2,792,951	2,036,673	8,381,104
2077	3,952,203	2,964,152	988,051	720,506	8.2886	5,971,983	2,141,682	1,606,902	534,779	389,971	4.2714	1,665,723	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	8,549,229
2078	6,475,767	2,964,152	3,511,614	2,560,736	8.6019	22,027,194	9,712,371	1,606,902	8,105,469	5,910,662	4.3816	25,898,156	1,250,000	911,524	1.0000	911,524	12,867,083	9,382,921	48,836,873
2079	3,952,203	2,964,152	988,051	720,506	8.9270	6,431,953	2,141,682	1,606,902	534,779	389,971	4.4947	1,752,803	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	9,096,281
2080	3,963,031	2,964,152	998,879	728,402	9.2645	6,748,276	2,150,974	1,606,902	544,072	396,747	4.6106	1,829,243	1,250,000	911,524	1.0000	911,524	2,792,951	2,036,673	9,489,043
2081	3,952,203	2,964,152	988,051	720,506	9.6147	6,927,445	2,141,682	1,606,902	534,779	389,971	4.7296	1,844,408	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	9,683,377
2082	6,366,216	2,964,152	3,402,064	2,480,850	9.9781	24,754,166	9,383,720	1,606,902	7,776,818	5,671,003	4.8516	27,513,440	1,250,000	911,524	1.0000	911,524	12,428,882	9,063,377	53,179,130
2083	3,952,203	2,964,152	988,051	720,506	10.3553	7,461,052	2,141,682	1,606,902	534,779	389,971	4.9768	1,940,809	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	10,313,384
2084	3,963,031	2,964,152	998,879	728,402	10.7467	7,827,913	2,150,974	1,606,902	544,072	396,747	5.1052	2,025,474	1,250,000	911,524	1.0000	911,524	2,792,951	2,036,673	10,764,911
2085	3,952,203	2,964,152	988,051	720,506	11.1529	8,035,727	2,141,682	1,606,902	534,779	389,971	5.2369	2,042,240	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	10,989,491
2086	3,952,203	2,964,152	988,051	720,506	11.5745	8,339,492	2,141,682	1,606,902	534,779	389,971	5.3720	2,094,925	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	11,345,941
2087	3,952,203	2,964,152	988,051	720,506	12.0120	8,654,713	2,141,682	1,606,902	534,779	389,971	5.5106	2,148,975	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	11,715,212
2088	19,159,622	2,964,152	16,195,469	11,810,044	12.4661	147,225,187	51,280,067	1,606,902	49,673,165	36,222,616	5.6528	204,759,202	1,250,000	911,524	1.0000	911,524	67,118,634	48,944,183	352,895,913
2089	3,952,203	2,964,152	988,051	720,506	12.9373	9,321,397	2,141,682	1,606,902	534,779	389,971	5.7986	2,261,287	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	12,494,208
2090	3,952,203	2,964,152	988,051	720,506	13.4263	9,673,724	2,141,682	1,606,902	534,779	389,971	5.9482	2,319,627	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	12,904,875
2091	3,952,203	2,964,152	988,051	720,506	13.9338	10,039,381	2,141,682	1,606,902	534,779	389,971	6.1017	2,379,487	1,250,000	911,524	1.0000	911,524	2,772,830	2,022,001	13,330,392
2092	3,963,031	2,964,152	998,879	728,402	14.4605	10,533,051	2,150,974	1,606,902	544,072	396,747	6.2591	2,483,281	1,250,000	911,524	1.0000	911,524	2,792,951	2,036,673	13,927,855
2093	4,055,991	2,964,152	1,091,839	796,189	15.0071	11,948,494	2,453,044	1,606,902	846,142	617,023	6.4206	3,961,656	1,250,000	911,524	1.0000	911,524	3,187,980	2,324,736	16,821,673
2094	4,211,672	2,964,152	1,247,520	909,715	15.5744	14,168,267	2,920,088	1,606,902	1,313,185	957,600	6.5863	6,307,040	1,250,000	911,524	1.0000	911,524	3,810,705	2,778,839	21,386,831
2095	5,730,397	2,964,152	2,766,244	2,017,198	16.1631	32,604,173	7,476,262	1,606,902	5,869,360	4,280,048	6.7562	28,916,864	1,250,000	911,524	1.0000	911,524	9,885,604	7,208,770	62,432,561
2096	5,286,877	2,964,152	2,322,725	1,693,775	16.7741	28,411,550	6,122,511	1,606,902	4,515,608	3,292,867	6.9305	22,821,218	1,250,000	911,524	1.0000	911,524	8,088,333	5,898,166	52,144,291
2097	5,120,368	2,964,152	2,156,215	1,572,353	17.4081	27,371,683	5,646,175	1,606,902	4,039,272	2,945,514	7.1093	20,940,544	1,250,000	911,524	1.0000	911,524	7,445,488	5,429,391	49,223,750
2098	4,315,460	2,964,152	1,351,307	985,399	18.0662	17,802,415	3,231,450	1,606,902	1,624,548	1,184,651	7.2927	8,639,306	1,250,000	911,524	1.0000	911,524	4,225,855	3,081,574	27,353,245
2099	5,120,368	2,964,152	2,156,215	1,572,353	18.7491	29,480,208	5,646,175	1,606,902	4,039,272	2,945,514	7.4809	22,035,097	1,250,000	911,524	1.0000	911,524	7,445,488	5,429,391	52,426,829
2100	5,574,716	2,964,152	2,610,563	1,903,672	19.4578	37,041,275	7,009,218	1,606,902	5,402,316	3,939,471	7.6739	30,231,109	1,250,000	911,524	1.0000	911,524	9,262,879	6,754,667	68,183,908
2101	5,730,397	2,964,152	2,766,244	2,017,198	20.1933	40,733,885	7,476,262	1,606,902	5,869,360	4,280,048	7.8719	33,692,114	1,250,000	911,524	1.0000	911,524	9,885,604	7,208,770	75,337,522
2102	5,730,397	2,964,152	2,766,244	2,017,198	20.9566	42,273,612	7,476,262	1,606,902	5,869,360	4,280,048	8.0750	34,561,392	1,250,000	911,524	1.0000	911,524	9,885,604	7,208,770	77,746,527

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	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2103	4,107,885	2,964,152	1,143,732	834,031	21.7488	18,139,180	2,608,725	1,606,902	1,001,823	730,548	8.2833	6,051,351	1,250,000	911,524	1.0000	911,524	3,395,555	2,476,103	25,102,055
2104	4,170,606	2,964,152	1,206,454	879,769	22.5709	19,857,182	2,773,699	1,606,902	1,166,797	850,850	8.4970	7,229,674	1,250,000	911,524	1.0000	911,524	3,623,251	2,642,143	27,998,380
2105	5,678,503	2,964,152	2,714,351	1,979,356	23.4240	46,364,438	7,320,581	1,606,902	5,713,678	4,166,523	8.7162	36,316,246	1,250,000	911,524	1.0000	911,524	9,678,029	7,057,403	83,592,207
2106	5,120,368	2,964,152	2,156,215	1,572,353	24.3095	38,223,121	5,646,175	1,606,902	4,039,272	2,945,514	8.9411	26,336,136	1,250,000	911,524	1.0000	911,524	7,445,488	5,429,391	65,470,781
2107	5,172,262	2,964,152	2,208,109	1,610,195	25.2284	40,622,647	5,801,856	1,606,902	4,194,954	3,059,040	9.1718	28,056,902	1,250,000	911,524	1.0000	911,524	7,653,063	5,580,759	69,591,073
2108	4,170,606	2,964,152	1,206,454	879,769	26.1820	23,034,117	2,773,699	1,606,902	1,166,797	850,850	9.4084	8,005,139	1,250,000	911,524	1.0000	911,524	3,623,251	2,642,143	31,950,779
2109	5,120,368	2,964,152	2,156,215	1,572,353	27.1717	42,723,511	5,646,175	1,606,902	4,039,272	2,945,514	9.6512	28,427,746	1,250,000	911,524	1.0000	911,524	7,445,488	5,429,391	72,062,781
2110	5,172,262	2,964,152	2,208,109	1,610,195	28.1988	45,405,571	5,801,856	1,606,902	4,194,954	3,059,040	9.9002	30,285,106	1,250,000	911,524	1.0000	911,524	7,653,063	5,580,759	76,602,201
2111	5,172,262	2,964,152	2,208,109	1,610,195	29.2647	47,121,878	5,801,856	1,606,902	4,194,954	3,059,040	10.1556	31,066,385	1,250,000	911,524	1.0000	911,524	7,653,063	5,580,759	79,099,787
2112	4,170,606	2,964,152	1,206,454	879,769	30.3709	26,719,382	2,773,699	1,606,902	1,166,797	850,850	10.4176	8,863,817	1,250,000	911,524	1.0000	911,524	3,623,251	2,642,143	36,494,722
2113	7,197,228	2,964,152	4,233,075	3,086,839	31.5189	97,293,770	11,876,755	1,606,902	10,269,852	7,488,971	10.6864	80,030,144	1,250,000	911,524	1.0000	911,524	15,752,928	11,487,334	178,235,438
2114	6,184,745	2,964,152	3,220,592	2,348,517	32.7103	76,820,698	8,839,305	1,606,902	7,232,403	5,274,006	10.9621	57,814,177	1,250,000	911,524	1.0000	911,524	11,702,995	8,534,046	135,546,399
2115	5,532,005	2,964,152	2,567,852	1,872,527	33.9468	63,566,285	6,881,085	1,606,902	5,274,183	3,846,034	11.2449	43,248,269	1,250,000	911,524	1.0000	911,524	9,092,035	6,630,084	107,726,078
2116	4,170,606	2,964,152	1,206,454	879,769	35.2299	30,994,180	2,773,699	1,606,902	1,166,797	850,850	11.5350	9,814,557	1,250,000	911,524	1.0000	911,524	3,623,251	2,642,143	41,720,261
2117	4,133,787	2,964,152	1,169,635	852,920	36.5616	31,184,114	14,547,923	1,606,902	12,941,020	9,436,838	11.8326	111,662,329	1,250,000	911,524	1.0000	911,524	15,360,655	11,201,282	143,757,967
2118	1,123,816	2,964,152	(1,840,336)	(1,342,008)	37.9437	(50,920,761)	3,040,582	1,606,902	1,433,680	1,045,466	12.1379	12,689,767	0	0	1.0000	0	(406,657)	(296,542)	(38,230,994)
	$751,975,217	$231,203,890	$520,771,327	$379,756,347		$1,893,618,187	$775,973,803	$125,338,388	$650,635,414	$474,455,706		$1,650,179,805	$106,250,000	$77,479,519		$77,479,519	$1,277,656,742	$931,691,572	$3,621,277,511

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	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 2																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2034	$8,345,548	$0	$8,345,548	$6,085,732	1.6811	$10,230,725	$4,974,446	$0	$4,974,446	$3,627,460	1.4285	$5,181,827	$1,250,000	$911,524	1.0000	$911,524	$14,569,994	$10,624,716	$16,324,075
2035	49,894,465	-	49,894,465	36,383,992	1.7446	63,475,512	37,951,789	-	37,951,789	27,675,166	1.4653	40,552,420	1,250,000	911,524	1.0000	911,524	89,096,254	64,970,681	104,939,456
2036	67,674,097	-	67,674,097	49,349,237	1.8106	89,351,729	75,594,885	-	75,594,885	55,125,227	1.5032	82,864,241	1,250,000	911,524	1.0000	911,524	144,518,982	105,385,988	173,127,494
2037	76,073,328	-	76,073,328	55,474,116	1.8790	104,235,864	94,046,676	-	94,046,676	68,580,623	1.5419	105,744,462	1,250,000	911,524	1.0000	911,524	171,370,003	124,966,263	210,891,850
2038	82,785,291	-	82,785,291	60,368,607	1.9501	117,724,821	103,456,871	-	103,456,871	75,442,716	1.5817	119,327,744	1,250,000	911,524	1.0000	911,524	187,492,162	136,722,847	237,964,089
2039	39,073,080	-	39,073,080	28,492,832	2.0238	57,663,794	15,617,110	-	15,617,110	11,388,294	1.6225	18,477,506	1,250,000	911,524	1.0000	911,524	55,940,190	40,792,649	77,052,824
2040	24,879,886	-	24,879,886	18,142,885	2.1003	38,105,502	14,363,504	-	14,363,504	10,474,140	1.6644	17,433,158	1,250,000	911,524	1.0000	911,524	40,493,389	29,528,549	56,450,184
2041	18,384,389	-	18,384,389	13,406,246	2.1797	29,221,594	18,969,870	-	18,969,870	13,833,189	1.7073	23,617,404	1,250,000	911,524	1.0000	911,524	38,604,259	28,150,959	53,750,522
2042	10,753,124	2,972,273	7,780,851	5,673,944	2.2620	12,834,462	10,071,677	1,611,305	8,460,372	6,169,464	1.7514	10,805,200	1,250,000	911,524	1.0000	911,524	17,491,223	12,754,932	24,551,185
2043	3,952,203	2,972,273	979,930	714,584	2.3475	1,677,485	2,141,682	1,611,305	530,377	386,761	1.7966	694,854	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	3,283,863
2044	3,963,031	2,972,273	990,758	722,480	2.4363	1,760,177	2,150,974	1,611,305	539,669	393,537	1.8429	725,249	1,250,000	911,524	1.0000	911,524	2,780,427	2,027,540	3,396,950
2045	5,466,341	2,972,273	2,494,068	1,818,722	2.5284	4,598,456	6,684,095	1,611,305	5,072,791	3,699,175	1.8905	6,993,291	1,250,000	911,524	1.0000	911,524	8,816,859	6,429,421	12,503,271
2046	4,961,629	2,972,273	1,989,355	1,450,676	2.6239	3,806,428	5,169,957	1,611,305	3,558,653	2,595,037	1.9392	5,032,296	1,250,000	911,524	1.0000	911,524	6,798,008	4,957,237	9,750,248
2047	4,961,629	2,972,273	1,989,355	1,450,676	2.7231	3,950,335	5,169,957	1,611,305	3,558,653	2,595,037	1.9893	5,162,307	1,250,000	911,524	1.0000	911,524	6,798,008	4,957,237	10,024,166
2048	3,963,031	2,972,273	990,758	722,480	2.8261	2,041,800	2,150,974	1,611,305	539,669	393,537	2.0406	803,051	1,250,000	911,524	1.0000	911,524	2,780,427	2,027,540	3,756,375
2049	4,961,629	2,972,273	1,989,355	1,450,676	2.9329	4,254,687	5,169,957	1,611,305	3,558,653	2,595,037	2.0932	5,431,932	1,250,000	911,524	1.0000	911,524	6,798,008	4,957,237	10,598,142
2050	5,466,341	2,972,273	2,494,068	1,818,722	3.0438	5,535,825	6,684,095	1,611,305	5,072,791	3,699,175	2.1472	7,942,869	1,250,000	911,524	1.0000	911,524	8,816,859	6,429,421	14,390,218
2051	5,411,566	2,972,273	2,439,293	1,778,779	3.1588	5,618,806	6,519,770	1,611,305	4,908,465	3,579,346	2.2026	7,883,868	1,250,000	911,524	1.0000	911,524	8,597,758	6,269,648	14,414,197
2052	5,477,169	2,972,273	2,504,896	1,826,618	3.2782	5,988,018	6,693,388	1,611,305	5,082,083	3,705,951	2.2595	8,373,597	1,250,000	911,524	1.0000	911,524	8,836,979	6,444,093	15,273,139
2053	3,952,203	2,972,273	979,930	714,584	3.4021	2,431,085	2,141,682	1,611,305	530,377	386,761	2.3178	896,434	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	4,239,043
2054	3,952,203	2,972,273	979,930	714,584	3.5307	2,522,980	2,141,682	1,611,305	530,377	386,761	2.3776	919,563	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	4,354,067
2055	5,466,341	2,972,273	2,494,068	1,818,722	3.6642	6,664,160	6,684,095	1,611,305	5,072,791	3,699,175	2.4389	9,021,919	1,250,000	911,524	1.0000	911,524	8,816,859	6,429,421	16,597,603
2056	4,972,457	2,972,273	2,000,183	1,458,572	3.8027	5,546,511	5,179,250	1,611,305	3,567,945	2,601,813	2.5018	6,509,216	1,250,000	911,524	1.0000	911,524	6,818,128	4,971,909	12,967,251
2057	4,961,629	2,972,273	1,989,355	1,450,676	3.9464	5,724,947	5,169,957	1,611,305	3,558,653	2,595,037	2.5664	6,659,903	1,250,000	911,524	1.0000	911,524	6,798,008	4,957,237	13,296,374
2058	3,952,203	2,972,273	979,930	714,584	4.0956	2,926,649	2,141,682	1,611,305	530,377	386,761	2.6326	1,018,187	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	4,856,359
2059	4,906,854	2,972,273	1,934,580	1,410,733	4.2504	5,996,178	5,005,632	1,611,305	3,394,327	2,475,208	2.7005	6,684,299	1,250,000	911,524	1.0000	911,524	6,578,907	4,797,464	13,592,001
2060	4,972,457	2,972,273	2,000,183	1,458,572	4.4111	6,433,906	5,179,250	1,611,305	3,567,945	2,601,813	2.7702	7,207,543	1,250,000	911,524	1.0000	911,524	6,818,128	4,971,909	14,552,972
2061	4,961,629	2,972,273	1,989,355	1,450,676	4.5778	6,640,903	5,169,957	1,611,305	3,558,653	2,595,037	2.8416	7,374,057	1,250,000	911,524	1.0000	911,524	6,798,008	4,957,237	14,926,485
2062	3,952,203	2,972,273	979,930	714,584	4.7509	3,394,915	2,141,682	1,611,305	530,377	386,761	2.9150	1,127,408	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	5,433,847
2063	6,980,479	2,972,273	4,008,206	2,922,860	4.9305	14,411,161	11,226,509	1,611,305	9,615,204	7,011,590	2.9902	20,966,055	1,250,000	911,524	1.0000	911,524	14,873,410	10,845,973	36,288,740
2064	5,927,107	2,972,273	2,954,833	2,154,721	5.1168	11,025,275	8,043,200	1,611,305	6,431,895	4,690,260	3.0673	14,386,435	1,250,000	911,524	1.0000	911,524	10,636,729	7,756,505	26,323,234
2065	4,961,629	2,972,273	1,989,355	1,450,676	5.3103	7,703,523	5,169,957	1,611,305	3,558,653	2,595,037	3.1465	8,165,284	1,250,000	911,524	1.0000	911,524	6,798,008	4,957,237	16,780,331
2066	3,952,203	2,972,273	979,930	714,584	5.5110	3,938,070	2,141,682	1,611,305	530,377	386,761	3.2276	1,248,309	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	6,097,903
2067	3,952,203	2,972,273	979,930	714,584	5.7193	4,086,918	2,141,682	1,611,305	530,377	386,761	3.3109	1,280,526	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	6,278,968
2068	5,981,882	2,972,273	3,009,609	2,194,664	5.9355	13,026,427	8,207,526	1,611,305	6,596,221	4,810,089	3.3963	16,336,507	1,250,000	911,524	1.0000	911,524	10,855,829	7,916,277	30,274,458
2069	5,466,341	2,972,273	2,494,068	1,818,722	6.1598	11,202,962	6,684,095	1,611,305	5,072,791	3,699,175	3.4840	12,887,927	1,250,000	911,524	1.0000	911,524	8,816,859	6,429,421	25,002,413
2070	3,952,203	2,972,273	979,930	714,584	6.3927	4,568,119	2,141,682	1,611,305	530,377	386,761	3.5738	1,382,206	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	6,861,848
2071	3,952,203	2,972,273	979,930	714,584	6.6343	4,740,762	2,141,682	1,611,305	530,377	386,761	3.6660	1,417,865	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	7,070,151
2072	6,431,819	2,972,273	3,459,546	2,522,767	6.8851	17,369,501	9,557,338	1,611,305	7,946,033	5,794,398	3.7606	21,790,415	1,250,000	911,524	1.0000	911,524	12,655,579	9,228,689	40,071,440
2073	3,952,203	2,972,273	979,930	714,584	7.1454	5,105,986	2,141,682	1,611,305	530,377	386,761	3.8576	1,491,969	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	7,509,478
2074	3,952,203	2,972,273	979,930	714,584	7.4155	5,298,995	2,141,682	1,611,305	530,377	386,761	3.9572	1,530,490	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	7,741,009
2075	6,835,510	2,972,273	3,863,236	2,817,145	7.6958	21,680,187	10,791,600	1,611,305	9,180,295	6,694,446	4.0593	27,174,764	1,250,000	911,524	1.0000	911,524	14,293,532	10,423,115	49,766,474
2076	3,963,031	2,972,273	990,758	722,480	7.9867	5,770,228	2,150,974	1,611,305	539,669	393,537	4.1640	1,638,688	1,250,000	911,524	1.0000	911,524	2,780,427	2,027,540	8,320,439
2077	3,952,203	2,972,273	979,930	714,584	8.2886	5,922,898	2,141,682	1,611,305	530,377	386,761	4.2714	1,652,010	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	8,486,432
2078	6,475,767	2,972,273	3,503,493	2,554,814	8.6019	21,976,253	9,712,371	1,611,305	8,101,066	5,907,452	4.3816	25,884,090	1,250,000	911,524	1.0000	911,524	12,854,560	9,373,789	48,771,867
2079	3,952,203	2,972,273	979,930	714,584	8.9270	6,379,088	2,141,682	1,611,305	530,377	386,761	4.4947	1,738,374	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	9,028,986
2080	3,963,031	2,972,273	990,758	722,480	9.2645	6,693,412	2,150,974	1,611,305	539,669	393,537	4.6106	1,814,441	1,250,000	911,524	1.0000	911,524	2,780,427	2,027,540	9,419,377
2081	3,952,203	2,972,273	979,930	714,584	9.6147	6,870,507	2,141,682	1,611,305	530,377	386,761	4.7296	1,829,224	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	9,611,255
2082	6,366,216	2,972,273	3,393,943	2,474,928	9.9781	24,695,076	9,383,720	1,611,305	7,772,416	5,667,793	4.8516	27,497,865	1,250,000	911,524	1.0000	911,524	12,416,359	9,054,245	53,104,465
2083	3,952,203	2,972,273	979,930	714,584	10.3553	7,399,728	2,141,682	1,611,305	530,377	386,761	4.9768	1,924,831	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	10,236,083
2084	3,963,031	2,972,273	990,758	722,480	10.7467	7,764,271	2,150,974	1,611,305	539,669	393,537	5.1052	2,009,085	1,250,000	911,524	1.0000	911,524	2,780,427	2,027,540	10,684,880
2085	3,952,203	2,972,273	979,930	714,584	11.1529	7,969,680	2,141,682	1,611,305	530,377	386,761	5.2369	2,025,428	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	10,906,631
2086	3,952,203	2,972,273	979,930	714,584	11.5745	8,270,948	2,141,682	1,611,305	530,377	386,761	5.3720	2,077,679	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	11,260,151
2087	3,952,203	2,972,273	979,930	714,584	12.0120	8,583,579	2,141,682	1,611,305	530,377	386,761	5.5106	2,131,284	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	11,626,386
2088	19,159,622	2,972,273	16,187,348	11,804,122	12.4661	147,151,363	51,280,067	1,611,305	49,668,763	36,219,405	5.6528	204,741,054	1,250,000	911,524	1.0000	911,524	67,106,111	48,935,051	352,803,942
2089	3,952,203	2,972,273	979,930	714,584	12.9373	9,244,783	2,141,682	1,611,305	530,377	386,761	5.7986	2,242,671	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	12,398,978
2090	3,952,203	2,972,273	979,930	714,584	13.4263	9,594,214	2,141,682	1,611,305	530,377	386,761	5.9482	2,300,531	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	12,806,269
2091	3,952,203	2,972,273	979,930	714,584	13.9338	9,956,865	2,141,682	1,611,305	530,377	386,761	6.1017	2,359,898	1,250,000	911,524	1.0000	911,524	2,760,307	2,012,868	13,228,288
2092	3,963,031	2,972,273	990,758	722,480	14.4605	10,447,416	2,150,974	1,611,305	539,669	393,537	6.2591	2,463,187	1,250,000	911,524	1.0000	911,524	2,780,427	2,027,540	13,822,127
2093	4,055,991	2,972,273	1,083,718	790,267	15.0071	11,859,623	2,453,044	1,611,305	841,739	613,812	6.4206	3,941,043	1,250,000	911,524	1.0000	911,524	3,175,457	2,315,603	16,712,189
2094	4,211,672	2,972,273	1,239,399	903,793	15.5744	14,076,036	2,920,088	1,611,305	1,308,783	954,389	6.5863	6,285,895	1,250,000	911,524	1.0000	911,524	3,798,182	2,769,706	21,273,455
2095	5,730,397	2,972,273	2,758,124	2,011,276	16.1631	32,508,456	7,476,262	1,611,305	5,864,957	4,276,838	6.7562	28,895,174	1,250,000	911,524	1.0000	911,524	9,873,081	7,199,638	62,315,154
2096	5,286,877	2,972,273	2,314,604	1,687,853	16.7741	28,312,214	6,122,511	1,611,305	4,511,206	3,289,657	6.9305	22,798,968	1,250,000	911,524	1.0000	911,524	8,075,810	5,889,034	52,022,706
2097	5,120,368	2,972,273	2,148,094	1,566,431	17.4081	27,268,592	5,646,175	1,611,305	4,034,870	2,942,304	7.1093	20,917,720	1,250,000	911,524	1.0000	911,524	7,432,964	5,420,259	49,097,836
2098	4,315,460	2,972,273	1,343,186	979,477	18.0662	17,695,427	3,231,450	1,611,305	1,620,146	1,181,441	7.2927	8,615,894	1,250,000	911,524	1.0000	911,524	4,213,332	3,072,442	27,222,845
2099	5,120,368	2,972,273	2,148,094	1,566,431	18.7491	29,369,177	5,646,175	1,611,305	4,034,870	2,942,304	7.4809	22,011,080	1,250,000	911,524	1.0000	911,524	7,432,964	5,420,259	52,291,781
2100	5,574,716	2,972,273	2,602,442	1,897,750	19.4578	36,926,047	7,009,218	1,611,305	5,397,913	3,936,261	7.6739	30,206,473	1,250,000	911,524	1.0000	911,524	9,250,356	6,745,535	68,044,043
2101	5,730,397	2,972,273	2,758,124	2,011,276	20.1933	40,614,301	7,476,262	1,611,305	5,864,957	4,276,838	7.8719	33,666,842	1,250,000	911,524	1.0000	911,524	9,873,081	7,199,638	75,192,667
2102	5,730,397	2,972,273	2,758,124	2,011,276	20.9566	42,149,508	7,476,262	1,611,305	5,864,957	4,276,838	8.0750	34,535,468	1,250,000	911,524	1.0000	911,524	9,873,081	7,199,638	77,596,500
2103	4,107,885	2,972,273	1,135,611	828,109	21.7488	18,010,385	2,608,725	1,611,305	997,421	727,338	8.2833	6,024,759	1,250,000	911,524	1.0000	911,524	3,383,032	2,466,971	24,946,667

Xcel Energy
Nuclear Decommissioning Accrual
100-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.11
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2104	4,170,606	2,972,273	1,198,333	873,847	22.5709	19,723,518	2,773,699	1,611,305	1,162,394	847,640	8.4970	7,202,396	1,250,000	911,524	1.0000	911,524	3,610,727	2,633,011	27,837,437
2105	5,678,503	2,972,273	2,706,230	1,973,434	23.4240	46,225,722	7,320,581	1,611,305	5,709,276	4,163,312	8.7162	36,288,263	1,250,000	911,524	1.0000	911,524	9,665,506	7,048,270	83,425,509
2106	5,120,368	2,972,273	2,148,094	1,566,431	24.3095	38,079,161	5,646,175	1,611,305	4,034,870	2,942,304	8.9411	26,307,432	1,250,000	911,524	1.0000	911,524	7,432,964	5,420,259	65,298,117
2107	5,172,262	2,972,273	2,199,988	1,604,273	25.2284	40,473,246	5,801,856	1,611,305	4,190,551	3,055,829	9.1718	28,027,457	1,250,000	911,524	1.0000	911,524	7,640,539	5,571,626	69,412,227
2108	4,170,606	2,972,273	1,198,333	873,847	26.1820	22,879,068	2,773,699	1,611,305	1,162,394	847,640	9.4084	7,974,934	1,250,000	911,524	1.0000	911,524	3,610,727	2,633,011	31,765,526
2109	5,120,368	2,972,273	2,148,094	1,566,431	27.1717	42,562,601	5,646,175	1,611,305	4,034,870	2,942,304	9.6512	28,396,762	1,250,000	911,524	1.0000	911,524	7,432,964	5,420,259	71,870,887
2110	5,172,262	2,972,273	2,199,988	1,604,273	28.1988	45,238,579	5,801,856	1,611,305	4,190,551	3,055,829	9.9002	30,253,323	1,250,000	911,524	1.0000	911,524	7,640,539	5,571,626	76,403,426
2111	5,172,262	2,972,273	2,199,988	1,604,273	29.2647	46,948,574	5,801,856	1,611,305	4,190,551	3,055,829	10.1556	31,033,782	1,250,000	911,524	1.0000	911,524	7,640,539	5,571,626	78,893,880
2112	4,170,606	2,972,273	1,198,333	873,847	30.3709	26,539,526	2,773,699	1,611,305	1,162,394	847,640	10.4176	8,830,373	1,250,000	911,524	1.0000	911,524	3,610,727	2,633,011	36,281,423
2113	7,197,228	2,972,273	4,224,954	3,080,917	31.5189	97,107,116	11,876,755	1,611,305	10,265,450	7,485,761	10.6864	79,995,837	1,250,000	911,524	1.0000	911,524	15,740,404	11,478,202	178,014,477
2114	6,184,745	2,972,273	3,212,471	2,342,595	32.7103	76,626,989	8,839,305	1,611,305	7,228,000	5,270,795	10.9621	57,778,985	1,250,000	911,524	1.0000	911,524	11,690,472	8,524,914	135,317,498
2115	5,532,005	2,972,273	2,559,731	1,866,605	33.9468	63,365,253	6,881,085	1,611,305	5,269,780	3,842,824	11.2449	43,212,169	1,250,000	911,524	1.0000	911,524	9,079,511	6,620,952	107,488,946
2116	4,170,606	2,972,273	1,198,333	873,847	35.2299	30,785,550	2,773,699	1,611,305	1,162,394	847,640	11.5350	9,777,525	1,250,000	911,524	1.0000	911,524	3,610,727	2,633,011	41,474,599
2117	4,133,787	2,972,273	1,161,514	846,998	36.5616	30,967,597	14,547,923	1,611,305	12,936,618	9,433,628	11.8326	111,624,342	1,250,000	911,524	1.0000	911,524	15,348,132	11,192,149	143,503,463
2118	1,123,816	2,972,273	(1,848,457)	(1,347,930)	37.9437	(51,145,463)	3,040,582	1,611,305	1,429,277	1,042,256	12.1379	12,650,800	0	0	1.0000	-	(419,180)	(305,674)	(38,494,662)
	$753,446,268	$228,865,051	$524,581,217	$382,534,590		$1,914,373,255	$787,828,851	$124,070,476	$663,758,374	$484,025,218		$1,674,108,595	$105,000,000	$76,567,995		$76,567,995	$1,293,339,591	$943,127,803	$3,665,049,845
	$2,911,933,726	$1,007,469,597	$1,904,464,129	$1,388,771,428		$9,907,613,480	$2,882,681,897	$422,711,877	$2,459,970,021	$1,793,856,879		$7,090,447,174	$211,250,000	$154,047,514		$154,047,514	$4,575,684,150	$3,336,675,820	$17,152,108,167

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Monticello

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$757,935,327	$15,073,411	$0	$6,696,113	$779,704,851
2021	779,704,851	31,044,753	-	8,507,110	819,256,714
2022	819,256,714	32,974,738	-	26,877,367	879,108,819
2023	879,108,819	35,344,881	-	26,877,367	941,331,067
2024	941,331,067	37,808,882	-	26,877,367	1,006,017,317
2025	1,006,017,317	40,370,458	-	26,877,367	1,073,265,142
2026	1,073,265,142	43,033,471	-	26,877,367	1,143,175,981
2027	1,143,175,981	45,801,941	-	26,877,367	1,215,855,289
2028	1,215,855,289	48,680,041	-	26,877,367	1,291,412,698
2029	1,291,412,698	51,672,115	-	26,877,367	1,369,962,180
2030	1,369,962,180	54,782,674	-	26,877,367	1,451,622,221
2031	1,451,622,221	58,016,412	-	26,877,367	1,536,516,001
2032	1,536,516,001	61,378,205	-	26,877,367	1,624,771,573
2033	1,624,771,573	64,873,126	-	26,877,367	1,716,522,067
2034	1,716,522,067	68,506,446	-	26,877,367	1,811,905,880
2035	1,811,905,880	72,283,645	-	26,877,367	1,911,066,892
2036	1,911,066,892	76,210,421	-	26,877,367	2,014,154,681
2037	2,014,154,681	80,292,697	-	26,877,367	2,121,324,745
2038	2,121,324,745	84,536,632	-	26,877,367	2,232,738,745
2039	2,232,738,745	88,948,626	-	26,877,367	2,348,564,738
2040	2,348,564,738	85,854,633	(46,107,404)	20,158,026	2,408,469,992
2041	2,408,469,992	87,668,308	(183,640,070)	-	2,312,498,229
2042	2,312,498,229	84,174,936	(317,582,210)	-	2,079,090,955
2043	2,079,090,955	75,678,911	(370,640,837)	-	1,784,129,028
2044	1,784,129,028	64,942,297	(350,340,524)	-	1,498,730,801
2045	1,498,730,801	54,553,801	(128,900,685)	-	1,424,383,917
2046	1,424,383,917	51,847,575	(97,673,331)	-	1,378,558,160
2047	1,378,558,160	50,179,517	(93,433,376)	-	1,335,304,301
2048	1,335,304,301	48,605,077	(9,726,948)	-	1,374,182,430
2049	1,374,182,430	50,020,240	(5,154,915)	-	1,419,047,755
2050	1,419,047,755	51,653,338	(16,535,130)	-	1,454,165,963
2051	1,454,165,963	52,931,641	(17,056,336)	-	1,490,041,268
2052	1,490,041,268	54,237,502	(17,656,772)	-	1,526,621,998
2053	1,526,621,998	55,569,041	(18,150,950)	-	1,564,040,089
2054	1,564,040,089	56,931,059	(18,725,136)	-	1,602,246,011
2055	1,602,246,011	58,321,755	(19,318,067)	-	1,641,249,699
2056	1,641,249,699	59,741,489	(20,001,487)	-	1,680,989,701
2057	1,680,989,701	61,188,025	(20,563,071)	-	1,721,614,655
2058	1,721,614,655	62,666,773	(83,994,831)	-	1,700,286,598
2059	1,700,286,598	61,890,432	(21,891,176)	-	1,740,285,854
2060	1,740,285,854	63,346,405	(22,670,265)	-	1,780,961,994

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External Levelized	2061	1,780,961,994	64,827,017	(23,308,141)	-	1,822,480,869
	2062	1,822,480,869	66,338,304	(24,052,473)	-	1,864,766,700
	2063	1,864,766,700	67,877,508	(61,202,945)	-	1,871,441,264
	2064	1,871,441,264	68,120,462	(25,708,544)	-	1,913,853,182
	2065	1,913,853,182	69,664,256	(26,434,946)	-	1,957,082,492
	2066	1,957,082,492	71,237,803	(35,234,908)	-	1,993,085,387
	2067	1,993,085,387	72,548,308	(28,157,315)	-	2,037,476,380
	2068	2,037,476,380	74,164,140	(147,332,621)	-	1,964,307,899
	2069	1,964,307,899	71,500,808	(29,996,394)	-	2,005,812,313
	2070	2,005,812,313	73,011,568	(30,961,822)	-	2,047,862,059
	2071	2,047,862,059	74,542,179	(31,959,473)	-	2,090,444,765
	2072	2,090,444,765	76,092,189	(33,115,575)	-	2,133,421,380
	2073	2,133,421,380	77,656,538	(34,056,110)	-	2,177,021,808
	2074	2,177,021,808	79,243,594	(35,157,458)	-	2,221,107,944
	2075	2,221,107,944	80,848,329	(36,295,322)	-	2,265,660,951
	2076	2,265,660,951	82,470,059	(37,615,091)	-	2,310,515,918
	2077	2,310,515,918	84,102,779	(38,686,356)	-	2,355,932,342
	2078	2,355,932,342	85,755,937	(39,942,406)	-	2,401,745,873
	2079	2,401,745,873	87,423,550	(41,240,731)	-	2,447,928,693
	2080	2,447,928,693	89,104,604	(103,196,157)	-	2,433,837,140
	2081	2,433,837,140	88,591,672	(43,969,652)	-	2,478,459,159
	2082	2,478,459,159	90,215,913	(45,403,129)	-	2,523,271,944
	2083	2,523,271,944	91,847,099	(46,885,275)	-	2,568,233,768
	2084	2,568,233,768	93,483,709	(48,608,386)	-	2,613,109,091
	2085	2,613,109,091	95,117,171	(120,308,215)	-	2,587,918,047
	2086	2,587,918,047	94,200,217	(51,637,791)	-	2,630,480,473
	2087	2,630,480,473	95,749,489	(98,153,256)	-	2,628,076,707
	2088	2,628,076,707	95,661,992	(70,738,746)	-	2,652,999,952
	2089	2,652,999,952	96,569,198	(56,889,113)	-	2,692,680,037
	2090	2,692,680,037	98,013,553	(58,759,419)	-	2,731,934,172
	2091	2,731,934,172	99,442,404	(60,693,401)	-	2,770,683,175
	2092	2,770,683,175	100,852,868	(80,395,911)	-	2,791,140,131
	2093	2,791,140,131	101,597,501	(96,242,901)	-	2,796,494,731
	2094	2,796,494,731	101,792,408	(718,857,426)	-	2,179,429,713
	2095	2,179,429,713	79,331,242	(97,797,261)	-	2,160,963,693
	2096	2,160,963,693	78,659,078	(111,130,025)	-	2,128,492,747
	2097	2,128,492,747	77,477,136	(27,523,643)	-	2,178,446,239
	2098	2,178,446,239	79,295,443	(28,526,315)	-	2,229,215,367
	2099	2,229,215,367	81,143,439	(29,565,836)	-	2,280,792,970
	2100	2,280,792,970	83,020,864	(30,643,606)	-	2,333,170,228
	2101	2,333,170,228	84,927,396	(31,761,114)	-	2,386,336,511
	2102	2,386,336,511	86,862,649	(32,919,804)	-	2,440,279,356
	2103	2,440,279,356	88,826,169	(34,121,260)	-	2,494,984,264
	2104	2,494,984,264	90,817,427	(35,757,764)	-	2,550,043,928
	2105	2,550,043,928	92,821,599	(36,658,524)	-	2,606,207,003
	2106	2,606,207,003	94,865,935	(37,997,964)	-	2,663,074,974
	2107	2,663,074,974	96,935,929	(39,386,736)	-	2,720,624,167

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2108	2,720,624,167	99,030,720	(326,067,495)	-	2,493,587,392
2109	2,493,587,392	90,766,581	(42,319,966)	-	2,542,034,007
2110	2,542,034,007	92,530,038	(43,868,337)	-	2,590,695,708
2111	2,590,695,708	94,301,324	(45,473,866)	-	2,639,523,165
2112	2,639,523,165	96,078,643	(47,659,608)	-	2,687,942,200
2113	2,687,942,200	97,841,096	(215,262,124)	-	2,570,521,173
2114	2,570,521,173	93,566,971	(50,655,392)	-	2,613,432,751
2115	2,613,432,751	95,128,952	(52,511,916)	-	2,656,049,787
2116	2,656,049,787	96,680,212	(91,592,886)	-	2,661,137,114
2117	2,661,137,114	96,865,391	(56,433,289)	-	2,701,569,216
2118	2,701,569,216	98,337,119	(631,546,007)	-	2,168,360,328
2119	2,168,360,328	78,928,316	(95,494,286)	-	2,151,794,358
2120	2,151,794,358	78,325,315	(93,536,021)	-	2,136,583,651
2121	2,136,583,651	77,771,645	(96,108,768)	-	2,118,246,529
2122	2,118,246,529	77,104,174	(99,493,539)	-	2,095,857,164
2123	2,095,857,164	76,289,201	(109,587,199)	-	2,062,559,165
2124	2,062,559,165	75,077,154	(107,434,656)	-	2,030,201,662
2125	2,030,201,662	73,899,341	(110,394,885)	-	1,993,706,118
2126	1,993,706,118	72,570,903	(114,292,977)	-	1,951,984,043
2127	1,951,984,043	71,052,219	(125,807,472)	-	1,897,228,791
2128	1,897,228,791	69,059,128	(176,940,763)	-	1,789,347,156
2129	1,789,347,156	65,132,236	(126,849,597)	-	1,727,629,796
2130	1,727,629,796	62,885,725	(382,825,760)	-	1,407,689,760
2131	1,407,689,760	51,239,907	(102,034,373)	-	1,356,895,295
2132	1,356,895,295	49,390,989	(106,826,995)	-	1,299,459,289
2133	1,299,459,289	47,300,318	(118,661,852)	-	1,228,097,755
2134	1,228,097,755	44,702,758	(113,613,620)	-	1,159,186,893
2135	1,159,186,893	42,194,403	(451,310,811)	-	750,070,485
2136	750,070,485	27,302,566	(133,260,094)	-	644,112,957
2137	644,112,957	23,445,712	(339,883,753)	-	327,674,915
2138	327,674,915	11,927,367	(131,145,936)	-	208,456,346
2139	208,456,346	7,587,811	(146,905,454)	-	69,138,703
2140	69,138,703	2,516,649	(248,166,900)	-	(176,511,549)
2141	(176,511,549)	(6,425,020)	182,936,569	-	(0)

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Prairie Island Unit 1

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$437,068,622	$8,785,327	$0	$24,632	$445,878,581
2021	445,878,581	18,173,553	-	12,399,703	476,451,837
2022	476,451,837	19,746,601	-	29,514,299	525,712,738
2023	525,712,738	21,726,889	-	29,514,299	576,953,926
2024	576,953,926	23,786,785	-	29,514,299	630,255,011
2025	630,255,011	25,929,489	-	29,514,299	685,698,799
2026	685,698,799	28,158,329	-	29,514,299	743,371,428
2027	743,371,428	30,476,769	-	29,514,299	803,362,496
2028	803,362,496	32,888,410	-	29,514,299	865,765,205
2029	865,765,205	35,396,999	-	29,514,299	930,676,503
2030	930,676,503	38,006,433	-	29,514,299	998,197,235
2031	998,197,235	40,720,766	-	29,514,299	1,068,432,301
2032	1,068,432,301	43,544,216	-	29,514,299	1,141,490,816
2033	1,141,490,816	40,989,061	(39,900,645)	19,774,581	1,162,353,812
2034	1,162,353,812	41,379,796	(122,923,789)	-	1,080,809,819
2035	1,080,809,819	38,476,830	(171,342,706)	-	947,943,943
2036	947,943,943	33,746,804	(175,316,670)	-	806,374,077
2037	806,374,077	28,706,917	(141,970,869)	-	693,110,124
2038	693,110,124	24,674,720	(89,804,897)	-	627,979,948
2039	627,979,948	22,356,086	(67,496,013)	-	582,840,021
2040	582,840,021	20,749,105	(44,142,529)	-	559,446,597
2041	559,446,597	19,916,299	(33,333,602)	-	546,029,294
2042	546,029,294	19,438,643	(17,920,460)	-	547,547,477
2043	547,547,477	19,492,690	(3,303,533)	-	563,736,634
2044	563,736,634	20,069,024	(3,417,294)	-	580,388,364
2045	580,388,364	20,661,826	(12,524,313)	-	588,525,877
2046	588,525,877	20,951,521	(9,772,012)	-	599,705,386
2047	599,705,386	21,349,512	(10,046,679)	-	611,008,219
2048	611,008,219	21,751,893	(3,779,662)	-	628,980,450
2049	628,980,450	22,391,704	(10,622,231)	-	640,749,923
2050	640,749,923	22,810,697	(14,415,137)	-	649,145,484
2051	649,145,484	23,109,579	(14,439,975)	-	657,815,088
2052	657,815,088	23,418,217	(15,299,806)	-	665,933,499
2053	665,933,499	23,707,233	(4,266,631)	-	685,374,101
2054	685,374,101	24,399,318	(4,382,608)	-	705,390,810
2055	705,390,810	25,111,913	(16,627,132)	-	713,875,592
2056	713,875,592	25,413,971	(12,997,802)	-	726,291,761
2057	726,291,761	25,855,987	(13,327,983)	-	738,819,765
2058	738,819,765	26,301,984	(4,889,065)	-	760,232,684
2059	760,232,684	27,064,284	(13,625,841)	-	773,671,126
2060	773,671,126	27,542,692	(14,587,988)	-	786,625,830

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External Levelized	2061	786,625,830	28,003,880	(14,962,717)	-	799,666,993
	2062	799,666,993	28,468,145	(5,471,340)	-	822,663,798
	2063	822,663,798	29,286,831	(36,327,538)	-	815,623,092
	2064	815,623,092	29,036,182	(26,363,383)	-	818,295,891
	2065	818,295,891	29,131,334	(16,821,880)	-	830,605,345
	2066	830,605,345	29,569,550	(6,140,901)	-	854,033,994
	2067	854,033,994	30,403,610	(6,323,467)	-	878,114,137
	2068	878,114,137	31,260,863	(30,320,511)	-	879,054,490
	2069	879,054,490	31,294,340	(25,050,076)	-	885,298,754
	2070	885,298,754	31,516,636	(6,911,179)	-	909,904,211
	2071	909,904,211	32,392,590	(7,121,208)	-	935,175,592
	2072	935,175,592	33,292,251	(40,124,286)	-	928,343,557
	2073	928,343,557	33,049,031	(7,564,177)	-	953,828,411
	2074	953,828,411	33,956,291	(7,797,627)	-	979,987,075
	2075	979,987,075	34,887,540	(49,825,080)	-	965,049,535
	2076	965,049,535	34,355,763	(8,381,104)	-	991,024,194
	2077	991,024,194	35,280,461	(8,549,229)	-	1,017,755,426
	2078	1,017,755,426	36,232,093	(48,836,873)	-	1,005,150,646
	2079	1,005,150,646	35,783,363	(9,096,281)	-	1,031,837,728
	2080	1,031,837,728	36,733,423	(9,489,043)	-	1,059,082,108
	2081	1,059,082,108	37,703,323	(9,683,377)	-	1,087,102,055
	2082	1,087,102,055	38,700,833	(53,179,130)	-	1,072,623,758
	2083	1,072,623,758	38,185,406	(10,313,384)	-	1,100,495,780
	2084	1,100,495,780	39,177,650	(10,764,911)	-	1,128,908,519
	2085	1,128,908,519	40,189,143	(10,989,491)	-	1,158,108,171
	2086	1,158,108,171	41,228,651	(11,345,941)	-	1,187,990,881
	2087	1,187,990,881	42,292,475	(11,715,212)	-	1,218,568,144
	2088	1,218,568,144	43,381,026	(352,895,913)	-	909,053,257
	2089	909,053,257	32,362,296	(12,494,208)	-	928,921,346
	2090	928,921,346	33,069,600	(12,904,875)	-	949,086,071
	2091	949,086,071	33,787,464	(13,330,392)	-	969,543,143
	2092	969,543,143	34,515,736	(13,927,855)	-	990,131,024
	2093	990,131,024	35,248,664	(16,821,673)	-	1,008,558,015
	2094	1,008,558,015	35,904,665	(21,386,831)	-	1,023,075,850
	2095	1,023,075,850	36,421,500	(62,432,561)	-	997,064,789
	2096	997,064,789	35,495,506	(52,144,291)	-	980,416,004
	2097	980,416,004	34,902,810	(49,223,750)	-	966,095,064
	2098	966,095,064	34,392,984	(27,353,245)	-	973,134,804
	2099	973,134,804	34,643,599	(52,426,829)	-	955,351,574
	2100	955,351,574	34,010,516	(68,183,908)	-	921,178,183
	2101	921,178,183	32,793,943	(75,337,522)	-	878,634,604
	2102	878,634,604	31,279,392	(77,746,527)	-	832,167,468
	2103	832,167,468	29,625,162	(25,102,055)	-	836,690,575
	2104	836,690,575	29,786,184	(27,998,380)	-	838,478,379
	2105	838,478,379	29,849,830	(83,592,207)	-	784,736,002
	2106	784,736,002	27,936,602	(65,470,781)	-	747,201,823
	2107	747,201,823	26,600,385	(69,591,073)	-	704,211,135

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2108	704,211,135	25,069,916	(31,950,779)	-	697,330,272
2109	697,330,272	24,824,958	(72,062,781)	-	650,092,449
2110	650,092,449	23,143,291	(76,602,201)	-	596,633,539
2111	596,633,539	21,240,154	(79,099,787)	-	538,773,905
2112	538,773,905	19,180,351	(36,494,722)	-	521,459,534
2113	521,459,534	18,563,959	(178,235,438)	-	361,788,055
2114	361,788,055	12,879,655	(135,546,399)	-	239,121,311
2115	239,121,311	8,512,719	(107,726,078)	-	139,907,951
2116	139,907,951	4,980,723	(41,720,261)	-	103,168,414
2117	103,168,414	3,672,796	(143,757,967)	-	(36,916,758)
2118	(36,916,758)	(1,314,237)	38,230,994	-	0

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Prairie Island Unit 2

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$487,163,479	$9,721,851	$0	$294,670	$497,180,001
2021	497,180,001	19,967,389	-	6,511,608	523,658,997
2022	523,658,997	21,368,087	-	23,764,067	568,791,151
2023	568,791,151	23,168,860	-	23,764,067	615,724,078
2024	615,724,078	25,041,484	-	23,764,067	664,529,629
2025	664,529,629	26,988,825	-	23,764,067	715,282,522
2026	715,282,522	29,013,866	-	23,764,067	768,060,454
2027	768,060,454	31,119,705	-	23,764,067	822,944,227
2028	822,944,227	33,309,568	-	23,764,067	880,017,861
2029	880,017,861	35,586,806	-	23,764,067	939,368,734
2030	939,368,734	37,954,906	-	23,764,067	1,001,087,707
2031	1,001,087,707	40,417,493	-	23,764,067	1,065,269,267
2032	1,065,269,267	42,978,337	-	23,764,067	1,132,011,670
2033	1,132,011,670	45,641,359	-	23,764,067	1,201,417,096
2034	1,201,417,096	42,879,283	(16,324,075)	19,724,176	1,247,696,480
2035	1,247,696,480	44,168,455	(104,939,456)	-	1,186,925,479
2036	1,186,925,479	42,017,162	(173,127,494)	-	1,055,815,147
2037	1,055,815,147	37,375,856	(210,891,850)	-	882,299,153
2038	882,299,153	31,233,390	(237,964,089)	-	675,568,454
2039	675,568,454	23,915,123	(77,052,824)	-	622,430,754
2040	622,430,754	22,034,049	(56,450,184)	-	588,014,619
2041	588,014,619	20,815,717	(53,750,522)	-	555,079,814
2042	555,079,814	19,649,825	(24,551,185)	-	550,178,454
2043	550,178,454	19,476,317	(3,283,863)	-	566,370,908
2044	566,370,908	20,049,530	(3,396,950)	-	583,023,489
2045	583,023,489	20,639,031	(12,503,271)	-	591,159,249
2046	591,159,249	20,927,037	(9,750,248)	-	602,336,039
2047	602,336,039	21,322,696	(10,024,166)	-	613,634,569
2048	613,634,569	21,722,664	(3,756,375)	-	631,600,858
2049	631,600,858	22,358,670	(10,598,142)	-	643,361,386
2050	643,361,386	22,774,993	(14,390,218)	-	651,746,161
2051	651,746,161	23,071,814	(14,414,197)	-	660,403,777
2052	660,403,777	23,378,294	(15,273,139)	-	668,508,932
2053	668,508,932	23,665,216	(4,239,043)	-	687,935,105
2054	687,935,105	24,352,903	(4,354,067)	-	707,933,941
2055	707,933,941	25,060,862	(16,597,603)	-	716,397,200
2056	716,397,200	25,360,461	(12,967,251)	-	728,790,411
2057	728,790,411	25,799,181	(13,296,374)	-	741,293,218
2058	741,293,218	26,241,780	(4,856,359)	-	762,678,639
2059	762,678,639	26,998,824	(13,592,001)	-	776,085,462
2060	776,085,462	27,473,425	(14,552,972)	-	789,005,915

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External Levelized	2061	789,005,915	27,930,809	(14,926,485)	-	802,010,240
	2062	802,010,240	28,391,162	(5,433,847)	-	824,967,555
	2063	824,967,555	29,203,851	(36,288,740)	-	817,882,667
	2064	817,882,667	28,953,046	(26,323,234)	-	820,512,479
	2065	820,512,479	29,046,142	(16,780,331)	-	832,778,290
	2066	832,778,290	29,480,351	(6,097,903)	-	856,160,738
	2067	856,160,738	30,308,090	(6,278,968)	-	880,189,860
	2068	880,189,860	31,158,721	(30,274,458)	-	881,074,123
	2069	881,074,123	31,190,024	(25,002,413)	-	887,261,734
	2070	887,261,734	31,409,065	(6,861,848)	-	911,808,951
	2071	911,808,951	32,278,037	(7,070,151)	-	937,016,837
	2072	937,016,837	33,170,396	(40,071,440)	-	930,115,794
	2073	930,115,794	32,926,099	(7,509,478)	-	955,532,415
	2074	955,532,415	33,825,847	(7,741,009)	-	981,617,253
	2075	981,617,253	34,749,251	(49,766,474)	-	966,600,030
	2076	966,600,030	34,217,641	(8,320,439)	-	992,497,232
	2077	992,497,232	35,134,402	(8,486,432)	-	1,019,145,202
	2078	1,019,145,202	36,077,740	(48,771,867)	-	1,006,451,076
	2079	1,006,451,076	35,628,368	(9,028,986)	-	1,033,050,458
	2080	1,033,050,458	36,569,986	(9,419,377)	-	1,060,201,067
	2081	1,060,201,067	37,531,118	(9,611,255)	-	1,088,120,930
	2082	1,088,120,930	38,519,481	(53,104,465)	-	1,073,535,946
	2083	1,073,535,946	38,003,172	(10,236,083)	-	1,101,303,035
	2084	1,101,303,035	38,986,127	(10,684,880)	-	1,129,604,283
	2085	1,129,604,283	39,987,992	(10,906,631)	-	1,158,685,644
	2086	1,158,685,644	41,017,472	(11,260,151)	-	1,188,442,964
	2087	1,188,442,964	42,070,881	(11,626,386)	-	1,218,887,459
	2088	1,218,887,459	43,148,616	(352,803,942)	-	909,232,133
	2089	909,232,133	32,186,818	(12,398,978)	-	929,019,973
	2090	929,019,973	32,887,307	(12,806,269)	-	949,101,011
	2091	949,101,011	33,598,176	(13,228,288)	-	969,470,899
	2092	969,470,899	34,319,270	(13,822,127)	-	989,968,043
	2093	989,968,043	35,044,869	(16,712,189)	-	1,008,300,722
	2094	1,008,300,722	35,693,846	(21,273,455)	-	1,022,721,112
	2095	1,022,721,112	36,204,327	(62,315,154)	-	996,610,286
	2096	996,610,286	35,280,004	(52,022,706)	-	979,867,584
	2097	979,867,584	34,687,312	(49,097,836)	-	965,457,060
	2098	965,457,060	34,177,180	(27,222,845)	-	972,411,395
	2099	972,411,395	34,423,363	(52,291,781)	-	954,542,977
	2100	954,542,977	33,790,821	(68,044,043)	-	920,289,755
	2101	920,289,755	32,578,257	(75,192,667)	-	877,675,346
	2102	877,675,346	31,069,707	(77,596,500)	-	831,148,554
	2103	831,148,554	29,422,659	(24,946,667)	-	835,624,545
	2104	835,624,545	29,581,109	(27,837,437)	-	837,368,217
	2105	837,368,217	29,642,835	(83,425,509)	-	783,585,543
	2106	783,585,543	27,738,928	(65,298,117)	-	746,026,354
	2107	746,026,354	26,409,333	(69,412,227)	-	703,023,460

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2108	703,023,460	24,887,030	(31,765,526)	-	696,144,965
2109	696,144,965	24,643,532	(71,870,887)	-	648,917,609
2110	648,917,609	22,971,683	(76,403,426)	-	595,485,867
2111	595,485,867	21,080,200	(78,893,880)	-	537,672,187
2112	537,672,187	19,033,595	(36,281,423)	-	520,424,360
2113	520,424,360	18,423,022	(178,014,477)	-	360,832,905
2114	360,832,905	12,773,485	(135,317,498)	-	238,288,892
2115	238,288,892	8,435,427	(107,488,946)	-	139,235,373
2116	139,235,373	4,928,932	(41,474,599)	-	102,689,706
2117	102,689,706	3,635,216	(143,503,463)	-	(37,178,542)
2118	(37,178,542)	(1,316,120)	38,494,662	-	0

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2022 ACCRUAL COMPARISON

	Present	Proposed	Difference
Monticello	$8,507,110	$53,138,244	$44,631,134
Prairie Island Unit 1	12,399,703	44,412,832	32,013,129
Prairie Island Unit 2	6,511,608	37,671,093	31,159,485
TOTAL	$27,418,421	$135,222,169	$107,803,748

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2022 MN RETAIL SUMMARY

	Remaining Life (yrs)	Operational Earnings Rate	Post-Shutdown Earnings Rate	Market Value Balance 6/30/2020	Book Value 6/30/2020	Unrealized Gain/Loss 6/30/2020	Tax-Effect Adjustment	Tax-Adjusted Fund Balance 6/30/2020	2022-2024 Decommissioning Accrual
Monticello	19.67	3.99%	3.88%	$814,968,100	$610,109,002	$204,859,098	$57,032,773	$757,935,327	**$ 53,138,244**
Prairie Island Unit 1	13.25	4.03%	3.85%	471,960,960	346,629,286	125,331,674	34,892,338	437,068,622	**44,412,832**
Prairie Island Unit 2	14.42	4.00%	3.84%	526,255,835	385,837,890	140,417,945	39,092,356	487,163,479	**37,671,093**
TOTAL DECOMMISSIONING ACCRUAL				**$1,813,184,895**	**$1,342,576,178**	**$470,608,717**	**$131,017,467**	**$1,682,167,428**	**$135,222,169**

INPUT DATA

Escalation Rate (Labor)	3.78%
Escalation Rate (Non-Labor)	2.58%
Escalation Rate (PIIC)	0.00%
Jurisdictional Factor	72.9219%
Tax Rate for tax-effect adjustment	27.84%

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AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Monticello																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2040	$22,675,886	$0	$22,675,886	$16,535,687	2.1003	$34,729,903	$9,374,135	$0	$9,374,135	$6,835,797	1.6644	$11,377,501	$0	$0	1.0000	$0	$32,050,021	$23,371,484	$46,107,404
2041	77,873,473	-	77,873,473	56,786,816	2.1797	123,778,223	48,081,975	-	48,081,975	35,062,290	1.7073	59,861,847	0	0	1.0000	0	125,955,448	91,849,106	183,640,070
2042	86,878,179	-	86,878,179	63,353,219	2.2620	143,304,981	136,457,474	-	136,457,474	99,507,383	1.7514	174,277,230	0	0	1.0000	0	223,335,652	162,860,601	317,582,210
2043	97,067,842	-	97,067,842	70,783,715	2.3475	166,164,770	156,074,917	-	156,074,917	113,812,795	1.7966	204,476,067	0	0	1.0000	0	253,142,759	184,596,509	370,640,837
2044	97,811,957	-	97,811,957	71,326,337	2.4363	173,772,356	131,387,082	-	131,387,082	95,809,956	1.8429	176,568,169	0	0	1.0000	0	229,199,039	167,136,294	350,340,524
2045	52,997,679	-	52,997,679	38,646,914	2.5284	97,714,858	22,621,563	-	22,621,563	16,496,074	1.8905	31,185,827	0	0	1.0000	0	75,619,242	55,142,988	128,900,685
2046	37,374,011	-	37,374,011	27,253,839	2.6239	71,511,349	18,500,781	-	18,500,781	13,491,121	1.9392	26,161,982	0	0	1.0000	0	55,874,792	40,744,960	97,673,330
2047	32,437,139	-	32,437,139	23,653,778	2.7231	64,411,603	20,005,569	-	20,005,569	14,588,441	1.9893	29,020,786	0	0	1.0000	0	52,442,708	38,242,219	93,432,389
2048	8,502,031	5,823,411	2,678,620	1,953,301	2.8261	5,520,223	4,661,450	1,836,756	2,824,694	2,059,820	2.0406	4,203,270	0	0	1.0000	0	5,503,314	4,013,121	9,723,492
2049	7,761,330	5,823,411	1,937,919	1,413,168	2.9329	4,144,679	2,496,300	1,836,756	659,545	480,952	2.0932	1,006,730	0	0	1.0000	0	2,597,464	1,894,120	5,151,409
2050	9,380,174	5,823,411	3,556,763	2,593,659	3.0438	7,894,579	7,352,831	1,836,756	5,516,075	4,022,427	2.1472	8,636,954	0	0	1.0000	0	9,072,838	6,616,086	16,531,533
2051	9,380,174	5,823,411	3,556,763	2,593,659	3.1588	8,192,850	7,352,831	1,836,756	5,516,075	4,022,427	2.2026	8,859,797	0	0	1.0000	0	9,072,838	6,616,086	17,052,647
2052	9,401,388	5,823,411	3,577,977	2,609,129	3.2782	8,553,247	7,359,522	1,836,756	5,522,766	4,027,306	2.2595	9,099,698	0	0	1.0000	0	9,100,744	6,636,435	17,652,945
2053	9,380,174	5,823,411	3,556,763	2,593,659	3.4021	8,823,887	7,352,831	1,836,756	5,516,075	4,022,427	2.3178	9,323,180	0	0	1.0000	0	9,072,838	6,616,086	18,147,067
2054	9,380,174	5,823,411	3,556,763	2,593,659	3.5307	9,157,432	7,352,831	1,836,756	5,516,075	4,022,427	2.3776	9,563,721	0	0	1.0000	0	9,072,838	6,616,086	18,721,153
2055	9,380,174	5,823,411	3,556,763	2,593,659	3.6642	9,503,685	7,352,831	1,836,756	5,516,075	4,022,427	2.4389	9,810,296	0	0	1.0000	0	9,072,838	6,616,086	19,313,981
2056	9,401,388	5,823,411	3,577,977	2,609,129	3.8027	9,921,735	7,359,522	1,836,756	5,522,766	4,027,306	2.5018	10,075,514	0	0	1.0000	0	9,100,744	6,636,435	19,997,249
2057	9,380,174	5,823,411	3,556,763	2,593,659	3.9464	10,235,616	7,352,831	1,836,756	5,516,075	4,022,427	2.5664	10,323,156	0	0	1.0000	0	9,072,838	6,616,086	20,558,771
2058	16,558,280	5,823,411	10,734,869	7,828,070	4.0956	32,060,645	28,887,149	1,836,756	27,050,393	19,725,661	2.6326	51,929,775	0	0	1.0000	0	37,785,262	27,553,731	83,990,420
2059	9,380,174	5,823,411	3,556,763	2,593,659	4.2504	11,024,088	7,352,831	1,836,756	5,516,075	4,022,427	2.7005	10,862,563	0	0	1.0000	0	9,072,838	6,616,086	21,886,651
2060	9,401,388	5,823,411	3,577,977	2,609,129	4.4111	11,509,129	7,359,522	1,836,756	5,522,766	4,027,306	2.7702	11,156,443	0	0	1.0000	0	9,100,744	6,636,435	22,665,572
2061	9,380,174	5,823,411	3,556,763	2,593,659	4.5778	11,873,252	7,352,831	1,836,756	5,516,075	4,022,427	2.8416	11,430,127	0	0	1.0000	0	9,072,838	6,616,086	23,303,379
2062	9,380,174	5,823,411	3,556,763	2,593,659	4.7509	12,322,214	7,352,831	1,836,756	5,516,075	4,022,427	2.9150	11,725,373	0	0	1.0000	0	9,072,838	6,616,086	24,047,588
2063	12,969,227	5,823,411	7,145,816	5,210,865	4.9305	25,692,168	18,119,990	1,836,756	16,283,234	11,874,044	2.9902	35,505,765	0	0	1.0000	0	23,429,050	17,084,908	61,197,934
2064	9,401,388	5,823,411	3,577,977	2,609,129	5.1168	13,350,392	7,359,522	1,836,756	5,522,766	4,027,306	3.0673	12,352,956	0	0	1.0000	0	9,100,744	6,636,435	25,703,347
2065	9,380,174	5,823,411	3,556,763	2,593,659	5.3103	13,773,107	7,352,831	1,836,756	5,516,075	4,022,427	3.1465	12,656,565	0	0	1.0000	0	9,072,838	6,616,086	26,429,672
2066	10,097,984	5,823,411	4,274,573	3,117,100	5.5110	17,178,339	9,506,262	1,836,756	7,669,507	5,592,750	3.2276	18,051,160	0	0	1.0000	0	11,944,080	8,709,850	35,229,498
2067	9,380,174	5,823,411	3,556,763	2,593,659	5.7193	14,833,914	7,352,831	1,836,756	5,516,075	4,022,427	3.3109	13,317,852	0	0	1.0000	0	9,072,838	6,616,086	28,151,766
2068	19,450,737	5,823,411	13,627,326	9,937,305	5.9355	58,982,874	37,507,568	1,836,756	35,670,812	26,011,834	3.3963	88,343,992	0	0	1.0000	0	49,298,138	35,949,139	147,326,866
2069	9,380,174	5,823,411	3,556,763	2,593,659	6.1598	15,976,420	7,352,831	1,836,756	5,516,075	4,022,427	3.4840	14,014,134	0	0	1.0000	0	9,072,838	6,616,086	29,990,555
2070	9,380,174	5,823,411	3,556,763	2,593,659	6.3927	16,580,484	7,352,831	1,836,756	5,516,075	4,022,427	3.5738	14,375,348	0	0	1.0000	0	9,072,838	6,616,086	30,955,832
2071	9,380,174	5,823,411	3,556,763	2,593,659	6.6343	17,207,112	7,352,831	1,836,756	5,516,075	4,022,427	3.6660	14,746,216	0	0	1.0000	0	9,072,838	6,616,086	31,953,327
2072	9,401,388	5,823,411	3,577,977	2,609,129	6.8851	17,964,114	7,359,522	1,836,756	5,522,766	4,027,306	3.7606	15,145,087	0	0	1.0000	0	9,100,744	6,636,435	33,109,202
2073	9,380,174	5,823,411	3,556,763	2,593,659	7.1454	18,532,731	7,352,831	1,836,756	5,516,075	4,022,427	3.8576	15,516,913	0	0	1.0000	0	9,072,838	6,616,086	34,049,643
2074	9,380,174	5,823,411	3,556,763	2,593,659	7.4155	19,233,278	7,352,831	1,836,756	5,516,075	4,022,427	3.9572	15,917,546	0	0	1.0000	0	9,072,838	6,616,086	35,150,824
2075	9,380,174	5,823,411	3,556,763	2,593,659	7.6958	19,960,280	7,352,831	1,836,756	5,516,075	4,022,427	4.0593	16,328,236	0	0	1.0000	0	9,072,838	6,616,086	36,288,517
2076	9,401,388	5,823,411	3,577,977	2,609,129	7.9867	20,838,331	7,359,522	1,836,756	5,522,766	4,027,306	4.1640	16,769,702	0	0	1.0000	0	9,100,744	6,636,435	37,608,033
2077	9,380,174	5,823,411	3,556,763	2,593,659	8.2886	21,497,802	7,352,831	1,836,756	5,516,075	4,022,427	4.2714	17,181,393	0	0	1.0000	0	9,072,838	6,616,086	38,679,194
2078	9,380,174	5,823,411	3,556,763	2,593,659	8.6019	22,310,395	7,352,831	1,836,756	5,516,075	4,022,427	4.3816	17,624,664	0	0	1.0000	0	9,072,838	6,616,086	39,935,059
2079	9,380,174	5,823,411	3,556,763	2,593,659	8.9270	23,153,593	7,352,831	1,836,756	5,516,075	4,022,427	4.4947	18,079,601	0	0	1.0000	0	9,072,838	6,616,086	41,233,194
2080	12,990,442	5,823,411	7,167,030	5,226,335	9.2645	48,419,378	18,126,681	1,836,756	16,289,925	11,878,923	4.6106	54,768,963	0	0	1.0000	0	23,456,956	17,105,258	103,188,342
2081	9,380,174	5,823,411	3,556,763	2,593,659	9.6147	24,937,253	7,352,831	1,836,756	5,516,075	4,022,427	4.7296	19,024,469	0	0	1.0000	0	9,072,838	6,616,086	43,961,721
2082	9,380,174	5,823,411	3,556,763	2,593,659	9.9781	25,879,788	7,352,831	1,836,756	5,516,075	4,022,427	4.8516	19,515,205	0	0	1.0000	0	9,072,838	6,616,086	45,394,993
2083	9,380,174	5,823,411	3,556,763	2,593,659	10.3553	26,858,116	7,352,831	1,836,756	5,516,075	4,022,427	4.9768	20,018,813	0	0	1.0000	0	9,072,838	6,616,086	46,876,929
2084	9,401,388	5,823,411	3,577,977	2,609,129	10.7467	28,039,527	7,359,522	1,836,756	5,522,766	4,027,306	5.1052	20,560,203	0	0	1.0000	0	9,100,744	6,636,435	48,599,730
2085	12,969,227	5,823,411	7,145,816	5,210,865	11.1529	58,116,252	18,119,990	1,836,756	16,283,234	11,874,044	5.2369	62,183,179	0	0	1.0000	0	23,429,050	17,084,908	120,299,432
2086	9,380,174	5,823,411	3,556,763	2,593,659	11.5745	30,020,305	7,352,831	1,836,756	5,516,075	4,022,427	5.3720	21,608,476	0	0	1.0000	0	9,072,838	6,616,086	51,628,781
2087	11,533,606	5,823,411	5,710,195	4,163,982	12.0120	50,017,756	13,813,126	1,836,756	11,976,370	8,733,397	5.5106	48,126,257	0	0	1.0000	0	17,686,565	12,897,379	98,144,013
2088	10,120,874	5,823,411	4,297,463	3,133,792	12.4661	39,066,163	9,517,980	1,836,756	7,681,224	5,601,295	5.6528	31,662,998	0	0	1.0000	0	11,978,687	8,735,086	70,729,161
2089	9,380,174	5,823,411	3,556,763	2,593,659	12.9373	33,554,944	7,352,831	1,836,756	5,516,075	4,022,427	5.7986	23,324,443	0	0	1.0000	0	9,072,838	6,616,086	56,879,387
2090	9,380,174	5,823,411	3,556,763	2,593,659	13.4263	34,823,243	7,352,831	1,836,756	5,516,075	4,022,427	5.9482	23,926,198	0	0	1.0000	0	9,072,838	6,616,086	58,749,441
2091	9,380,174	5,823,411	3,556,763	2,593,659	13.9338	36,139,525	7,352,831	1,836,756	5,516,075	4,022,427	6.1017	24,543,640	0	0	1.0000	0	9,072,838	6,616,086	60,683,165
2092	9,401,388	5,823,411	3,577,977	2,609,129	14.4605	37,729,311	7,359,522	1,836,756	5,522,766	4,027,306	6.2591	25,207,311	0	0	1.0000	0	9,100,744	6,636,435	62,936,622
2093	9,380,174	5,823,411	3,556,763	2,593,659	15.0071	38,923,299	7,352,831	1,836,756	5,516,075	4,022,427	6.4206	25,826,392	0	0	1.0000	0	9,072,838	6,616,086	64,749,691
2094	34,503,545	5,823,411	28,680,134	20,914,099	15.5744	325,724,542	82,722,946	1,836,756	80,886,190	58,983,746	6.5863	388,484,649	0	0	1.0000	0	109,566,324	79,897,845	714,209,192
2095	9,380,174	5,823,411	3,556,763	2,593,659	16.1631	41,921,569	7,352,831	1,836,756	5,516,075	4,022,427	6.7562	27,176,318	0	0	1.0000	0	9,072,838	6,616,086	69,097,887
2096	9,401,388	5,823,411	3,577,977	2,609,129	16.7741	43,765,792	7,359,522	1,836,756	5,522,766	4,027,306	6.9305	27,911,244	0	0	1.0000	0	9,100,744	6,636,435	71,677,036
2097	9,380,174	5,823,411	3,556,763	2,593,659	17.4081	45,150,674	7,352,831	1,836,756	5,516,075	4,022,427	7.1093	28,596,637	0	0	1.0000	0	9,072,838	6,616,086	73,747,312
2098	9,380,174	5,823,411	3,556,763	2,593,659	18.0662	46,857,561	7,352,831	1,836,756	5,516,075	4,022,427	7.2927	29,334,350	0	0	1.0000	0	9,072,838	6,616,086	76,191,911
2099	9,380,174	5,823,411	3,556,763	2,593,659	18.7491	48,628,771	7,352,831	1,836,756	5,516,075	4,022,427	7.4809	30,091,371	0	0	1.0000	0	9,072,838	6,616,086	78,720,142
2100	9,380,174	5,823,411	3,556,763	2,593,659	19.4578	50,466,897	7,352,831	1,836,756	5,516,075	4,022,427	7.6739	30,867,699	0	0	1.0000	0	9,072,838	6,616,086	81,334,596
2101	9,380,174	5,823,411	3,556,763	2,593,659	20.1933	52,374,533	7,352,831	1,836,756	5,516,075	4,022,427	7.8719	31,664,140	0	0	1.0000	0	9,072,838	6,616,086	84,038,673
2102	9,380,174	5,823,411	3,556,763	2,593,659	20.9566	54,354,273	7,352,831	1,836,756	5,516,075	4,022,427	8.0750	32,481,095	0	0	1.0000	0	9,072,838	6,616,086	86,835,368
2103	9,380,174	5,823,411	3,556,763	2,593,659	21.7488	56,408,970	7,352,831	1,836,756	5,516,075	4,022,427	8.2833	33,318,966	0	0	1.0000	0	9,072,838	6,616,086	89,727,936
2104	9,401,388	5,823,411	3,577,977	2,609,129	22.5709	58,890,391	7,359,522	1,836,756	5,522,766	4,027,306	8.4970	34,220,019	0	0	1.0000	0	9,100,744	6,636,435	93,110,410
2105	9,380,174	5,823,411	3,556,763	2,593,659	23.4240	60,753,867	7,352,831	1,836,756	5,516,075	4,022,427	8.7162	35,060,275	0	0	1.0000	0	9,072,838	6,616,086	95,814,142
2106	9,380,174	5,823,411	3,556,763	2,593,659	24.3095	63,050,552	7,352,831	1,836,756	5,516,075	4,022,427	8.9411	35,964,918	0	0	1.0000	0	9,072,838	6,616,086	99,015,470
2107	9,380,174	5,823,411	3,556,763	2,593,659	25.2284	65,433,865	7,352,831	1,836,756	5,516,075	4,022,427	9.1718	36,892,892	0	0	1.0000	0	9,072,838	6,616,086	102,326,757
2108	16,579,495	5,823,411	10,756,084	7,843,540	26.1820	205,359,577	28,893,840	1,836,756	27,057,085	19,730,540	9.4084	185,632,815	0	0	1.0000	0	37,813,168	27,574,081	390,992,392
2109	9,380,174	5,823,411	3,556,763	2,593,659	27.1717	70,474,123	7,352,831	1,836,756	5,516,075	4,022,427	9.6512	38,821,243	0	0	1.0000	0	9,072,838	6,616,086	109,295,366
2110	9,380,174	5,823,411	3,556,763	2,593,659	28.1988	73,138,070	7,352,831	1,836,756	5,516,075	4,022,427	9.9002	39,822,828	0	0	1.0000	0	9,072,838	6,616,086	112,960,897
2111	9,380,174	5,823,411	3,556,763	2,593,659	29.2647	75,902,651	7,352,831	1,836,756	5,516,075	4,022,427	10.1556	40,850,155	0	0	1.0000	0	9,072,838	6,616,086	116,752,806
2112	9,401,388	5,823,411	3,577,977	2,609,129	30.3709	79,241,598	7,359,522	1,836,756	5,522,766	4,027,306	10.4176	41,954,863	0	0	1.0000	0	9,100,744	6,636,435	121,196,461
2113	12,969,227	5,823,411	7,145,816	5,210,865	31.5189	164,240,722	18,119,990	1,836,756	16,283,234	11,874,044	10.6864	126,890,781	0	0	1.0000	0	23,429,050	17,084,908	291,131,503
2114	9,380,174	5,823,411	3,556,763	2,593,659	32.7103	84,839,362	7,352,831	1,836,756	5,516,075	4,022,427	10.9621	44,094,242	0	0	1.0000	0	9,072,838	6,616,086	128,933,604

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.12
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2115	9,380,174	5,823,411	3,556,763	2,593,659	33.9468	88,046,421	7,352,831	1,836,756	5,516,075	4,022,427	11.2449	45,231,785	0	0	1.0000	0	9,072,838	6,616,086	133,278,206
2116	10,119,199	5,823,411	4,295,788	3,132,570	35.2299	110,360,135	9,512,954	1,836,756	7,676,198	5,597,629	11.5350	64,568,656	0	0	1.0000	0	11,971,986	8,730,200	174,928,791
2117	9,380,174	5,823,411	3,556,763	2,593,659	36.5616	94,828,321	7,352,831	1,836,756	5,516,075	4,022,427	11.8326	47,595,765	0	0	1.0000	0	9,072,838	6,616,086	142,424,086
2118	19,429,522	5,823,411	13,606,111	9,921,835	37.9437	376,471,128	37,500,877	1,836,756	35,664,121	26,006,955	12.1379	315,669,814	0	0	1.0000	0	49,270,232	35,928,789	692,140,942
2119	9,380,174	5,823,411	3,556,763	2,593,659	39.3779	102,132,842	7,352,831	1,836,756	5,516,075	4,022,427	12.4511	50,083,636	0	0	1.0000	0	9,072,838	6,616,086	152,216,478
2120	9,401,388	5,823,411	3,577,977	2,609,129	40.8664	106,625,712	7,359,522	1,836,756	5,522,766	4,027,306	12.7723	51,437,961	0	0	1.0000	0	9,100,744	6,636,435	158,063,673
2121	9,380,174	5,823,411	3,556,763	2,593,659	42.4112	110,000,188	7,352,831	1,836,756	5,516,075	4,022,427	13.1018	52,701,029	0	0	1.0000	0	9,072,838	6,616,086	162,701,217
2122	9,380,174	5,823,411	3,556,763	2,593,659	44.0143	114,158,083	7,352,831	1,836,756	5,516,075	4,022,427	13.4399	54,061,011	0	0	1.0000	0	9,072,838	6,616,086	168,219,094
2123	9,380,174	5,823,411	3,556,763	2,593,659	45.6781	118,473,413	7,352,831	1,836,756	5,516,075	4,022,427	13.7866	55,455,586	0	0	1.0000	0	9,072,838	6,616,086	173,928,999
2124	9,401,388	5,823,411	3,577,977	2,609,129	47.4047	123,684,980	7,359,522	1,836,756	5,522,766	4,027,306	14.1423	56,955,370	0	0	1.0000	0	9,100,744	6,636,435	180,640,350
2125	9,380,174	5,823,411	3,556,763	2,593,659	49.1966	127,599,202	7,352,831	1,836,756	5,516,075	4,022,427	14.5072	58,354,147	0	0	1.0000	0	9,072,838	6,616,086	185,953,348
2126	9,380,174	5,823,411	3,556,763	2,593,659	51.0562	132,422,370	7,352,831	1,836,756	5,516,075	4,022,427	14.8815	59,859,741	0	0	1.0000	0	9,072,838	6,616,086	192,282,111
2127	9,380,174	5,823,411	3,556,763	2,593,659	52.9861	137,427,872	7,352,831	1,836,756	5,516,075	4,022,427	15.2654	61,403,951	0	0	1.0000	0	9,072,838	6,616,086	198,831,823
2128	10,120,874	5,823,411	4,297,463	3,133,792	54.9890	172,324,083	9,517,980	1,836,756	7,681,224	5,601,295	15.6593	87,712,351	0	0	1.0000	0	11,978,687	8,735,086	260,036,434
2129	9,380,174	5,823,411	3,556,763	2,593,659	57.0676	148,013,891	7,352,831	1,836,756	5,516,075	4,022,427	16.0633	64,613,445	0	0	1.0000	0	9,072,838	6,616,086	212,627,336
2130	12,969,227	5,823,411	7,145,816	5,210,865	59.2248	308,612,417	18,119,990	1,836,756	16,283,234	11,874,044	16.4777	195,656,930	0	0	1.0000	0	23,429,050	17,084,908	504,269,347
2131	9,380,174	5,823,411	3,556,763	2,593,659	61.4635	159,415,356	7,352,831	1,836,756	5,516,075	4,022,427	16.9028	67,990,272	0	0	1.0000	0	9,072,838	6,616,086	227,405,628
2132	9,401,388	5,823,411	3,577,977	2,609,129	63.7868	166,427,994	7,359,522	1,836,756	5,522,766	4,027,306	17.3389	69,829,056	0	0	1.0000	0	9,100,744	6,636,435	236,257,050
2133	9,380,174	5,823,411	3,556,763	2,593,659	66.1979	171,694,775	7,352,831	1,836,756	5,516,075	4,022,427	17.7863	71,544,086	0	0	1.0000	0	9,072,838	6,616,086	243,238,861
2134	9,380,174	5,823,411	3,556,763	2,593,659	68.7002	178,184,888	7,352,831	1,836,756	5,516,075	4,022,427	18.2451	73,389,575	0	0	1.0000	0	9,072,838	6,616,086	251,574,463
2135	12,969,227	5,823,411	7,145,816	5,210,865	71.2971	371,519,538	18,119,990	1,836,756	16,283,234	11,874,044	18.7159	222,233,415	0	0	1.0000	0	23,429,050	17,084,908	593,752,953
2136	9,401,388	5,823,411	3,577,977	2,609,129	73.9921	193,054,938	7,359,522	1,836,756	5,522,766	4,027,306	19.1987	77,319,040	0	0	1.0000	0	9,100,744	6,636,435	270,373,979
2137	11,533,606	5,823,411	5,710,195	4,163,982	76.7890	319,748,042	13,813,126	1,836,756	11,976,370	8,733,397	19.6941	171,996,391	0	0	1.0000	0	17,686,565	12,897,379	491,744,433
2138	9,380,174	5,823,411	3,556,763	2,593,659	79.6916	206,692,831	7,352,831	1,836,756	5,516,075	4,022,427	20.2022	81,261,866	0	0	1.0000	0	9,072,838	6,616,086	287,954,697
2139	9,380,174	5,823,411	3,556,763	2,593,659	82.7040	214,505,969	7,352,831	1,836,756	5,516,075	4,022,427	20.7234	83,358,355	0	0	1.0000	0	9,072,838	6,616,086	297,864,324
2140	9,401,388	5,823,411	3,577,977	2,609,129	85.8302	223,942,069	7,359,522	1,836,756	5,522,766	4,027,306	21.2580	85,612,472	0	0	1.0000	0	9,100,744	6,636,435	309,554,541
2141	9,380,174	5,823,411	3,556,763	2,593,659	89.0745	231,028,874	7,352,831	1,836,756	5,516,075	4,022,427	21.8065	87,715,045	0	0	1.0000	0	9,072,838	6,616,086	318,743,919
2142	9,380,174	5,823,411	3,556,763	2,593,659	92.4416	239,761,983	7,352,831	1,836,756	5,516,075	4,022,427	22.3691	89,978,062	0	0	1.0000	0	9,072,838	6,616,086	329,740,045
2143	9,380,174	5,823,411	3,556,763	2,593,659	95.9359	248,825,005	7,352,831	1,836,756	5,516,075	4,022,427	22.9462	92,299,405	0	0	1.0000	0	9,072,838	6,616,086	341,124,410
2144	34,524,760	5,823,411	28,701,349	20,929,569	99.5622	2,083,793,938	82,729,637	1,836,756	80,892,881	58,988,626	23.5382	1,388,486,075	0	0	1.0000	0	109,594,230	79,918,195	3,472,280,013
2145	9,380,174	5,823,411	3,556,763	2,593,659	103.3257	267,991,626	7,352,831	1,836,756	5,516,075	4,022,427	24.1455	97,123,501	0	0	1.0000	0	9,072,838	6,616,086	365,115,127
2146	9,380,174	5,823,411	3,556,763	2,593,659	107.2314	278,121,680	7,352,831	1,836,756	5,516,075	4,022,427	24.7685	99,629,473	0	0	1.0000	0	9,072,838	6,616,086	377,751,152
2147	9,380,174	5,823,411	3,556,763	2,593,659	111.2847	288,634,557	7,352,831	1,836,756	5,516,075	4,022,427	25.4075	102,199,803	0	0	1.0000	0	9,072,838	6,616,086	390,834,361
2148	9,401,388	5,823,411	3,577,977	2,609,129	115.4913	301,331,707	7,359,522	1,836,756	5,522,766	4,027,306	26.0630	104,963,677	0	0	1.0000	0	9,100,744	6,636,435	406,295,384
2149	9,380,174	5,823,411	3,556,763	2,593,659	119.8569	310,867,921	7,352,831	1,836,756	5,516,075	4,022,427	26.7355	107,541,586	0	0	1.0000	0	9,072,838	6,616,086	418,409,506
2150	9,380,174	5,823,411	3,556,763	2,593,659	124.3875	322,618,752	7,352,831	1,836,756	5,516,075	4,022,427	27.4252	110,315,853	0	0	1.0000	0	9,072,838	6,616,086	432,934,605
2151	9,380,174	5,823,411	3,556,763	2,593,659	129.0893	334,813,617	7,352,831	1,836,756	5,516,075	4,022,427	28.1328	113,162,122	0	0	1.0000	0	9,072,838	6,616,086	447,975,740
2152	9,401,388	5,823,411	3,577,977	2,609,129	133.9689	349,542,150	7,359,522	1,836,756	5,522,766	4,027,306	28.8586	116,222,414	0	0	1.0000	0	9,100,744	6,636,435	465,764,564
2153	9,380,174	5,823,411	3,556,763	2,593,659	139.0329	360,603,924	7,352,831	1,836,756	5,516,075	4,022,427	29.6032	119,076,698	0	0	1.0000	0	9,072,838	6,616,086	479,680,623
2154	9,380,174	5,823,411	3,556,763	2,593,659	144.2884	374,234,899	7,352,831	1,836,756	5,516,075	4,022,427	30.3669	122,148,626	0	0	1.0000	0	9,072,838	6,616,086	496,383,525
2155	9,380,174	5,823,411	3,556,763	2,593,659	149.7425	388,380,974	7,352,831	1,836,756	5,516,075	4,022,427	31.1504	125,300,197	0	0	1.0000	0	9,072,838	6,616,086	513,681,171
2156	9,401,388	5,823,411	3,577,977	2,609,129	155.4027	405,465,701	7,359,522	1,836,756	5,522,766	4,027,306	31.9541	128,688,940	0	0	1.0000	0	9,100,744	6,636,435	534,154,640
2157	9,380,174	5,823,411	3,556,763	2,593,659	161.2769	418,297,274	7,352,831	1,836,756	5,516,075	4,022,427	32.7785	131,849,110	0	0	1.0000	0	9,072,838	6,616,086	550,146,384
2158	16,558,280	5,823,411	10,734,869	7,828,070	167.3732	1,310,209,186	28,887,149	1,836,756	27,050,393	19,725,661	33.6242	663,259,565	0	0	1.0000	0	37,785,262	27,553,731	1,973,468,752
2159	9,380,174	5,823,411	3,556,763	2,593,659	173.6999	450,518,299	7,352,831	1,836,756	5,516,075	4,022,427	34.4917	138,740,331	0	0	1.0000	0	9,072,838	6,616,086	589,258,630
2160	9,401,388	5,823,411	3,577,977	2,609,129	180.2658	470,336,737	7,359,522	1,836,756	5,522,766	4,027,306	35.3816	142,492,531	0	0	1.0000	0	9,100,744	6,636,435	612,829,268
2161	9,380,174	5,823,411	3,556,763	2,593,659	187.0798	485,221,196	7,352,831	1,836,756	5,516,075	4,022,427	36.2944	145,991,559	0	0	1.0000	0	9,072,838	6,616,086	631,212,755
2162	9,380,174	5,823,411	3,556,763	2,593,659	194.1514	503,562,515	7,352,831	1,836,756	5,516,075	4,022,427	37.2308	149,758,159	0	0	1.0000	0	9,072,838	6,616,086	653,320,674
2163	12,969,227	5,823,411	7,145,816	5,210,865	201.4904	1,049,939,203	18,119,990	1,836,756	16,283,234	11,874,044	38.1914	453,486,353	0	0	1.0000	0	23,429,050	17,084,908	1,503,425,556
2164	9,401,388	5,823,411	3,577,977	2,609,129	209.1067	545,586,368	7,359,522	1,836,756	5,522,766	4,027,306	39.1767	157,776,560	0	0	1.0000	0	9,100,744	6,636,435	703,362,928
2165	9,380,174	5,823,411	3,556,763	2,593,659	217.0109	562,852,261	7,352,831	1,836,756	5,516,075	4,022,427	40.1875	161,651,268	0	0	1.0000	0	9,072,838	6,616,086	724,503,530
2166	10,097,984	5,823,411	4,274,573	3,117,100	225.2140	702,014,579	9,506,262	1,836,756	7,669,507	5,592,750	41.2243	230,557,204	0	0	1.0000	0	11,944,080	8,709,850	932,571,782
2167	9,380,174	5,823,411	3,556,763	2,593,659	233.7270	606,208,124	7,352,831	1,836,756	5,516,075	4,022,427	42.2879	170,099,973	0	0	1.0000	0	9,072,838	6,616,086	776,308,097
2168	20,170,223	5,823,411	14,346,812	10,461,968	242.5619	2,537,674,808	39,666,026	1,836,756	37,829,270	27,585,822	43.3789	1,196,642,636	0	0	1.0000	0	52,176,082	38,047,790	3,734,317,443
2169	9,380,174	5,823,411	3,556,763	2,593,659	251.7308	652,903,841	7,352,831	1,836,756	5,516,075	4,022,427	44.4981	178,990,340	0	0	1.0000	0	9,072,838	6,616,086	831,894,181
2170	9,380,174	5,823,411	3,556,763	2,593,659	261.2462	677,583,543	7,352,831	1,836,756	5,516,075	4,022,427	45.6462	183,608,488	0	0	1.0000	0	9,072,838	6,616,086	861,192,031
2171	9,380,174	5,823,411	3,556,763	2,593,659	271.1213	703,196,184	7,352,831	1,836,756	5,516,075	4,022,427	46.8238	188,345,298	0	0	1.0000	0	9,072,838	6,616,086	891,541,482
2172	9,401,388	5,823,411	3,577,977	2,609,129	281.3697	734,129,861	7,359,522	1,836,756	5,522,766	4,027,306	48.0319	193,439,160	0	0	1.0000	0	9,100,744	6,636,435	927,569,021
2173	9,380,174	5,823,411	3,556,763	2,593,659	292.0054	757,362,417	7,352,831	1,836,756	5,516,075	4,022,427	49.2711	198,189,382	0	0	1.0000	0	9,072,838	6,616,086	955,551,799
2174	9,380,174	5,823,411	3,556,763	2,593,659	303.0433	785,990,965	7,352,831	1,836,756	5,516,075	4,022,427	50.5423	203,302,691	0	0	1.0000	0	9,072,838	6,616,086	989,293,656
2175	9,380,174	5,823,411	3,556,763	2,593,659	314.4983	815,701,328	7,352,831	1,836,756	5,516,075	4,022,427	51.8463	208,547,935	0	0	1.0000	0	9,072,838	6,616,086	1,024,249,263
2176	9,401,388	5,823,411	3,577,977	2,609,129	326.3863	851,583,980	7,359,522	1,836,756	5,522,766	4,027,306	53.1839	214,187,841	0	0	1.0000	0	9,100,744	6,636,435	1,065,771,821
2177	9,380,174	5,823,411	3,556,763	2,593,659	338.7237	878,533,754	7,352,831	1,836,756	5,516,075	4,022,427	54.5561	219,447,907	0	0	1.0000	0	9,072,838	6,616,086	1,097,981,660
2178	9,380,174	5,823,411	3,556,763	2,593,659	351.5275	911,742,444	7,352,831	1,836,756	5,516,075	4,022,427	55.9636	225,109,472	0	0	1.0000	0	9,072,838	6,616,086	1,136,851,916
2179	9,380,174	5,823,411	3,556,763	2,593,659	364.8152	946,206,206	7,352,831	1,836,756	5,516,075	4,022,427	57.4075	230,917,454	0	0	1.0000	0	9,072,838	6,616,086	1,177,123,660
2180	12,990,442	5,823,411	7,167,030	5,226,335	378.6052	1,978,717,521	18,126,681	1,836,756	16,289,925	11,878,923	58.8886	699,533,154	0	0	1.0000	0	23,456,956	17,105,258	2,678,250,675
2181	9,380,174	5,823,411	3,556,763	2,593,659	392.9165	1,019,091,394	7,352,831	1,836,756	5,516,075	4,022,427	60.4079	242,986,342	0	0	1.0000	0	9,072,838	6,616,086	1,262,077,736
2182	9,380,174	5,823,411	3,556,763	2,593,659	407.7688	1,057,613,195	7,352,831	1,836,756	5,516,075	4,022,427	61.9664	249,255,294	0	0	1.0000	0	9,072,838	6,616,086	1,306,868,489
2183	9,380,174	5,823,411	3,556,763	2,593,659	423.1824	1,097,590,816	7,352,831	1,836,756	5,516,075	4,022,427	63.5652	255,686,350	0	0	1.0000	0	9,072,838	6,616,086	1,353,277,166
2184	9,401,388	5,823,411	3,577,977	2,609,129	439.1787	1,145,873,909	7,359,522	1,836,756	5,522,766	4,027,306	65.2052	262,601,295	0	0	1.0000	0	9,100,744	6,636,435	1,408,475,204
2185	12,969,227	5,823,411	7,145,816	5,210,865	455.7797	2,375,006,328	18,119,990	1,836,756	16,283,234	11,874,044	66.8874	794,223,911	0	0	1.0000	0	23,429,050	17,084,908	3,169,230,239
2186	9,380,174	5,823,411	3,556,763	2,593,659	473.0081	1,226,821,689	7,352,831	1,836,756	5,516,075	4,022,427	68.6131	275,991,157	0	0	1.0000	0	9,072,838	6,616,086	1,502,812,846
2187	11,533,606	5,823,411	5,710,195	4,163,982	490.8878	2,044,048,144	13,813,126	1,836,756	11,976,370	8,733,397	70.3834	614,686,164	0	0	1.0000	0	17,686,565	12,897,379	2,658,734,308
2188	9,401,388	5,823,411	3,577,977	2,609,129	509.4434	1,329,203,580	7,359,522	1,836,756	5,522,766	4,027,306	72.1993	290,768,676	0	0	1.0000	0	9,100,744	6,636,435	1,619,972,256
2189	9,380,174	5,823,411	3,556,763	2,593,659	528.7004	1,371,268,521	7,352,831	1,836,756	5,516,075	4,022,427	74.0620	297,908,957	0	0	1.0000	0	9,072,838	6,616,086	1,669,177,478
2190	9,380,174	5,823,411	3,556,763	2,593,659	548.6852	1,423,102,276	7,352,831	1,836,756	5,516,075	4,022,427	75.9728	305,595,010	0	0	1.0000	0	9,072,838	6,616,086	1,728,697,286
2191	9,380,174	5,823,411	3,556,763	2,593,659	569.4255	1,476,895,540	7,352,831	1,836,756	5,516,075	4,022,427	77.9329	313,479,368	0	0	1.0000	0	9,072,838	6,616,086	1,790,374,909

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.12
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2192	10,121,288	5,823,411	4,297,877	3,134,094	590.9498	1,852,092,115	9,519,222	1,836,756	7,682,466	5,602,200	79.9436	447,860,060	0	0	1.0000	0	11,980,344	8,736,294	2,299,952,176
2193	10,639,999	5,823,411	4,816,588	3,512,347	613.2877	2,154,079,379	11,132,306	1,836,756	9,295,550	6,778,492	82.0061	555,877,656	0	0	1.0000	0	14,112,138	10,290,839	2,709,957,035
2194	34,683,520	5,823,411	28,860,109	21,045,340	636.4700	13,394,727,615	83,262,871	1,836,756	81,426,115	59,377,470	84.1219	4,994,945,598	0	0	1.0000	0	110,286,224	80,422,810	18,389,673,213
2195	10,460,024	5,823,411	4,636,613	3,381,106	660.5286	2,233,317,265	10,592,381	1,836,756	8,755,625	6,384,768	86.2922	550,955,676	0	0	1.0000	0	13,392,238	9,765,874	2,784,272,942
2196	10,841,188	5,823,411	5,017,777	3,659,059	685.4966	2,508,272,214	11,678,922	1,836,756	9,842,166	7,177,095	88.5185	635,305,646	0	0	1.0000	0	14,859,944	10,836,153	3,143,577,860
2197	7,743,343	5,823,411	1,919,932	1,400,051	711.4083	996,007,897	2,442,339	1,836,756	605,583	441,603	90.8023	40,098,543	0	0	1.0000	0	2,525,515	1,841,654	1,036,106,441
2198	7,743,343	5,823,411	1,919,932	1,400,051	738.2996	1,033,657,088	2,442,339	1,836,756	605,583	441,603	93.1450	41,133,086	0	0	1.0000	0	2,525,515	1,841,654	1,074,790,175
2199	7,743,343	5,823,411	1,919,932	1,400,051	766.2073	1,072,729,291	2,442,339	1,836,756	605,583	441,603	95.5482	42,194,346	0	0	1.0000	0	2,525,515	1,841,654	1,114,923,637
2200	7,743,343	5,823,411	1,919,932	1,400,051	795.1699	1,113,278,408	2,442,339	1,836,756	605,583	441,603	98.0133	43,282,941	0	0	1.0000	0	2,525,515	1,841,654	1,156,561,349
2201	7,743,343	5,823,411	1,919,932	1,400,051	825.2273	1,155,360,301	2,442,339	1,836,756	605,583	441,603	100.5421	44,399,666	0	0	1.0000	0	2,525,515	1,841,654	1,199,759,967
2202	7,743,343	5,823,411	1,919,932	1,400,051	856.4209	1,199,032,932	2,442,339	1,836,756	605,583	441,603	103.1360	45,545,139	0	0	1.0000	0	2,525,515	1,841,654	1,244,578,071
2203	7,743,343	5,823,411	1,919,932	1,400,051	888.7937	1,244,356,503	2,442,339	1,836,756	605,583	441,603	105.7969	46,720,200	0	0	1.0000	0	2,525,515	1,841,654	1,291,076,702
2204	7,764,558	5,823,411	1,941,147	1,415,521	922.3901	1,305,662,659	2,449,030	1,836,756	612,274	446,482	108.5265	48,455,148	0	0	1.0000	0	2,553,421	1,862,003	1,354,117,808
2205	7,743,343	5,823,411	1,919,932	1,400,051	957.2564	1,340,207,774	2,442,339	1,836,756	605,583	441,603	111.3265	49,162,086	0	0	1.0000	0	2,525,515	1,841,654	1,389,369,860
2206	7,743,343	5,823,411	1,919,932	1,400,051	993.4407	1,390,867,639	2,442,339	1,836,756	605,583	441,603	114.1987	50,430,457	0	0	1.0000	0	2,525,515	1,841,654	1,441,298,096
2207	7,743,343	5,823,411	1,919,932	1,400,051	1,030.9927	1,443,442,354	2,442,339	1,836,756	605,583	441,603	117.1450	51,731,552	0	0	1.0000	0	2,525,515	1,841,654	1,495,173,905
2208	15,662,150	5,823,411	9,838,739	7,174,595	1,069.9643	7,676,560,909	26,141,807	1,836,756	24,305,051	17,723,705	120.1674	2,129,811,542	0	0	1.0000	0	34,143,790	24,898,300	9,806,372,450
2209	7,743,343	5,823,411	1,919,932	1,400,051	1,110.4089	1,554,629,084	2,442,339	1,836,756	605,583	441,603	123.2677	54,435,353	0	0	1.0000	0	2,525,515	1,841,654	1,609,064,436
2210	7,743,343	5,823,411	1,919,932	1,400,051	1,152.3824	1,613,394,124	2,442,339	1,836,756	605,583	441,603	126.4480	55,839,782	0	0	1.0000	0	2,525,515	1,841,654	1,669,233,906
2211	7,743,343	5,823,411	1,919,932	1,400,051	1,195.9424	1,674,380,345	2,442,339	1,836,756	605,583	441,603	129.7104	57,280,467	0	0	1.0000	0	2,525,515	1,841,654	1,731,660,812
2212	7,764,558	5,823,411	1,941,147	1,415,521	1,241.1491	1,756,872,753	2,449,030	1,836,756	612,274	446,482	133.0569	59,407,535	0	0	1.0000	0	2,553,421	1,862,003	1,816,280,288
2213	11,332,396	5,823,411	5,508,985	4,017,257	1,288.0645	5,174,485,747	13,209,498	1,836,756	11,372,742	8,293,220	136.4898	1,131,939,920	0	0	1.0000	0	16,881,728	12,310,477	6,306,425,667
2214	7,743,343	5,823,411	1,919,932	1,400,051	1,336.7533	1,871,522,786	2,442,339	1,836,756	605,583	441,603	140.0112	61,829,328	0	0	1.0000	0	2,525,515	1,841,654	1,933,352,113
2215	7,743,343	5,823,411	1,919,932	1,400,051	1,387.2826	1,942,266,382	2,442,339	1,836,756	605,583	441,603	143.6235	63,424,529	0	0	1.0000	0	2,525,515	1,841,654	2,005,690,912
2216	8,482,369	5,823,411	2,658,957	1,938,962	1,439.7219	2,791,566,419	4,602,462	1,836,756	2,765,706	2,016,806	147.3290	297,133,953	0	0	1.0000	0	5,424,664	3,955,768	3,088,700,372
2217	7,743,343	5,823,411	1,919,932	1,400,051	1,494.1434	2,091,876,951	2,442,339	1,836,756	605,583	441,603	151.1301	66,739,464	0	0	1.0000	0	2,525,515	1,841,654	2,158,616,416
2218	18,311,629	5,823,411	12,488,218	9,106,646	1,550.6220	14,120,965,736	34,147,197	1,836,756	32,310,442	23,561,388	155.0292	3,652,703,124	0	0	1.0000	0	44,798,660	32,668,034	17,773,668,861
2219	8,366,068	5,823,411	2,542,657	1,854,154	1,609.2355	2,983,770,271	4,310,514	1,836,756	2,473,758	1,803,911	159.0290	286,874,231	0	0	1.0000	0	5,016,415	3,658,065	3,270,644,502
2220	8,283,495	5,823,411	2,460,084	1,793,940	1,670.0646	2,995,996,016	4,005,843	1,836,756	2,169,087	1,581,739	163.1319	258,032,159	0	0	1.0000	0	4,629,171	3,375,680	3,254,028,175
2221	8,262,281	5,823,411	2,438,870	1,778,470	1,733.1930	3,082,431,890	3,999,151	1,836,756	2,162,396	1,576,860	167.3407	263,872,853	0	0	1.0000	0	4,601,265	3,355,330	3,346,304,744
2222	8,262,281	5,823,411	2,438,870	1,778,470	1,798.7077	3,198,947,824	3,999,151	1,836,756	2,162,396	1,576,860	171.6581	270,680,789	0	0	1.0000	0	4,601,265	3,355,330	3,469,628,612
2223	8,366,068	5,823,411	2,542,657	1,854,154	1,866.6989	3,461,147,037	4,310,514	1,836,756	2,473,758	1,803,911	176.0869	317,645,172	0	0	1.0000	0	5,016,415	3,658,065	3,778,792,209
2224	8,283,495	5,823,411	2,460,084	1,793,940	1,937.2601	3,475,328,764	4,005,843	1,836,756	2,169,087	1,581,739	180.6299	285,709,436	0	0	1.0000	0	4,629,171	3,375,680	3,761,038,200
2225	8,262,281	5,823,411	2,438,870	1,778,470	2,010.4885	3,575,593,640	3,999,151	1,836,756	2,162,396	1,576,860	185.2902	292,176,702	0	0	1.0000	0	4,601,265	3,355,330	3,867,770,341
2226	8,262,281	5,823,411	2,438,870	1,778,470	2,086.4850	3,710,751,141	3,999,151	1,836,756	2,162,396	1,576,860	190.0707	299,714,881	0	0	1.0000	0	4,601,265	3,355,330	4,010,466,022
2227	8,366,068	5,823,411	2,542,657	1,854,154	2,165.3541	4,014,899,739	4,310,514	1,836,756	2,473,758	1,803,911	194.9745	351,716,730	0	0	1.0000	0	5,016,415	3,658,065	4,366,616,469
2228	8,283,495	5,823,411	2,460,084	1,793,940	2,247.2045	4,031,350,481	4,005,843	1,836,756	2,169,087	1,581,739	200.0048	316,355,479	0	0	1.0000	0	4,629,171	3,375,680	4,347,705,961
2229	8,262,281	5,823,411	2,438,870	1,778,470	2,332.1489	4,147,657,037	3,999,151	1,836,756	2,162,396	1,576,860	205.1650	323,516,478	0	0	1.0000	0	4,601,265	3,355,330	4,471,173,515
2230	11,436,184	5,823,411	5,612,773	4,092,941	2,420.3041	9,906,160,722	13,520,861	1,836,756	11,684,105	8,520,271	210.4582	1,793,160,963	0	0	1.0000	0	17,296,878	12,613,212	11,699,321,686
2231	7,847,131	5,823,411	2,023,720	1,475,735	2,511.7916	3,706,738,300	2,753,701	1,836,756	916,946	668,654	215.8880	144,354,413	0	0	1.0000	0	2,940,665	2,144,389	3,851,092,714
2232	7,868,345	5,823,411	2,044,934	1,491,205	2,606.7373	3,887,179,508	2,760,393	1,836,756	923,637	673,534	221.4580	149,159,411	0	0	1.0000	0	2,968,571	2,164,739	4,036,338,919
2233	7,950,918	5,823,411	2,127,507	1,551,419	2,705.2720	4,197,009,373	3,065,064	1,836,756	1,228,308	895,706	227.1716	203,478,881	0	0	1.0000	0	3,355,815	2,447,124	4,400,488,254
2234	7,847,131	5,823,411	2,023,720	1,475,735	2,807.5313	4,143,171,671	2,753,701	1,836,756	916,946	668,654	233.0326	155,818,222	0	0	1.0000	0	2,940,665	2,144,389	4,298,989,892
2235	11,436,184	5,823,411	5,612,773	4,092,941	2,913.6559	11,925,420,295	13,520,861	1,836,756	11,684,105	8,520,271	239.0448	2,036,726,551	0	0	1.0000	0	17,296,878	12,613,212	13,962,146,846
2236	7,972,133	5,823,411	2,148,722	1,566,889	3,023.7921	4,737,945,809	3,071,755	1,836,756	1,234,999	900,585	245.2122	220,834,449	0	0	1.0000	0	3,383,721	2,467,474	4,958,780,258
2237	10,000,563	5,823,411	4,177,151	3,046,058	3,138.0915	9,558,809,460	9,213,997	1,836,756	7,377,241	5,379,624	251.5387	1,353,183,742	0	0	1.0000	0	11,554,393	8,425,683	10,911,993,202
2238	7,847,131	5,823,411	2,023,720	1,475,735	3,256.7113	4,806,042,233	2,753,701	1,836,756	916,946	668,654	258.0284	172,531,768	0	0	1.0000	0	2,940,665	2,144,389	4,978,574,001
2239	7,950,918	5,823,411	2,127,507	1,551,419	3,379.8150	5,243,507,948	3,065,064	1,836,756	1,228,308	895,706	264.6855	237,080,293	0	0	1.0000	0	3,355,815	2,447,124	5,480,588,240
2240	7,919,652	5,823,411	2,096,241	1,528,618	3,507.5720	5,361,739,109	9,380,077	1,836,756	7,543,322	5,500,734	271.5144	1,493,528,362	0	0	1.0000	0	9,639,562	7,029,352	6,855,267,471
2241	2,074,007	5,823,411	(3,749,404)	(2,734,137)	3,640.1583	(9,952,690,736)	5,654,893	1,836,756	3,818,137	2,784,258	278.5195	775,470,146	0	0	1.0000	0	68,733	50,121	(9,177,220,591)
	$2,458,455,841	$1,129,741,756	$1,328,714,084	$968,923,556		$224,842,186,810	$2,393,720,043	$356,330,608	$2,037,389,435	$1,485,703,086		$46,227,410,170	$0	$0		$0	$3,366,103,519	$2,454,626,642	$271,069,596,981

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.12
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 1																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2033	$23,781,621	$0	$23,781,621	$17,342,010	1.6199	$28,092,322	$10,730,367	$0	$10,730,367	$7,824,788	1.3926	$10,896,799	$1,250,000	$911,524	1.0000	$911,524	$35,761,989	$26,078,322	$39,900,645
2034	67,414,165	-	67,414,165	49,159,690	1.6811	82,642,355	37,794,291	-	37,794,291	27,560,315	1.4285	39,369,910	1,250,000	911,524	1.0000	911,524	106,458,456	77,631,529	122,923,789
2035	68,590,728	-	68,590,728	50,017,662	1.7446	87,260,813	77,836,645	-	77,836,645	56,759,960	1.4653	83,170,370	1,250,000	911,524	1.0000	911,524	147,677,372	107,689,146	171,342,706
2036	64,616,422	-	64,616,422	47,119,523	1.8106	85,314,608	81,274,975	-	81,274,975	59,267,256	1.5032	89,090,539	1,250,000	911,524	1.0000	911,524	147,141,397	107,298,302	175,316,670
2037	46,367,050	-	46,367,050	33,811,734	1.8790	63,532,248	68,950,805	-	68,950,805	50,280,237	1.5419	77,527,098	1,250,000	911,524	1.0000	911,524	116,567,855	85,003,495	141,970,869
2038	26,102,517	-	26,102,517	19,034,451	1.9501	37,119,083	44,888,187	-	44,888,187	32,733,319	1.5817	51,774,290	1,250,000	911,524	1.0000	911,524	72,240,703	52,679,293	89,804,897
2039	33,734,614	-	33,734,614	24,599,921	2.0238	49,785,321	14,198,586	-	14,198,586	10,353,879	1.6225	16,799,168	1,250,000	911,524	1.0000	911,524	49,183,200	35,865,324	67,496,013
2040	20,721,562	-	20,721,562	15,110,557	2.1003	31,736,703	9,470,370	-	9,470,370	6,905,974	1.6644	11,494,303	1,250,000	911,524	1.0000	911,524	31,441,932	22,928,054	44,142,529
2041	15,615,259	2,964,152	12,651,106	9,225,427	2.1797	20,108,663	11,497,230	1,596,286	9,900,945	7,219,957	1.7073	12,326,633	1,250,000	911,524	1.0000	911,524	23,802,051	17,356,908	33,346,820
2042	9,448,219	2,964,152	6,484,067	4,728,305	2.2620	10,695,425	6,542,839	1,596,286	4,946,554	3,607,121	1.7514	6,317,511	1,250,000	911,524	1.0000	911,524	12,680,620	9,246,949	17,924,460
2043	3,952,204	2,964,152	988,052	720,506	2.3475	1,691,388	2,127,526	1,596,286	531,240	387,390	1.7966	695,985	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	3,298,897
2044	3,963,032	2,964,152	998,879	728,402	2.4363	1,774,606	2,136,779	1,596,286	540,493	394,138	1.8429	726,357	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	3,412,486
2045	5,466,342	2,964,152	2,502,189	1,824,644	2.5284	4,613,430	6,669,939	1,596,286	5,073,654	3,699,805	1.8905	6,994,481	1,250,000	911,524	1.0000	911,524	8,825,843	6,435,973	12,519,435
2046	4,961,629	2,964,152	1,997,477	1,456,598	2.6239	3,821,968	5,155,801	1,596,286	3,559,516	2,595,667	1.9392	5,033,517	1,250,000	911,524	1.0000	911,524	6,806,993	4,963,788	9,767,008
2047	4,961,629	2,964,152	1,997,477	1,456,598	2.7231	3,966,462	5,155,801	1,596,286	3,559,516	2,595,667	1.9893	5,163,560	1,250,000	911,524	1.0000	911,524	6,806,993	4,963,788	10,041,546
2048	3,963,032	2,964,152	998,879	728,402	2.8261	2,058,537	2,136,779	1,596,286	540,493	394,138	2.0406	804,278	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	3,774,339
2049	4,961,629	2,964,152	1,997,477	1,456,598	2.9329	4,272,056	5,155,801	1,596,286	3,559,516	2,595,667	2.0932	5,433,249	1,250,000	911,524	1.0000	911,524	6,806,993	4,963,788	10,616,830
2050	5,466,342	2,964,152	2,502,189	1,824,644	3.0438	5,553,852	6,669,939	1,596,286	5,073,654	3,699,805	2.1472	7,944,221	1,250,000	911,524	1.0000	911,524	8,825,843	6,435,973	14,409,596
2051	5,411,567	2,964,152	2,447,414	1,784,701	3.1588	5,637,514	6,505,614	1,596,286	4,909,328	3,579,976	2.2026	7,885,254	1,250,000	911,524	1.0000	911,524	8,606,743	6,276,200	14,434,291
2052	5,477,170	2,964,152	2,513,017	1,832,540	3.2782	6,007,433	6,679,193	1,596,286	5,082,907	3,706,553	2.2595	8,374,956	1,250,000	911,524	1.0000	911,524	8,845,925	6,450,616	15,293,912
2053	3,952,204	2,964,152	988,052	720,506	3.4021	2,451,233	2,127,526	1,596,286	531,240	387,390	2.3178	897,893	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	4,260,650
2054	3,952,204	2,964,152	988,052	720,506	3.5307	2,543,890	2,127,526	1,596,286	531,240	387,390	2.3776	921,059	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	4,376,473
2055	5,466,342	2,964,152	2,502,189	1,824,644	3.6642	6,685,861	6,669,939	1,596,286	5,073,654	3,699,805	2.4389	9,023,454	1,250,000	911,524	1.0000	911,524	8,825,843	6,435,973	16,620,838
2056	4,972,457	2,964,152	2,008,305	1,464,494	3.8027	5,569,031	5,165,055	1,596,286	3,568,769	2,602,414	2.5018	6,510,720	1,250,000	911,524	1.0000	911,524	6,827,074	4,978,432	12,991,276
2057	4,961,629	2,964,152	1,997,477	1,456,598	3.9464	5,748,319	5,155,801	1,596,286	3,559,516	2,595,667	2.5664	6,661,519	1,250,000	911,524	1.0000	911,524	6,806,993	4,963,788	13,321,361
2058	3,952,204	2,964,152	988,052	720,506	4.0956	2,950,904	2,127,526	1,596,286	531,240	387,390	2.6326	1,019,844	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	4,882,272
2059	4,906,854	2,964,152	1,942,702	1,416,655	4.2504	6,021,350	4,991,476	1,596,286	3,395,190	2,475,837	2.7005	6,685,999	1,250,000	911,524	1.0000	911,524	6,587,892	4,804,016	13,618,873
2060	4,972,457	2,964,152	2,008,305	1,464,494	4.4111	6,460,029	5,165,055	1,596,286	3,568,769	2,602,414	2.7702	7,209,208	1,250,000	911,524	1.0000	911,524	6,827,074	4,978,432	14,580,762
2061	4,961,629	2,964,152	1,997,477	1,456,598	4.5778	6,668,015	5,155,801	1,596,286	3,559,516	2,595,667	2.8416	7,375,846	1,250,000	911,524	1.0000	911,524	6,806,993	4,963,788	14,955,385
2062	3,952,204	2,964,152	988,052	720,506	4.7509	3,423,052	2,127,526	1,596,286	531,240	387,390	2.9150	1,129,243	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	5,463,818
2063	6,980,480	2,964,152	4,016,327	2,928,782	4.9305	14,440,361	11,212,353	1,596,286	9,616,068	7,012,219	2.9902	20,967,938	1,250,000	911,524	1.0000	911,524	14,882,395	10,852,525	36,319,822
2064	5,927,107	2,964,152	2,962,955	2,160,643	5.1168	11,055,578	8,029,005	1,596,286	6,432,720	4,690,862	3.0673	14,388,279	1,250,000	911,524	1.0000	911,524	10,645,675	7,763,028	26,355,381
2065	4,961,629	2,964,152	1,997,477	1,456,598	5.3103	7,734,973	5,155,801	1,596,286	3,559,516	2,595,667	3.1465	8,167,265	1,250,000	911,524	1.0000	911,524	6,806,993	4,963,788	16,813,761
2066	3,952,204	2,964,152	988,052	720,506	5.5110	3,970,708	2,127,526	1,596,286	531,240	387,390	3.2276	1,250,341	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	6,132,573
2067	3,952,204	2,964,152	988,052	720,506	5.7193	4,120,790	2,127,526	1,596,286	531,240	387,390	3.3109	1,282,611	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	6,314,924
2068	5,981,882	2,964,152	3,017,730	2,200,586	5.9355	13,061,579	8,193,331	1,596,286	6,597,045	4,810,691	3.3963	16,338,549	1,250,000	911,524	1.0000	911,524	10,864,775	7,922,801	30,311,651
2069	5,466,342	2,964,152	2,502,189	1,824,644	6.1598	11,239,443	6,669,939	1,596,286	5,073,654	3,699,805	3.4840	12,890,120	1,250,000	911,524	1.0000	911,524	8,825,843	6,435,973	25,041,086
2070	3,952,204	2,964,152	988,052	720,506	6.3927	4,605,978	2,127,526	1,596,286	531,240	387,390	3.5738	1,384,455	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	6,901,958
2071	3,952,204	2,964,152	988,052	720,506	6.6343	4,780,053	2,127,526	1,596,286	531,240	387,390	3.6660	1,420,173	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	7,111,749
2072	6,431,820	2,964,152	3,467,668	2,528,689	6.8851	17,410,277	9,543,143	1,596,286	7,946,858	5,795,000	3.7606	21,792,676	1,250,000	911,524	1.0000	911,524	12,664,525	9,235,212	40,114,477
2073	3,952,204	2,964,152	988,052	720,506	7.1454	5,148,303	2,127,526	1,596,286	531,240	387,390	3.8576	1,494,397	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	7,554,224
2074	3,952,204	2,964,152	988,052	720,506	7.4155	5,342,912	2,127,526	1,596,286	531,240	387,390	3.9572	1,532,981	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	7,787,417
2075	6,835,510	2,964,152	3,871,358	2,823,068	7.6958	21,725,764	10,777,444	1,596,286	9,181,159	6,695,075	4.0593	27,177,319	1,250,000	911,524	1.0000	911,524	14,302,516	10,429,667	49,814,607
2076	3,963,032	2,964,152	998,879	728,402	7.9867	5,817,528	2,136,779	1,596,286	540,493	394,138	4.1640	1,641,191	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	8,370,242
2077	3,952,204	2,964,152	988,052	720,506	8.2886	5,971,986	2,127,526	1,596,286	531,240	387,390	4.2714	1,654,699	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	8,538,208
2078	6,475,767	2,964,152	3,511,615	2,560,736	8.6019	22,027,197	9,698,215	1,596,286	8,101,930	5,908,081	4.3816	25,886,848	1,250,000	911,524	1.0000	911,524	12,863,544	9,380,341	48,825,568
2079	3,952,204	2,964,152	988,052	720,506	8.9270	6,431,957	2,127,526	1,596,286	531,240	387,390	4.4947	1,741,203	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	9,084,684
2080	3,963,032	2,964,152	998,879	728,402	9.2645	6,748,279	2,136,779	1,596,286	540,493	394,138	4.6106	1,817,213	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	9,477,016
2081	3,952,204	2,964,152	988,052	720,506	9.6147	6,927,449	2,127,526	1,596,286	531,240	387,390	4.7296	1,832,201	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	9,671,174
2082	6,366,217	2,964,152	3,402,064	2,480,850	9.9781	24,754,170	9,369,564	1,596,286	7,773,279	5,668,423	4.8516	27,500,919	1,250,000	911,524	1.0000	911,524	12,425,343	9,060,796	53,166,613
2083	3,952,204	2,964,152	988,052	720,506	10.3553	7,461,055	2,127,526	1,596,286	531,240	387,390	4.9768	1,927,964	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	10,300,543
2084	3,963,032	2,964,152	998,879	728,402	10.7467	7,827,917	2,136,779	1,596,286	540,493	394,138	5.1052	2,012,154	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	10,751,594
2085	3,952,204	2,964,152	988,052	720,506	11.1529	8,035,731	2,127,526	1,596,286	531,240	387,390	5.2369	2,028,724	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	10,975,979
2086	3,952,204	2,964,152	988,052	720,506	11.5745	8,339,496	2,127,526	1,596,286	531,240	387,390	5.3720	2,081,061	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	11,332,081
2087	3,952,204	2,964,152	988,052	720,506	12.0120	8,654,718	2,127,526	1,596,286	531,240	387,390	5.5106	2,134,753	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	11,700,994
2088	19,159,622	2,964,152	16,195,470	11,810,044	12.4661	147,225,192	51,265,873	1,596,286	49,669,587	36,220,007	5.6528	204,744,453	1,250,000	911,524	1.0000	911,524	67,115,057	48,941,575	352,881,169
2089	3,952,204	2,964,152	988,052	720,506	12.9373	9,321,402	2,127,526	1,596,286	531,240	387,390	5.7986	2,246,321	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	12,479,247
2090	3,952,204	2,964,152	988,052	720,506	13.4263	9,673,729	2,127,526	1,596,286	531,240	387,390	5.9482	2,304,275	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	12,889,528
2091	3,952,204	2,964,152	988,052	720,506	13.9338	10,039,386	2,127,526	1,596,286	531,240	387,390	6.1017	2,363,739	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	13,314,649
2092	3,963,032	2,964,152	998,879	728,402	14.4605	10,533,056	2,136,779	1,596,286	540,493	394,138	6.2591	2,466,950	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	13,911,529
2093	3,952,204	2,964,152	988,052	720,506	15.0071	10,812,705	2,127,526	1,596,286	531,240	387,390	6.4206	2,487,278	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	14,211,507
2094	3,952,204	2,964,152	988,052	720,506	15.5744	11,221,448	2,127,526	1,596,286	531,240	387,390	6.5863	2,551,469	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	14,684,440
2095	5,470,929	2,964,152	2,506,776	1,827,989	16.1631	29,545,967	6,683,700	1,596,286	5,087,414	3,709,839	6.7562	25,064,414	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	55,521,905
2096	4,975,515	2,964,152	2,011,363	1,466,724	16.7741	24,602,972	5,174,228	1,596,286	3,577,943	2,609,104	6.9305	18,082,395	1,250,000	911,524	1.0000	911,524	6,839,306	4,987,352	43,596,891
2097	4,964,687	2,964,152	2,000,535	1,458,828	17.4081	25,395,422	5,164,975	1,596,286	3,568,689	2,602,356	7.1093	18,500,930	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	44,807,876
2098	3,952,204	2,964,152	988,052	720,506	18.0662	13,016,805	2,127,526	1,596,286	531,240	387,390	7.2927	2,825,121	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	16,753,450
2099	4,964,687	2,964,152	2,000,535	1,458,828	18.7491	27,351,710	5,164,975	1,596,286	3,568,689	2,602,356	7.4809	19,467,966	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	47,731,200
2100	5,470,929	2,964,152	2,506,776	1,827,989	19.4578	35,568,641	6,683,700	1,596,286	5,087,414	3,709,839	7.6739	28,468,934	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	64,949,099
2101	5,470,929	2,964,152	2,506,776	1,827,989	20.1933	36,913,127	6,683,700	1,596,286	5,087,414	3,709,839	7.8719	29,203,482	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	67,028,133
2102	5,470,929	2,964,152	2,506,776	1,827,989	20.9566	38,308,431	6,683,700	1,596,286	5,087,414	3,709,839	8.0750	29,956,950	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	69,176,905
2103	3,952,204	2,964,152	988,052	720,506	21.7488	15,670,140	2,127,526	1,596,286	531,240	387,390	8.2833	3,208,870	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	19,790,534
2104	3,963,032	2,964,152	998,879	728,402	22.5709	16,440,687	2,136,779	1,596,286	540,493	394,138	8.4970	3,348,992	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	20,701,202
2105	5,470,929	2,964,152	2,506,776	1,827,989	23.4240	42,818,811	6,683,700	1,596,286	5,087,414	3,709,839	8.7162	32,335,699	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	76,066,033
2106	4,964,687	2,964,152	2,000,535	1,458,828	24.3095	35,463,376	5,164,975	1,596,286	3,568,689	2,602,356	8.9411	23,267,926	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	59,642,826
2107	4,964,687	2,964,152	2,000,535	1,458,828	25.2284	36,803,893	5,164,975	1,596,286	3,568,689	2,602,356	9.1718	23,868,290	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	61,583,707

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.12
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2108	3,963,032	2,964,152	998,879	728,402	26.1820	19,071,019	2,136,779	1,596,286	540,493	394,138	9.4084	3,708,209	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	23,690,752
2109	4,964,687	2,964,152	2,000,535	1,458,828	27.1717	39,638,834	5,164,975	1,596,286	3,568,689	2,602,356	9.6512	25,115,859	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	65,666,217
2110	4,964,687	2,964,152	2,000,535	1,458,828	28.1988	41,137,196	5,164,975	1,596,286	3,568,689	2,602,356	9.9002	25,763,846	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	67,812,566
2111	4,964,687	2,964,152	2,000,535	1,458,828	29.2647	42,692,160	5,164,975	1,596,286	3,568,689	2,602,356	10.1556	26,428,488	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	70,032,172
2112	3,963,032	2,964,152	998,879	728,402	30.3709	22,122,222	2,136,779	1,596,286	540,493	394,138	10.4176	4,105,973	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	27,139,719
2113	6,989,653	2,964,152	4,025,501	2,935,472	31.5189	92,522,840	11,239,874	1,596,286	9,643,588	7,032,288	10.6864	75,149,839	1,250,000	911,524	1.0000	911,524	14,919,089	10,879,283	168,584,203
2114	5,977,170	2,964,152	3,013,018	2,197,150	32.7103	71,869,430	8,202,424	1,596,286	6,606,139	4,817,322	10.9621	52,807,964	1,250,000	911,524	1.0000	911,524	10,869,157	7,925,995	125,588,918
2115	5,324,430	2,964,152	2,360,278	1,721,159	33.9468	58,427,851	6,244,204	1,596,286	4,647,918	3,389,350	11.2449	38,112,906	1,250,000	911,524	1.0000	911,524	8,258,196	6,022,033	97,452,280
2116	3,963,032	2,964,152	998,879	728,402	35.2299	25,661,526	2,136,779	1,596,286	540,493	394,138	11.5350	4,546,383	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	31,119,433
2117	3,952,204	2,964,152	988,052	720,506	36.5616	26,342,851	2,127,526	1,596,286	531,240	387,390	11.8326	4,583,834	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	31,838,209
2118	5,977,170	2,964,152	3,013,018	2,197,150	37.9437	83,367,993	8,202,424	1,596,286	6,606,139	4,817,322	12.1379	58,472,171	1,250,000	911,524	1.0000	911,524	10,869,157	7,925,995	142,751,689
2119	5,470,929	2,964,152	2,506,776	1,827,989	39.3779	71,982,362	6,683,700	1,596,286	5,087,414	3,709,839	12.4511	46,191,576	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	119,085,462
2120	3,963,032	2,964,152	998,879	728,402	40.8664	29,767,164	2,136,779	1,596,286	540,493	394,138	12.7723	5,034,050	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	35,712,738
2121	3,952,204	2,964,152	988,052	720,506	42.4112	30,557,522	2,127,526	1,596,286	531,240	387,390	13.1018	5,075,510	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	36,544,556
2122	6,483,412	2,964,152	3,519,259	2,566,311	44.0143	112,954,372	9,721,149	1,596,286	8,124,863	5,924,805	13.4399	79,628,784	1,250,000	911,524	1.0000	911,524	12,894,123	9,402,639	193,494,680
2123	3,952,204	2,964,152	988,052	720,506	45.6781	32,911,343	2,127,526	1,596,286	531,240	387,390	13.7866	5,340,795	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	39,163,662
2124	3,963,032	2,964,152	998,879	728,402	47.4047	34,529,674	2,136,779	1,596,286	540,493	394,138	14.1423	5,574,020	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	41,015,217
2125	6,483,412	2,964,152	3,519,259	2,566,311	49.1966	126,253,765	9,721,149	1,596,286	8,124,863	5,924,805	14.5072	85,952,328	1,250,000	911,524	1.0000	911,524	12,894,123	9,402,639	213,117,617
2126	3,952,204	2,964,152	988,052	720,506	51.0562	36,786,296	2,127,526	1,596,286	531,240	387,390	14.8815	5,764,949	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	43,462,769
2127	3,952,204	2,964,152	988,052	720,506	52.9861	38,176,801	2,127,526	1,596,286	531,240	387,390	15.2654	5,913,668	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	45,001,992
2128	6,494,240	2,964,152	3,530,087	2,574,207	54.9890	141,553,054	9,730,403	1,596,286	8,134,117	5,931,553	15.6593	92,883,962	1,250,000	911,524	1.0000	911,524	12,914,204	9,417,283	235,348,539
2129	3,952,204	2,964,152	988,052	720,506	57.0676	41,117,546	2,127,526	1,596,286	531,240	387,390	16.0633	6,222,767	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	48,251,836
2130	3,952,204	2,964,152	988,052	720,506	59.2248	42,671,821	2,127,526	1,596,286	531,240	387,390	16.4777	6,383,301	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	49,966,646
2131	3,952,204	2,964,152	988,052	720,506	61.4635	44,284,818	2,127,526	1,596,286	531,240	387,390	16.9028	6,547,981	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	51,744,322
2132	6,494,240	2,964,152	3,530,087	2,574,207	63.7868	164,200,410	9,730,403	1,596,286	8,134,117	5,931,553	17.3389	102,846,598	1,250,000	911,524	1.0000	911,524	12,914,204	9,417,283	267,958,531
2133	3,952,204	2,964,152	988,052	720,506	66.1979	47,695,981	2,127,526	1,596,286	531,240	387,390	17.7863	6,890,240	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	55,497,745
2134	3,952,204	2,964,152	988,052	720,506	68.7002	49,498,903	2,127,526	1,596,286	531,240	387,390	18.2451	7,067,975	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	57,478,402
2135	3,952,204	2,964,152	988,052	720,506	71.2971	51,369,985	2,127,526	1,596,286	531,240	387,390	18.7159	7,250,358	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	59,531,867
2136	3,963,032	2,964,152	998,879	728,402	73.9921	53,895,987	2,136,779	1,596,286	540,493	394,138	19.1987	7,566,939	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	62,374,450
2137	3,952,204	2,964,152	988,052	720,506	76.7890	55,326,932	2,127,526	1,596,286	531,240	387,390	19.6941	7,629,303	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	63,867,759
2138	19,139,451	2,964,152	16,175,298	11,795,335	79.6916	939,989,109	47,689,266	1,596,286	46,092,980	33,611,877	20.2022	679,033,864	1,250,000	911,524	1.0000	911,524	63,518,279	46,318,736	1,619,934,496
2139	3,952,204	2,964,152	988,052	720,506	82.7040	59,588,725	2,127,526	1,596,286	531,240	387,390	20.7234	8,028,044	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	68,528,292
2140	3,963,032	2,964,152	998,879	728,402	85.8302	62,518,881	2,136,779	1,596,286	540,493	394,138	21.2580	8,378,588	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	71,808,993
2141	3,952,204	2,964,152	988,052	720,506	89.0745	64,178,708	2,127,526	1,596,286	531,240	387,390	21.8065	8,447,626	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	73,537,858
2142	3,952,204	2,964,152	988,052	720,506	92.4416	66,604,723	2,127,526	1,596,286	531,240	387,390	22.3691	8,665,572	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	76,181,819
2143	3,952,204	2,964,152	988,052	720,506	95.9359	69,122,387	2,127,526	1,596,286	531,240	387,390	22.9462	8,889,135	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	78,923,046
2144	3,963,032	2,964,152	998,879	728,402	99.5622	72,521,296	2,136,779	1,596,286	540,493	394,138	23.5382	9,277,302	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	82,710,122
2145	5,470,929	2,964,152	2,506,776	1,827,989	103.3257	188,878,227	6,683,700	1,596,286	5,087,414	3,709,839	24.1455	89,575,918	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	279,365,669
2146	4,964,687	2,964,152	2,000,535	1,458,828	107.2314	156,432,156	5,164,975	1,596,286	3,568,689	2,602,356	24.7685	64,456,457	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	221,800,138
2147	4,964,687	2,964,152	2,000,535	1,458,828	111.2847	162,345,224	5,164,975	1,596,286	3,568,689	2,602,356	25.4075	66,119,363	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	229,376,110
2148	3,963,032	2,964,152	998,879	728,402	115.4913	84,124,083	2,136,779	1,596,286	540,493	394,138	26.0630	10,272,422	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	95,308,029
2149	4,964,687	2,964,152	2,000,535	1,458,828	119.8569	174,850,588	5,164,975	1,596,286	3,568,689	2,602,356	26.7355	69,575,292	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	245,337,404
2150	5,470,929	2,964,152	2,506,776	1,827,989	124.3875	227,378,963	6,683,700	1,596,286	5,087,414	3,709,839	27.4252	101,743,077	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	330,033,563
2151	5,470,929	2,964,152	2,506,776	1,827,989	129.0893	235,973,801	6,683,700	1,596,286	5,087,414	3,709,839	28.1328	104,368,159	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	341,253,483
2152	5,481,757	2,964,152	2,517,604	1,835,885	133.9689	245,951,467	6,692,953	1,596,286	5,096,668	3,716,587	28.8586	107,255,493	1,250,000	911,524	1.0000	911,524	8,864,272	6,463,995	354,118,484
2153	3,952,204	2,964,152	988,052	720,506	139.0329	100,174,033	2,127,526	1,596,286	531,240	387,390	29.6032	11,467,992	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	112,553,549
2154	3,952,204	2,964,152	988,052	720,506	144.2884	103,960,652	2,127,526	1,596,286	531,240	387,390	30.3669	11,763,842	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	116,636,018
2155	5,830,672	2,964,152	2,866,519	2,090,320	149.7425	313,009,782	7,762,929	1,596,286	6,166,643	4,496,833	31.1504	140,078,155	1,250,000	911,524	1.0000	911,524	10,283,162	7,498,677	453,999,461
2156	4,975,515	2,964,152	2,011,363	1,466,724	155.4027	227,932,844	5,174,228	1,596,286	3,577,943	2,609,104	31.9541	83,371,568	1,250,000	911,524	1.0000	911,524	6,839,306	4,987,352	312,215,936
2157	4,964,687	2,964,152	2,000,535	1,458,828	161.2769	235,275,239	5,164,975	1,596,286	3,568,689	2,602,356	32.7785	85,301,330	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	321,488,093
2158	3,952,204	2,964,152	988,052	720,506	167.3732	120,593,388	2,127,526	1,596,286	531,240	387,390	33.6242	13,025,689	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	134,530,600
2159	4,964,687	2,964,152	2,000,535	1,458,828	173.6999	253,398,258	5,164,975	1,596,286	3,568,689	2,602,356	34.4917	89,759,686	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	344,069,468
2160	4,975,515	2,964,152	2,011,363	1,466,724	180.2658	264,400,146	5,174,228	1,596,286	3,577,943	2,609,104	35.3816	92,314,272	1,250,000	911,524	1.0000	911,524	6,839,306	4,987,352	357,625,941
2161	4,964,687	2,964,152	2,000,535	1,458,828	187.0798	272,917,229	5,164,975	1,596,286	3,568,689	2,602,356	36.2944	94,450,954	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	368,279,706
2162	3,952,204	2,964,152	988,052	720,506	194.1514	139,887,240	2,127,526	1,596,286	531,240	387,390	37.2308	14,422,851	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	155,221,615
2163	6,989,653	2,964,152	4,025,501	2,935,472	201.4904	591,469,375	11,239,874	1,596,286	9,643,588	7,032,288	38.1914	268,572,912	1,250,000	911,524	1.0000	911,524	14,919,089	10,879,283	860,953,811
2164	5,987,998	2,964,152	3,023,846	2,205,046	209.1067	461,089,843	8,211,678	1,596,286	6,615,392	4,824,070	39.1767	188,991,132	1,250,000	911,524	1.0000	911,524	10,889,238	7,940,639	650,992,499
2165	4,964,687	2,964,152	2,000,535	1,458,828	217.0109	316,581,552	5,164,975	1,596,286	3,568,689	2,602,356	40.1875	104,582,186	1,250,000	911,524	1.0000	911,524	6,819,224	4,972,708	422,075,262
2166	3,952,204	2,964,152	988,052	720,506	225.2140	162,268,029	2,127,526	1,596,286	531,240	387,390	41.2243	15,969,894	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	179,149,446
2167	3,952,204	2,964,152	988,052	720,506	233.7270	168,401,696	2,127,526	1,596,286	531,240	387,390	42.2879	16,381,922	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	185,695,142
2168	5,987,998	2,964,152	3,023,846	2,205,046	242.5619	534,860,090	8,211,678	1,596,286	6,615,392	4,824,070	43.3789	209,262,838	1,250,000	911,524	1.0000	911,524	10,889,238	7,940,639	745,034,452
2169	5,470,929	2,964,152	2,506,776	1,827,989	251.7308	460,161,095	6,683,700	1,596,286	5,087,414	3,709,839	44.4981	165,080,787	1,250,000	911,524	1.0000	911,524	8,844,190	6,449,352	626,153,406
2170	3,952,204	2,964,152	988,052	720,506	261.2462	188,229,443	2,127,526	1,596,286	531,240	387,390	45.6462	17,682,895	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	206,823,862
2171	3,952,204	2,964,152	988,052	720,506	271.1213	195,344,512	2,127,526	1,596,286	531,240	387,390	46.8238	18,139,086	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	214,395,121
2172	6,494,240	2,964,152	3,530,087	2,574,207	281.3697	724,303,775	9,730,403	1,596,286	8,134,117	5,931,553	48.0319	284,903,742	1,250,000	911,524	1.0000	911,524	12,914,204	9,417,283	1,010,119,041
2173	3,952,204	2,964,152	988,052	720,506	292.0054	210,391,630	2,127,526	1,596,286	531,240	387,390	49.2711	19,087,146	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	230,390,300
2174	3,952,204	2,964,152	988,052	720,506	303.0433	218,344,503	2,127,526	1,596,286	531,240	387,390	50.5423	19,579,596	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	238,835,623
2175	6,483,412	2,964,152	3,519,259	2,566,311	314.4983	807,100,377	9,721,149	1,596,286	8,124,863	5,924,805	51.8463	307,179,207	1,250,000	911,524	1.0000	911,524	12,894,123	9,402,639	1,115,191,107
2176	3,963,032	2,964,152	998,879	728,402	326.3863	237,740,404	2,136,779	1,596,286	540,493	394,138	53.1839	20,961,802	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	259,613,730
2177	3,952,204	2,964,152	988,052	720,506	338.7237	244,052,444	2,127,526	1,596,286	531,240	387,390	54.5561	21,134,504	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	266,098,471
2178	6,483,412	2,964,152	3,519,259	2,566,311	351.5275	902,128,812	9,721,149	1,596,286	8,124,863	5,924,805	55.9636	331,573,405	1,250,000	911,524	1.0000	911,524	12,894,123	9,402,639	1,234,613,741
2179	3,952,204	2,964,152	988,052	720,506	364.8152	262,851,525	2,127,526	1,596,286	531,240	387,390	57.4075	22,239,108	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	286,002,157
2180	3,963,032	2,964,152	998,879	728,402	378.6052	275,776,750	2,136,779	1,596,286	540,493	394,138	58.8886	23,210,242	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	299,898,516
2181	3,952,204	2,964,152	988,052	720,506	392.9165	283,098,679	2,127,526	1,596,286	531,240	387,390	60.4079	23,401,434	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	307,411,637
2182	6,483,412	2,964,152	3,519,259	2,566,311	407.7688	1,046,461,466	9,721,149	1,596,286	8,124,863	5,924,805	61.9664	367,138,824	1,250,000	911,524	1.0000	911,524	12,894,123	9,402,639	1,414,511,813
2183	3,952,204	2,964,152	988,052	720,506	423.1824	304,905,440	2,127,526	1,596,286	531,240	387,390	63.5652	24,624,542	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	330,441,505
2184	3,963,032	2,964,152	998,879	728,402	439.1787	319,898,603	2,136,779	1,596,286	540,493	394,138	65.2052	25,699,855	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	346,509,982

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.12
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2185	3,952,204	2,964,152	988,052	720,506	455.7797	328,391,989	2,127,526	1,596,286	531,240	387,390	66.8874	25,911,530	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	355,215,042
2186	3,952,204	2,964,152	988,052	720,506	473.0081	340,805,154	2,127,526	1,596,286	531,240	387,390	68.6131	26,580,049	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	368,296,726
2187	3,952,204	2,964,152	988,052	720,506	490.8878	353,687,584	2,127,526	1,596,286	531,240	387,390	70.3834	27,265,846	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	381,864,954
2188	19,150,279	2,964,152	16,186,126	11,803,231	509.4434	6,013,078,045	47,698,520	1,596,286	46,102,234	33,618,625	72.1993	2,427,241,186	1,250,000	911,524	1.0000	911,524	63,538,360	46,333,380	8,441,230,755
2189	3,952,204	2,964,152	988,052	720,506	528.7004	380,931,787	2,127,526	1,596,286	531,240	387,390	74.0620	28,690,900	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	410,534,211
2190	3,952,204	2,964,152	988,052	720,506	548.6852	395,330,955	2,127,526	1,596,286	531,240	387,390	75.9728	29,431,125	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	425,673,604
2191	3,952,204	2,964,152	988,052	720,506	569.4255	410,274,465	2,127,526	1,596,286	531,240	387,390	77.9329	30,190,449	1,250,000	911,524	1.0000	911,524	2,769,292	2,019,420	441,376,437
2192	3,963,032	2,964,152	998,879	728,402	590.9498	430,448,962	2,136,779	1,596,286	540,493	394,138	79.9436	31,508,820	1,250,000	911,524	1.0000	911,524	2,789,373	2,034,064	462,869,306
2193	4,055,991	2,964,152	1,091,839	796,190	613.2877	488,293,395	2,438,888	1,596,286	842,603	614,442	82.0061	50,387,974	1,250,000	911,524	1.0000	911,524	3,184,442	2,322,155	539,592,893
2194	4,211,673	2,964,152	1,247,520	909,715	636.4700	579,006,624	2,905,932	1,596,286	1,309,646	955,019	84.1219	80,338,009	1,250,000	911,524	1.0000	911,524	3,807,167	2,776,258	660,256,157
2195	6,090,140	2,964,152	3,125,988	2,279,530	660.5286	1,505,694,633	8,541,335	1,596,286	6,945,049	5,064,462	86.2922	437,023,558	1,250,000	911,524	1.0000	911,524	11,321,037	8,255,515	1,943,629,715
2196	5,286,878	2,964,152	2,322,725	1,693,775	685.4966	1,161,077,200	6,108,316	1,596,286	4,512,030	3,290,258	88.5185	291,248,729	1,250,000	911,524	1.0000	911,524	8,084,756	5,895,557	1,453,237,453
2197	5,120,368	2,964,152	2,156,216	1,572,354	711.4083	1,118,585,409	5,632,019	1,596,286	4,035,733	2,942,933	90.8023	267,225,112	1,250,000	911,524	1.0000	911,524	7,441,949	5,426,811	1,386,722,044
2198	4,315,460	2,964,152	1,351,308	985,399	738.2996	727,519,921	3,217,294	1,596,286	1,621,009	1,182,070	93.1450	110,103,948	1,250,000	911,524	1.0000	911,524	4,222,317	3,078,993	838,535,393
2199	5,120,368	2,964,152	2,156,216	1,572,354	766.2073	1,204,748,814	5,632,019	1,596,286	4,035,733	2,942,933	95.5482	281,191,979	1,250,000	911,524	1.0000	911,524	7,441,949	5,426,811	1,486,852,317
2200	5,574,716	2,964,152	2,610,564	1,903,673	795.1699	1,513,743,203	6,995,062	1,596,286	5,398,777	3,936,890	98.0133	385,867,626	1,250,000	911,524	1.0000	911,524	9,259,340	6,752,087	1,900,522,353
2201	5,730,397	2,964,152	2,766,245	2,017,198	825.2273	1,664,647,182	7,462,106	1,596,286	5,865,820	4,277,468	100.5421	430,065,579	1,250,000	911,524	1.0000	911,524	9,882,065	7,206,190	2,095,624,284
2202	5,730,397	2,964,152	2,766,245	2,017,198	856.4209	1,727,570,862	7,462,106	1,596,286	5,865,820	4,277,468	103.1360	441,160,902	1,250,000	911,524	1.0000	911,524	9,882,065	7,206,190	2,169,643,287
2203	4,107,885	2,964,152	1,143,733	834,032	888.7937	741,282,105	2,594,569	1,596,286	998,284	727,968	105.7969	77,016,706	1,250,000	911,524	1.0000	911,524	3,392,017	2,473,523	819,210,334
2204	4,170,607	2,964,152	1,206,454	879,770	922.3901	811,490,716	2,759,504	1,596,286	1,163,219	848,241	108.5265	92,056,633	1,250,000	911,524	1.0000	911,524	3,619,673	2,639,534	904,458,872
2205	5,678,504	2,964,152	2,714,351	1,979,356	957.2564	1,894,751,661	7,306,425	1,596,286	5,710,139	4,163,942	111.3265	463,557,079	1,250,000	911,524	1.0000	911,524	9,674,490	7,054,822	2,359,220,264
2206	5,120,368	2,964,152	2,156,216	1,572,354	993.4407	1,562,040,071	5,632,019	1,596,286	4,035,733	2,942,933	114.1987	336,079,156	1,250,000	911,524	1.0000	911,524	7,441,949	5,426,811	1,899,030,751
2207	5,172,262	2,964,152	2,208,110	1,610,196	1,030.9927	1,660,099,825	5,787,700	1,596,286	4,191,414	3,056,459	117.1450	358,048,892	1,250,000	911,524	1.0000	911,524	7,649,524	5,578,178	2,019,060,241
2208	4,170,607	2,964,152	1,206,454	879,770	1,069.9643	941,322,002	2,759,504	1,596,286	1,163,219	848,241	120.1674	101,930,922	1,250,000	911,524	1.0000	911,524	3,619,673	2,639,534	1,044,164,448
2209	5,120,368	2,964,152	2,156,216	1,572,354	1,110.4089	1,745,955,443	5,632,019	1,596,286	4,035,733	2,942,933	123.2677	362,768,618	1,250,000	911,524	1.0000	911,524	7,441,949	5,426,811	2,109,635,585
2210	5,172,262	2,964,152	2,208,110	1,610,196	1,152.3824	1,855,560,976	5,787,700	1,596,286	4,191,414	3,056,459	126.4480	386,483,130	1,250,000	911,524	1.0000	911,524	7,649,524	5,578,178	2,242,955,630
2211	5,172,262	2,964,152	2,208,110	1,610,196	1,195.9424	1,925,701,093	5,787,700	1,596,286	4,191,414	3,056,459	129.7104	396,454,522	1,250,000	911,524	1.0000	911,524	7,649,524	5,578,178	2,323,067,139
2212	4,170,607	2,964,152	1,206,454	879,770	1,241.1491	1,091,925,175	2,759,504	1,596,286	1,163,219	848,241	133.0569	112,864,325	1,250,000	911,524	1.0000	911,524	3,619,673	2,639,534	1,205,701,024
2213	7,197,228	2,964,152	4,233,076	3,086,839	1,288.0645	3,976,048,216	11,862,599	1,596,286	10,266,313	7,486,391	136.4898	1,021,815,954	1,250,000	911,524	1.0000	911,524	15,749,389	11,484,754	4,998,775,694
2214	6,184,745	2,964,152	3,220,593	2,348,517	1,336.7533	3,139,388,447	8,825,149	1,596,286	7,228,864	5,271,425	140.0112	738,058,512	1,250,000	911,524	1.0000	911,524	11,699,457	8,531,466	3,878,358,483
2215	5,172,262	2,964,152	2,208,110	1,610,196	1,387.2826	2,233,796,226	5,787,700	1,596,286	4,191,414	3,056,459	143.6235	438,979,342	1,250,000	911,524	1.0000	911,524	7,649,524	5,578,178	2,673,687,091
2216	4,170,607	2,964,152	1,206,454	879,770	1,439.7219	1,266,623,476	2,759,504	1,596,286	1,163,219	848,241	147.3290	124,970,507	1,250,000	911,524	1.0000	911,524	3,619,673	2,639,534	1,392,505,507
2217	4,133,788	2,964,152	1,169,635	852,920	1,494.1434	1,274,385,057	14,534,310	1,596,286	12,938,024	9,434,653	151.1301	1,425,860,066	1,250,000	911,524	1.0000	911,524	15,357,659	11,199,097	2,701,156,647
2218	1,123,816	2,964,152	(1,840,336)	(1,342,008)	1,550.6220	(2,080,947,614)	3,040,582	1,596,286	1,444,296	1,053,208	155.0292	163,278,062	0	0	1.0000	0	(396,040)	(288,800)	(1,917,669,552)
	$1,249,423,317	$527,619,129	$721,804,188	$526,353,328		$61,283,682,476	$1,293,782,498	$284,138,836	$1,009,643,662	$736,251,342		$18,466,023,783	$231,250,000	$168,631,894		$168,631,894	$1,962,697,851	$1,431,236,564	$79,918,338,153

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.12
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment					
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
Prairie Island Unit 2																			
Factors	*2020*			*72.9219%*	*3.78%*						*2.58%*				*0.00%*				
2034	$8,345,548	$0	$8,345,548	$6,085,732	1.6811	$10,230,725	$4,974,446	$0	$4,974,446	$3,627,460	1.4285	$5,181,827	$1,250,000	$911,524	1.0000	$911,524	$14,569,994	$10,624,716	$16,324,075
2035	49,894,465	-	49,894,465	36,383,992	1.7446	63,475,512	37,951,789	-	37,951,789	27,675,166	1.4653	40,552,420	1,250,000	911,524	1.0000	911,524	89,096,254	64,970,681	104,939,456
2036	67,674,097	-	67,674,097	49,349,237	1.8106	89,351,729	75,594,885	-	75,594,885	55,125,227	1.5032	82,864,241	1,250,000	911,524	1.0000	911,524	144,518,982	105,385,988	173,127,494
2037	76,073,328	-	76,073,328	55,474,116	1.8790	104,235,864	94,046,676	-	94,046,676	68,580,623	1.5419	105,744,462	1,250,000	911,524	1.0000	911,524	171,370,003	124,966,263	210,891,850
2038	82,785,291	-	82,785,291	60,368,607	1.9501	117,724,821	103,456,871	-	103,456,871	75,442,716	1.5817	119,327,744	1,250,000	911,524	1.0000	911,524	187,492,162	136,722,847	237,964,089
2039	39,073,080	-	39,073,080	28,492,832	2.0238	57,663,794	15,617,110	-	15,617,110	11,388,294	1.6225	18,477,506	1,250,000	911,524	1.0000	911,524	55,940,190	40,792,649	77,052,824
2040	24,879,886	-	24,879,886	18,142,885	2.1003	38,105,502	14,363,504	-	14,363,504	10,474,140	1.6644	17,433,158	1,250,000	911,524	1.0000	911,524	40,493,389	29,528,549	56,450,184
2041	18,384,389	-	18,384,389	13,406,246	2.1797	29,221,594	18,969,870	-	18,969,870	13,833,189	1.7073	23,617,404	1,250,000	911,524	1.0000	911,524	38,604,259	28,150,959	53,750,522
2042	10,753,124	2,972,273	7,780,851	5,673,944	2.2620	12,834,462	10,064,192	1,600,659	8,463,533	6,171,769	1.7514	10,809,236	1,250,000	911,524	1.0000	911,524	17,494,384	12,757,237	24,555,222
2043	3,952,204	2,972,273	979,931	714,584	2.3475	1,677,486	2,127,526	1,600,659	526,867	384,201	1.7966	690,256	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	3,279,265
2044	3,963,032	2,972,273	990,759	722,480	2.4363	1,760,178	2,136,779	1,600,659	536,120	390,949	1.8429	720,480	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	3,392,181
2045	5,466,342	2,972,273	2,494,069	1,818,722	2.5284	4,598,457	6,669,939	1,600,659	5,069,280	3,696,616	1.8905	6,988,452	1,250,000	911,524	1.0000	911,524	8,813,349	6,426,861	12,498,433
2046	4,961,629	2,972,273	1,989,356	1,450,676	2.6239	3,806,429	5,155,801	1,600,659	3,555,143	2,592,477	1.9392	5,027,332	1,250,000	911,524	1.0000	911,524	6,794,498	4,954,677	9,745,285
2047	4,961,629	2,972,273	1,989,356	1,450,676	2.7231	3,950,336	5,155,801	1,600,659	3,555,143	2,592,477	1.9893	5,157,215	1,250,000	911,524	1.0000	911,524	6,794,498	4,954,677	10,019,075
2048	3,963,032	2,972,273	990,759	722,480	2.8261	2,041,801	2,136,779	1,600,659	536,120	390,949	2.0406	797,770	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	3,751,095
2049	4,961,629	2,972,273	1,989,356	1,450,676	2.9329	4,254,688	5,155,801	1,600,659	3,555,143	2,592,477	2.0932	5,426,574	1,250,000	911,524	1.0000	911,524	6,794,498	4,954,677	10,592,785
2050	5,466,342	2,972,273	2,494,069	1,818,722	3.0438	5,535,826	6,669,939	1,600,659	5,069,280	3,696,616	2.1472	7,937,373	1,250,000	911,524	1.0000	911,524	8,813,349	6,426,861	14,384,723
2051	5,411,567	2,972,273	2,439,293	1,778,779	3.1588	5,618,807	6,505,614	1,600,659	4,904,955	3,576,786	2.2026	7,878,230	1,250,000	911,524	1.0000	911,524	8,594,248	6,267,089	14,408,561
2052	5,477,170	2,972,273	2,504,896	1,826,618	3.2782	5,988,019	6,679,193	1,600,659	5,078,534	3,703,363	2.2595	8,367,750	1,250,000	911,524	1.0000	911,524	8,833,430	6,441,505	15,267,293
2053	3,952,204	2,972,273	979,931	714,584	3.4021	2,431,086	2,127,526	1,600,659	526,867	384,201	2.3178	890,501	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	4,233,111
2054	3,952,204	2,972,273	979,931	714,584	3.5307	2,522,982	2,127,526	1,600,659	526,867	384,201	2.3776	913,477	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	4,347,982
2055	5,466,342	2,972,273	2,494,069	1,818,722	3.6642	6,664,162	6,669,939	1,600,659	5,069,280	3,696,616	2.4389	9,015,676	1,250,000	911,524	1.0000	911,524	8,813,349	6,426,861	16,591,361
2056	4,972,457	2,972,273	2,000,184	1,458,572	3.8027	5,546,512	5,165,055	1,600,659	3,564,396	2,599,225	2.5018	6,502,742	1,250,000	911,524	1.0000	911,524	6,814,580	4,969,321	12,960,777
2057	4,961,629	2,972,273	1,989,356	1,450,676	3.9464	5,724,948	5,155,801	1,600,659	3,555,143	2,592,477	2.5664	6,653,334	1,250,000	911,524	1.0000	911,524	6,794,498	4,954,677	13,289,806
2058	3,952,204	2,972,273	979,931	714,584	4.0956	2,926,650	2,127,526	1,600,659	526,867	384,201	2.6326	1,011,448	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	4,849,622
2059	4,906,854	2,972,273	1,934,581	1,410,733	4.2504	5,996,180	4,991,476	1,600,659	3,390,817	2,472,648	2.7005	6,677,387	1,250,000	911,524	1.0000	911,524	6,575,398	4,794,905	13,585,090
2060	4,972,457	2,972,273	2,000,184	1,458,572	4.4111	6,433,907	5,165,055	1,600,659	3,564,396	2,599,225	2.7702	7,200,374	1,250,000	911,524	1.0000	911,524	6,814,580	4,969,321	14,545,805
2061	4,961,629	2,972,273	1,989,356	1,450,676	4.5778	6,640,905	5,155,801	1,600,659	3,555,143	2,592,477	2.8416	7,366,784	1,250,000	911,524	1.0000	911,524	6,794,498	4,954,677	14,919,213
2062	3,952,204	2,972,273	979,931	714,584	4.7509	3,394,917	2,127,526	1,600,659	526,867	384,201	2.9150	1,119,946	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	5,426,387
2063	6,980,480	2,972,273	4,008,206	2,922,860	4.9305	14,411,163	11,212,353	1,600,659	9,611,694	7,009,030	2.9902	20,958,402	1,250,000	911,524	1.0000	911,524	14,869,901	10,843,414	36,281,088
2064	5,927,107	2,972,273	2,954,834	2,154,721	5.1168	11,025,277	8,029,005	1,600,659	6,428,346	4,687,672	3.0673	14,378,497	1,250,000	911,524	1.0000	911,524	10,633,180	7,753,917	26,315,298
2065	4,961,629	2,972,273	1,989,356	1,450,676	5.3103	7,703,525	5,155,801	1,600,659	3,555,143	2,592,477	3.1465	8,157,230	1,250,000	911,524	1.0000	911,524	6,794,498	4,954,677	16,772,279
2066	3,952,204	2,972,273	979,931	714,584	5.5110	3,938,072	2,127,526	1,600,659	526,867	384,201	3.2276	1,240,048	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	6,089,644
2067	3,952,204	2,972,273	979,931	714,584	5.7193	4,086,920	2,127,526	1,600,659	526,867	384,201	3.3109	1,272,052	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	6,270,496
2068	5,981,882	2,972,273	3,009,609	2,194,664	5.9355	13,026,429	8,193,331	1,600,659	6,592,672	4,807,502	3.3963	16,327,718	1,250,000	911,524	1.0000	911,524	10,852,281	7,913,689	30,265,670
2069	5,466,342	2,972,273	2,494,069	1,818,722	6.1598	11,202,965	6,669,939	1,600,659	5,069,280	3,696,616	3.4840	12,879,009	1,250,000	911,524	1.0000	911,524	8,813,349	6,426,861	24,993,497
2070	3,952,204	2,972,273	979,931	714,584	6.3927	4,568,121	2,127,526	1,600,659	526,867	384,201	3.5738	1,373,058	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	6,852,703
2071	3,952,204	2,972,273	979,931	714,584	6.6343	4,740,765	2,127,526	1,600,659	526,867	384,201	3.6660	1,408,481	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	7,060,770
2072	6,431,820	2,972,273	3,459,547	2,522,767	6.8851	17,369,504	9,543,143	1,600,659	7,942,484	5,791,810	3.7606	21,780,683	1,250,000	911,524	1.0000	911,524	12,652,031	9,226,101	40,061,710
2073	3,952,204	2,972,273	979,931	714,584	7.1454	5,105,988	2,127,526	1,600,659	526,867	384,201	3.8576	1,482,094	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	7,499,607
2074	3,952,204	2,972,273	979,931	714,584	7.4155	5,298,998	2,127,526	1,600,659	526,867	384,201	3.9572	1,520,361	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	7,730,882
2075	6,835,510	2,972,273	3,863,237	2,817,146	7.6958	21,680,190	10,777,444	1,600,659	9,176,785	6,691,886	4.0593	27,164,373	1,250,000	911,524	1.0000	911,524	14,290,022	10,420,556	49,756,087
2076	3,963,032	2,972,273	990,759	722,480	7.9867	5,770,231	2,136,779	1,600,659	536,120	390,949	4.1640	1,627,911	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	8,309,666
2077	3,952,204	2,972,273	979,931	714,584	8.2886	5,922,901	2,127,526	1,600,659	526,867	384,201	4.2714	1,641,077	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	8,475,501
2078	6,475,767	2,972,273	3,503,494	2,554,814	8.6019	21,976,257	9,698,215	1,600,659	8,097,556	5,904,892	4.3816	25,872,874	1,250,000	911,524	1.0000	911,524	12,851,050	9,371,230	48,760,655
2079	3,952,204	2,972,273	979,931	714,584	8.9270	6,379,091	2,127,526	1,600,659	526,867	384,201	4.4947	1,726,869	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	9,017,484
2080	3,963,032	2,972,273	990,759	722,480	9.2645	6,693,415	2,136,779	1,600,659	536,120	390,949	4.6106	1,802,509	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	9,407,448
2081	3,952,204	2,972,273	979,931	714,584	9.6147	6,870,511	2,127,526	1,600,659	526,867	384,201	4.7296	1,817,118	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	9,599,152
2082	6,366,217	2,972,273	3,393,944	2,474,928	9.9781	24,695,080	9,369,564	1,600,659	7,768,905	5,665,233	4.8516	27,485,447	1,250,000	911,524	1.0000	911,524	12,412,849	9,051,685	53,092,050
2083	3,952,204	2,972,273	979,931	714,584	10.3553	7,399,732	2,127,526	1,600,659	526,867	384,201	4.9768	1,912,092	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	10,223,348
2084	3,963,032	2,972,273	990,759	722,480	10.7467	7,764,275	2,136,779	1,600,659	536,120	390,949	5.1052	1,995,873	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	10,671,672
2085	3,952,204	2,972,273	979,931	714,584	11.1529	7,969,684	2,127,526	1,600,659	526,867	384,201	5.2369	2,012,023	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	10,893,231
2086	3,952,204	2,972,273	979,931	714,584	11.5745	8,270,952	2,127,526	1,600,659	526,867	384,201	5.3720	2,063,929	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	11,246,405
2087	3,952,204	2,972,273	979,931	714,584	12.0120	8,583,583	2,127,526	1,600,659	526,867	384,201	5.5106	2,117,179	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	11,612,285
2088	19,159,622	2,972,273	16,187,349	11,804,122	12.4661	147,151,368	51,265,873	1,600,659	49,665,214	36,216,817	5.6528	204,726,425	1,250,000	911,524	1.0000	911,524	67,102,562	48,932,463	352,789,317
2089	3,952,204	2,972,273	979,931	714,584	12.9373	9,244,788	2,127,526	1,600,659	526,867	384,201	5.7986	2,227,829	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	12,384,140
2090	3,952,204	2,972,273	979,931	714,584	13.4263	9,594,219	2,127,526	1,600,659	526,867	384,201	5.9482	2,285,305	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	12,791,048
2091	3,952,204	2,972,273	979,931	714,584	13.9338	9,956,870	2,127,526	1,600,659	526,867	384,201	6.1017	2,344,280	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	13,212,674
2092	3,963,032	2,972,273	990,759	722,480	14.4605	10,447,421	2,136,779	1,600,659	536,120	390,949	6.2591	2,446,989	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	13,805,934
2093	3,952,204	2,972,273	979,931	714,584	15.0071	10,723,833	2,127,526	1,600,659	526,867	384,201	6.4206	2,466,802	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	14,102,159
2094	3,952,204	2,972,273	979,931	714,584	15.5744	11,129,217	2,127,526	1,600,659	526,867	384,201	6.5863	2,530,464	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	14,571,205
2095	5,470,929	2,972,273	2,498,655	1,822,067	16.1631	29,450,249	6,683,700	1,600,659	5,083,041	3,706,650	6.7562	25,042,868	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	55,404,641
2096	4,975,515	2,972,273	2,003,242	1,460,802	16.7741	24,503,637	5,174,228	1,600,659	3,573,570	2,605,915	6.9305	18,060,292	1,250,000	911,524	1.0000	911,524	6,826,811	4,978,240	43,475,453
2097	4,964,687	2,972,273	1,992,414	1,452,906	17.4081	25,292,332	5,164,975	1,600,659	3,564,316	2,599,167	7.1093	18,478,258	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	44,682,113
2098	3,952,204	2,972,273	979,931	714,584	18.0662	12,909,817	2,127,526	1,600,659	526,867	384,201	7.2927	2,801,864	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	16,623,205
2099	4,964,687	2,972,273	1,992,414	1,452,906	18.7491	27,240,678	5,164,975	1,600,659	3,564,316	2,599,167	7.4809	19,444,108	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	47,596,310
2100	5,470,929	2,972,273	2,498,655	1,822,067	19.4578	35,453,413	6,683,700	1,600,659	5,083,041	3,706,650	7.6739	28,444,460	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	64,809,397
2101	5,470,929	2,972,273	2,498,655	1,822,067	20.1933	36,793,543	6,683,700	1,600,659	5,083,041	3,706,650	7.8719	29,178,377	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	66,883,444
2102	5,470,929	2,972,273	2,498,655	1,822,067	20.9566	38,184,327	6,683,700	1,600,659	5,083,041	3,706,650	8.0750	29,931,198	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	69,027,048
2103	3,952,204	2,972,273	979,931	714,584	21.7488	15,541,344	2,127,526	1,600,659	526,867	384,201	8.2833	3,182,453	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	19,635,321
2104	3,963,032	2,972,273	990,759	722,480	22.5709	16,307,023	2,136,779	1,600,659	536,120	390,949	8.4970	3,321,893	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	20,540,440
2105	5,470,929	2,972,273	2,498,655	1,822,067	23.4240	42,680,095	6,683,700	1,600,659	5,083,041	3,706,650	8.7162	32,307,901	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	75,899,520
2106	4,964,687	2,972,273	1,992,414	1,452,906	24.3095	35,319,417	5,164,975	1,600,659	3,564,316	2,599,167	8.9411	23,239,412	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	59,470,352
2107	4,964,687	2,972,273	1,992,414	1,452,906	25.2284	36,654,492	5,164,975	1,600,659	3,564,316	2,599,167	9.1718	23,839,040	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	61,405,055
2108	3,963,032	2,972,273	990,759	722,480	26.1820	18,915,970	2,136,779	1,600,659	536,120	390,949	9.4084	3,678,204	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	23,505,698

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.12
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2109	4,964,687	2,972,273	1,992,414	1,452,906	27.1717	39,477,924	5,164,975	1,600,659	3,564,316	2,599,167	9.6512	25,085,080	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	65,474,528
2110	4,964,687	2,972,273	1,992,414	1,452,906	28.1988	40,970,204	5,164,975	1,600,659	3,564,316	2,599,167	9.9002	25,732,273	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	67,614,000
2111	4,964,687	2,972,273	1,992,414	1,452,906	29.2647	42,518,856	5,164,975	1,600,659	3,564,316	2,599,167	10.1556	26,396,100	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	69,826,480
2112	3,963,032	2,972,273	990,759	722,480	30.3709	21,942,366	2,136,779	1,600,659	536,120	390,949	10.4176	4,072,750	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	26,926,640
2113	6,989,653	2,972,273	4,017,380	2,929,550	31.5189	92,336,187	11,239,874	1,600,659	9,639,215	7,029,099	10.6864	75,115,759	1,250,000	911,524	1.0000	911,524	14,906,595	10,870,172	168,363,469
2114	5,977,170	2,972,273	3,004,897	2,191,228	32.7103	71,675,720	8,202,424	1,600,659	6,601,765	4,814,133	10.9621	52,773,005	1,250,000	911,524	1.0000	911,524	10,856,662	7,916,884	125,360,249
2115	5,324,430	2,972,273	2,352,157	1,715,237	33.9468	58,226,819	6,244,204	1,600,659	4,643,545	3,386,161	11.2449	38,077,044	1,250,000	911,524	1.0000	911,524	8,245,702	6,012,922	97,215,387
2116	3,963,032	2,972,273	990,759	722,480	35.2299	25,452,896	2,136,779	1,600,659	536,120	390,949	11.5350	4,509,596	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	30,874,016
2117	3,952,204	2,972,273	979,931	714,584	36.5616	26,126,334	2,127,526	1,600,659	526,867	384,201	11.8326	4,546,098	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	31,583,956
2118	5,977,170	2,972,273	3,004,897	2,191,228	37.9437	83,143,292	8,202,424	1,600,659	6,601,765	4,814,133	12.1379	58,433,462	1,250,000	911,524	1.0000	911,524	10,856,662	7,916,884	142,488,278
2119	5,470,929	2,972,273	2,498,655	1,822,067	39.3779	71,749,168	6,683,700	1,600,659	5,083,041	3,706,650	12.4511	46,151,868	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	118,812,559
2120	3,963,032	2,972,273	990,759	722,480	40.8664	29,525,154	2,136,779	1,600,659	536,120	390,949	12.7723	4,993,317	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	35,429,996
2121	3,952,204	2,972,273	979,931	714,584	42.4112	30,306,365	2,127,526	1,600,659	526,867	384,201	13.1018	5,033,726	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	36,251,615
2122	6,483,412	2,972,273	3,511,138	2,560,389	44.0143	112,693,721	9,721,149	1,600,659	8,120,490	5,921,616	13.4399	79,585,922	1,250,000	911,524	1.0000	911,524	12,881,628	9,393,528	193,191,167
2123	3,952,204	2,972,273	979,931	714,584	45.6781	32,640,839	2,127,526	1,600,659	526,867	384,201	13.7866	5,296,827	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	38,849,190
2124	3,963,032	2,972,273	990,759	722,480	47.4047	34,248,945	2,136,779	1,600,659	536,120	390,949	14.1423	5,528,918	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	40,689,386
2125	6,483,412	2,972,273	3,511,138	2,560,389	49.1966	125,962,424	9,721,149	1,600,659	8,120,490	5,921,616	14.5072	85,906,062	1,250,000	911,524	1.0000	911,524	12,881,628	9,393,528	212,780,010
2126	3,952,204	2,972,273	979,931	714,584	51.0562	36,483,943	2,127,526	1,600,659	526,867	384,201	14.8815	5,717,489	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	43,112,956
2127	3,952,204	2,972,273	979,931	714,584	52.9861	37,863,019	2,127,526	1,600,659	526,867	384,201	15.2654	5,864,984	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	44,639,527
2128	6,494,240	2,972,273	3,521,966	2,568,285	54.9890	141,227,411	9,730,403	1,600,659	8,129,744	5,928,363	15.6593	92,834,022	1,250,000	911,524	1.0000	911,524	12,901,710	9,408,172	234,972,957
2129	3,952,204	2,972,273	979,931	714,584	57.0676	40,779,594	2,127,526	1,600,659	526,867	384,201	16.0633	6,171,538	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	47,862,655
2130	3,952,204	2,972,273	979,931	714,584	59.2248	42,321,094	2,127,526	1,600,659	526,867	384,201	16.4777	6,330,751	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	49,563,369
2131	3,952,204	2,972,273	979,931	714,584	61.4635	43,920,833	2,127,526	1,600,659	526,867	384,201	16.9028	6,494,075	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	51,326,432
2132	6,494,240	2,972,273	3,521,966	2,568,285	63.7868	163,822,667	9,730,403	1,600,659	8,129,744	5,928,363	17.3389	102,791,301	1,250,000	911,524	1.0000	911,524	12,901,710	9,408,172	267,525,492
2133	3,952,204	2,972,273	979,931	714,584	66.1979	47,303,960	2,127,526	1,600,659	526,867	384,201	17.7863	6,833,517	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	55,049,000
2134	3,952,204	2,972,273	979,931	714,584	68.7002	49,092,063	2,127,526	1,600,659	526,867	384,201	18.2451	7,009,788	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	57,013,375
2135	3,952,204	2,972,273	979,931	714,584	71.2971	50,947,767	2,127,526	1,600,659	526,867	384,201	18.7159	7,190,670	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	59,049,960
2136	3,963,032	2,972,273	990,759	722,480	73.9921	53,457,808	2,136,779	1,600,659	536,120	390,949	19.1987	7,505,712	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	61,875,044
2137	3,952,204	2,972,273	979,931	714,584	76.7890	54,872,190	2,127,526	1,600,659	526,867	384,201	19.6941	7,566,496	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	63,350,210
2138	19,139,451	2,972,273	16,167,177	11,789,413	79.6916	939,517,178	47,689,266	1,600,659	46,088,607	33,608,688	20.2022	678,969,436	1,250,000	911,524	1.0000	911,524	63,505,784	46,309,625	1,619,398,138
2139	3,952,204	2,972,273	979,931	714,584	82.7040	59,098,955	2,127,526	1,600,659	526,867	384,201	20.7234	7,961,954	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	67,972,432
2140	3,963,032	2,972,273	990,759	722,480	85.8302	62,010,598	2,136,779	1,600,659	536,120	390,949	21.2580	8,310,793	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	71,232,915
2141	3,952,204	2,972,273	979,931	714,584	89.0745	63,651,212	2,127,526	1,600,659	526,867	384,201	21.8065	8,378,082	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	72,940,818
2142	3,952,204	2,972,273	979,931	714,584	92.4416	66,057,288	2,127,526	1,600,659	526,867	384,201	22.3691	8,594,234	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	75,563,045
2143	3,952,204	2,972,273	979,931	714,584	95.9359	68,554,259	2,127,526	1,600,659	526,867	384,201	22.9462	8,815,956	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	78,281,739
2144	3,963,032	2,972,273	990,759	722,480	99.5622	71,931,693	2,136,779	1,600,659	536,120	390,949	23.5382	9,202,235	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	82,045,451
2145	5,470,929	2,972,273	2,498,655	1,822,067	103.3257	188,266,336	6,683,700	1,600,659	5,083,041	3,706,650	24.1455	89,498,914	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	278,676,774
2146	4,964,687	2,972,273	1,992,414	1,452,906	107.2314	155,797,136	5,164,975	1,600,659	3,564,316	2,599,167	24.7685	64,377,467	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	221,086,127
2147	4,964,687	2,972,273	1,992,414	1,452,906	111.2847	161,686,200	5,164,975	1,600,659	3,564,316	2,599,167	25.4075	66,038,335	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	228,636,058
2148	3,963,032	2,972,273	990,759	722,480	115.4913	83,440,148	2,136,779	1,600,659	536,120	390,949	26.0630	10,189,303	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	94,540,975
2149	4,964,687	2,972,273	1,992,414	1,452,906	119.8569	174,140,800	5,164,975	1,600,659	3,564,316	2,599,167	26.7355	69,490,028	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	244,542,352
2150	5,470,929	2,972,273	2,498,655	1,822,067	124.3875	226,642,345	6,683,700	1,600,659	5,083,041	3,706,650	27.4252	101,655,614	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	329,209,482
2151	5,470,929	2,972,273	2,498,655	1,822,067	129.0893	235,209,339	6,683,700	1,600,659	5,083,041	3,706,650	28.1328	104,278,439	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	340,399,302
2152	5,481,757	2,972,273	2,509,483	1,829,963	133.9689	245,158,108	6,692,953	1,600,659	5,092,294	3,713,398	28.8586	107,163,458	1,250,000	911,524	1.0000	911,524	8,851,777	6,454,884	353,233,090
2153	3,952,204	2,972,273	979,931	714,584	139.0329	99,350,685	2,127,526	1,600,659	526,867	384,201	29.6032	11,373,583	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	111,635,792
2154	3,952,204	2,972,273	979,931	714,584	144.2884	103,106,181	2,127,526	1,600,659	526,867	384,201	30.3669	11,666,998	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	115,684,703
2155	5,830,672	2,972,273	2,858,398	2,084,398	149.7425	312,123,013	7,762,929	1,600,659	6,162,270	4,493,644	31.1504	139,978,811	1,250,000	911,524	1.0000	911,524	10,270,668	7,489,566	453,013,348
2156	4,975,515	2,972,273	2,003,242	1,460,802	155.4027	227,012,555	5,174,228	1,600,659	3,573,570	2,605,915	31.9541	83,269,662	1,250,000	911,524	1.0000	911,524	6,826,811	4,978,240	311,193,741
2157	4,964,687	2,972,273	1,992,414	1,452,906	161.2769	234,320,163	5,164,975	1,600,659	3,564,316	2,599,167	32.7785	85,196,794	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	320,428,481
2158	3,952,204	2,972,273	979,931	714,584	167.3732	119,602,210	2,127,526	1,600,659	526,867	384,201	33.6242	12,918,456	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	133,432,189
2159	4,964,687	2,972,273	1,992,414	1,452,906	173.6999	252,369,613	5,164,975	1,600,659	3,564,316	2,599,167	34.4917	89,649,687	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	342,930,824
2160	4,975,515	2,972,273	2,003,242	1,460,802	180.2658	263,332,618	5,174,228	1,600,659	3,573,570	2,605,915	35.3816	92,201,435	1,250,000	911,524	1.0000	911,524	6,826,811	4,978,240	356,445,577
2161	4,964,687	2,972,273	1,992,414	1,452,906	187.0798	271,809,349	5,164,975	1,600,659	3,564,316	2,599,167	36.2944	94,335,205	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	367,056,078
2162	3,952,204	2,972,273	979,931	714,584	194.1514	138,737,483	2,127,526	1,600,659	526,867	384,201	37.2308	14,304,116	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	153,953,122
2163	6,989,653	2,972,273	4,017,380	2,929,550	201.4904	590,276,157	11,239,874	1,600,659	9,639,215	7,029,099	38.1914	268,451,114	1,250,000	911,524	1.0000	911,524	14,906,595	10,870,172	859,638,794
2164	5,987,998	2,972,273	3,015,725	2,199,124	209.1067	459,851,521	8,211,678	1,600,659	6,611,019	4,820,881	39.1767	188,866,192	1,250,000	911,524	1.0000	911,524	10,876,744	7,931,528	649,629,237
2165	4,964,687	2,972,273	1,992,414	1,452,906	217.0109	315,296,422	5,164,975	1,600,659	3,564,316	2,599,167	40.1875	104,454,022	1,250,000	911,524	1.0000	911,524	6,806,730	4,963,597	420,661,968
2166	3,952,204	2,972,273	979,931	714,584	225.2140	160,934,320	2,127,526	1,600,659	526,867	384,201	41.2243	15,838,423	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	177,684,266
2167	3,952,204	2,972,273	979,931	714,584	233.7270	167,017,573	2,127,526	1,600,659	526,867	384,201	42.2879	16,247,059	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	184,176,156
2168	5,987,998	2,972,273	3,015,725	2,199,124	242.5619	533,423,648	8,211,678	1,600,659	6,611,019	4,820,881	43.3789	209,124,496	1,250,000	911,524	1.0000	911,524	10,876,744	7,931,528	743,459,668
2169	5,470,929	2,972,273	2,498,655	1,822,067	251.7308	458,670,355	6,683,700	1,600,659	5,083,041	3,706,650	44.4981	164,938,876	1,250,000	911,524	1.0000	911,524	8,831,696	6,440,240	624,520,755
2170	3,952,204	2,972,273	979,931	714,584	261.2462	186,682,353	2,127,526	1,600,659	526,867	384,201	45.6462	17,537,322	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	205,131,199
2171	3,952,204	2,972,273	979,931	714,584	271.1213	193,738,941	2,127,526	1,600,659	526,867	384,201	46.8238	17,989,757	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	212,640,223
2172	6,494,240	2,972,273	3,521,966	2,568,285	281.3697	722,637,514	9,730,403	1,600,659	8,129,744	5,928,363	48.0319	284,750,561	1,250,000	911,524	1.0000	911,524	12,901,710	9,408,172	1,008,299,599
2173	3,952,204	2,972,273	979,931	714,584	292.0054	208,662,385	2,127,526	1,600,659	526,867	384,201	49.2711	18,930,013	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	228,503,922
2174	3,952,204	2,972,273	979,931	714,584	303.0433	216,549,892	2,127,526	1,600,659	526,867	384,201	50.5423	19,418,409	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	236,879,825
2175	6,483,412	2,972,273	3,511,138	2,560,389	314.4983	805,237,930	9,721,149	1,600,659	8,120,490	5,921,616	51.8463	307,013,861	1,250,000	911,524	1.0000	911,524	12,881,628	9,393,528	1,113,163,314
2176	3,963,032	2,972,273	990,759	722,480	326.3863	235,807,556	2,136,779	1,600,659	536,120	390,949	53.1839	20,792,191	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	257,511,271
2177	3,952,204	2,972,273	979,931	714,584	338.7237	242,046,535	2,127,526	1,600,659	526,867	384,201	54.5561	20,960,516	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	263,918,574
2178	6,483,412	2,972,273	3,511,138	2,560,389	351.5275	900,047,079	9,721,149	1,600,659	8,120,490	5,921,616	55.9636	331,394,929	1,250,000	911,524	1.0000	911,524	12,881,628	9,393,528	1,232,353,532
2179	3,952,204	2,972,273	979,931	714,584	364.8152	260,691,103	2,127,526	1,600,659	526,867	384,201	57.4075	22,056,027	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	283,658,653
2180	3,963,032	2,972,273	990,759	722,480	378.6052	273,534,664	2,136,779	1,600,659	536,120	390,949	58.8886	23,022,437	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	297,468,625
2181	3,952,204	2,972,273	979,931	714,584	392.9165	280,771,842	2,127,526	1,600,659	526,867	384,201	60.4079	23,208,784	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	304,892,150
2182	6,483,412	2,972,273	3,511,138	2,560,389	407.7688	1,044,046,674	9,721,149	1,600,659	8,120,490	5,921,616	61.9664	366,941,203	1,250,000	911,524	1.0000	911,524	12,881,628	9,393,528	1,411,899,401
2183	3,952,204	2,972,273	979,931	714,584	423.1824	302,399,370	2,127,526	1,600,659	526,867	384,201	63.5652	24,421,822	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	327,732,716
2184	3,963,032	2,972,273	990,759	722,480	439.1787	317,297,803	2,136,779	1,600,659	536,120	390,949	65.2052	25,491,905	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	343,701,232
2185	3,952,204	2,972,273	979,931	714,584	455.7797	325,692,879	2,127,526	1,600,659	526,867	384,201	66.8874	25,698,215	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	352,302,618

Xcel Energy
Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

Docket No. E002/M-20-___
Schedule E.12
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Proposed

AMOUNT TO RECOVER

	LABOR						NON-LABOR						PIIC Payment						
	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	DOE Reimbursement Estimate Nominal $s	Adjusted Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Cost Estimate Nominal $s	Jurisdictional Cost in Nominal $s	Escalation Factor	Jurisdictional Cost in Future $'s	Total Cost Estimate Nominal $s	Total Jurisdictional Cost in Nominal $s	Total Jurisdictional Cost in Future $'s
2186	3,952,204	2,972,273	979,931	714,584	473.0081	338,004,017	2,127,526	1,600,659	526,867	384,201	68.6131	26,361,231	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	365,276,772
2187	3,952,204	2,972,273	979,931	714,584	490.8878	350,780,565	2,127,526	1,600,659	526,867	384,201	70.3834	27,041,382	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	378,733,471
2188	19,150,279	2,972,273	16,178,005	11,797,309	509.4434	6,010,061,141	47,698,520	1,600,659	46,097,861	33,615,436	72.1993	2,427,010,932	1,250,000	911,524	1.0000	911,524	63,525,866	46,324,268	8,437,983,596
2189	3,952,204	2,972,273	979,931	714,584	528.7004	377,800,844	2,127,526	1,600,659	526,867	384,201	74.0620	28,454,705	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	407,167,072
2190	3,952,204	2,972,273	979,931	714,584	548.6852	392,081,662	2,127,526	1,600,659	526,867	384,201	75.9728	29,188,836	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	422,182,022
2191	3,952,204	2,972,273	979,931	714,584	569.4255	406,902,348	2,127,526	1,600,659	526,867	384,201	77.9329	29,941,909	1,250,000	911,524	1.0000	911,524	2,756,797	2,010,309	437,755,781
2192	3,963,032	2,972,273	990,759	722,480	590.9498	426,949,379	2,136,779	1,600,659	536,120	390,949	79.9436	31,253,868	1,250,000	911,524	1.0000	911,524	2,776,879	2,024,953	459,114,771
2193	4,055,991	2,972,273	1,083,718	790,268	613.2877	484,661,528	2,438,888	1,600,659	838,229	611,253	82.0061	50,126,444	1,250,000	911,524	1.0000	911,524	3,171,947	2,313,044	535,699,496
2194	4,211,673	2,972,273	1,239,399	903,794	636.4700	575,237,472	2,905,932	1,600,659	1,305,273	951,830	84.1219	80,069,731	1,250,000	911,524	1.0000	911,524	3,794,672	2,767,147	656,218,728
2195	6,090,140	2,972,273	3,117,867	2,273,608	660.5286	1,501,783,008	8,541,335	1,600,659	6,940,676	5,061,273	86.2922	436,748,359	1,250,000	911,524	1.0000	911,524	11,308,543	8,246,404	1,939,442,890
2196	5,286,878	2,972,273	2,314,604	1,687,853	685.4966	1,157,017,715	6,108,316	1,600,659	4,507,657	3,287,069	88.5185	290,966,429	1,250,000	911,524	1.0000	911,524	8,072,261	5,886,446	1,448,895,668
2197	5,120,368	2,972,273	2,148,095	1,566,432	711.4083	1,114,372,476	5,632,019	1,600,659	4,031,360	2,939,744	90.8023	266,935,529	1,250,000	911,524	1.0000	911,524	7,429,455	5,417,700	1,382,219,528
2198	4,315,460	2,972,273	1,343,187	979,477	738.2996	723,147,738	3,217,294	1,600,659	1,616,635	1,178,881	93.1450	109,806,894	1,250,000	911,524	1.0000	911,524	4,209,822	3,069,882	833,866,156
2199	5,120,368	2,972,273	2,148,095	1,566,432	766.2073	1,200,211,364	5,632,019	1,600,659	4,031,360	2,939,744	95.5482	280,887,261	1,250,000	911,524	1.0000	911,524	7,429,455	5,417,700	1,482,010,148
2200	5,574,716	2,972,273	2,602,443	1,897,751	795.1699	1,509,034,237	6,995,062	1,600,659	5,394,403	3,933,701	98.0133	385,555,046	1,250,000	911,524	1.0000	911,524	9,246,846	6,742,976	1,895,500,807
2201	5,730,397	2,972,273	2,758,124	2,011,276	825.2273	1,659,760,217	7,462,106	1,600,659	5,861,447	4,274,278	100.5421	429,744,934	1,250,000	911,524	1.0000	911,524	9,869,571	7,197,079	2,090,416,675
2202	5,730,397	2,972,273	2,758,124	2,011,276	856.4209	1,722,499,169	7,462,106	1,600,659	5,861,447	4,274,278	103.1360	440,831,985	1,250,000	911,524	1.0000	911,524	9,869,571	7,197,079	2,164,242,678
2203	4,107,885	2,972,273	1,135,612	828,110	888.7937	736,018,702	2,594,569	1,600,659	993,910	724,778	105.7969	76,679,303	1,250,000	911,524	1.0000	911,524	3,379,522	2,464,412	813,609,528
2204	4,170,607	2,972,273	1,198,334	873,848	922.3901	806,028,356	2,759,504	1,600,659	1,158,845	845,052	108.5265	91,710,525	1,250,000	911,524	1.0000	911,524	3,607,179	2,630,423	898,650,405
2205	5,678,504	2,972,273	2,706,230	1,973,435	957.2564	1,889,082,825	7,306,425	1,600,659	5,705,766	4,160,753	111.3265	463,202,041	1,250,000	911,524	1.0000	911,524	9,661,996	7,045,711	2,353,196,390
2206	5,120,368	2,972,273	2,148,095	1,566,432	993.4407	1,556,156,953	5,632,019	1,600,659	4,031,360	2,939,744	114.1987	335,714,959	1,250,000	911,524	1.0000	911,524	7,429,455	5,417,700	1,892,783,435
2207	5,172,262	2,972,273	2,199,989	1,604,274	1,030.9927	1,653,994,325	5,787,700	1,600,659	4,187,041	3,053,270	117.1450	357,675,298	1,250,000	911,524	1.0000	911,524	7,637,030	5,569,067	2,012,581,147
2208	4,170,607	2,972,273	1,198,334	873,848	1,069.9643	934,985,714	2,759,504	1,600,659	1,158,845	845,052	120.1674	101,547,690	1,250,000	911,524	1.0000	911,524	3,607,179	2,630,423	1,037,444,927
2209	5,120,368	2,972,273	2,148,095	1,566,432	1,110.4089	1,739,379,643	5,632,019	1,600,659	4,031,360	2,939,744	123.2677	362,375,498	1,250,000	911,524	1.0000	911,524	7,429,455	5,417,700	2,102,666,665
2210	5,172,262	2,972,273	2,199,989	1,604,274	1,152.3824	1,848,736,611	5,787,700	1,600,659	4,187,041	3,053,270	126.4480	386,079,867	1,250,000	911,524	1.0000	911,524	7,637,030	5,569,067	2,235,728,002
2211	5,172,262	2,972,273	2,199,989	1,604,274	1,195.9424	1,918,618,767	5,787,700	1,600,659	4,187,041	3,053,270	129.7104	396,040,855	1,250,000	911,524	1.0000	911,524	7,637,030	5,569,067	2,315,571,146
2212	4,170,607	2,972,273	1,198,334	873,848	1,241.1491	1,084,575,137	2,759,504	1,600,659	1,158,845	845,052	133.0569	112,439,986	1,250,000	911,524	1.0000	911,524	3,607,179	2,630,423	1,197,926,647
2213	7,197,228	2,972,273	4,224,955	3,080,917	1,288.0645	3,968,420,347	11,862,599	1,600,659	10,261,940	7,483,201	136.4898	1,021,380,667	1,250,000	911,524	1.0000	911,524	15,736,895	11,475,643	4,990,712,537
2214	6,184,745	2,972,273	3,212,472	2,342,595	1,336.7533	3,131,472,245	8,825,149	1,600,659	7,224,490	5,268,236	140.0112	737,611,995	1,250,000	911,524	1.0000	911,524	11,686,962	8,522,355	3,869,995,763
2215	5,172,262	2,972,273	2,199,989	1,604,274	1,387.2826	2,225,580,790	5,787,700	1,600,659	4,187,041	3,053,270	143.6235	438,521,304	1,250,000	911,524	1.0000	911,524	7,637,030	5,569,067	2,665,013,618
2216	4,170,607	2,972,273	1,198,334	873,848	1,439.7219	1,258,097,497	2,759,504	1,600,659	1,158,845	845,052	147.3290	124,500,652	1,250,000	911,524	1.0000	911,524	3,607,179	2,630,423	1,383,509,673
2217	4,133,788	2,972,273	1,161,514	846,998	1,494.1434	1,265,536,796	14,534,310	1,600,659	12,933,651	9,431,464	151.1301	1,425,378,089	1,250,000	911,524	1.0000	911,524	15,345,165	11,189,986	2,691,826,408
2218	1,123,816	2,972,273	(1,848,457)	(1,347,930)	1,550.6220	(2,090,130,339)	3,040,582	1,600,659	1,439,923	1,050,019	155.0292	162,783,650	0	0	1.0000	0	(408,534)	(297,911)	(1,927,346,689)
	$1,250,894,368	$526,092,387	$724,801,981	$528,539,376		$61,058,494,756	$1,305,637,546	$283,316,640	$1,022,320,907	$745,495,829		$18,471,829,558	$230,000,000	$167,720,370		$167,720,370	$1,977,122,888	$1,441,755,575	$79,698,044,684
	$4,958,773,526	$2,183,453,272	$2,775,320,253	$2,023,816,260		$347,184,364,043	$4,993,140,088	$923,786,084	$4,069,354,004	$2,967,450,257		$83,165,263,510	$461,250,000	$336,352,264		$336,352,264	$7,305,924,258	$5,327,618,781	$430,685,979,817

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	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$757,935,327	$15,187,603	$0	$6,696,113	$779,819,043
2021	779,819,043	31,284,497	-	8,507,110	819,610,650
2022	819,610,650	33,762,573	-	53,138,244	906,511,467
2023	906,511,467	37,229,916	-	53,138,244	996,879,627
2024	996,879,627	40,835,605	-	53,138,244	1,090,853,476
2025	1,090,853,476	44,585,162	-	53,138,244	1,188,576,882
2026	1,188,576,882	48,484,326	-	53,138,244	1,290,199,452
2027	1,290,199,452	52,539,066	-	53,138,244	1,395,876,762
2028	1,395,876,762	56,755,591	-	53,138,244	1,505,770,597
2029	1,505,770,597	61,140,355	-	53,138,244	1,620,049,196
2030	1,620,049,196	65,700,071	-	53,138,244	1,738,887,512
2031	1,738,887,512	70,441,720	-	53,138,244	1,862,467,476
2032	1,862,467,476	75,372,560	-	53,138,244	1,990,978,280
2033	1,990,978,280	80,500,141	-	53,138,244	2,124,616,666
2034	2,124,616,666	85,832,313	-	53,138,244	2,263,587,223
2035	2,263,587,223	91,377,238	-	53,138,244	2,408,102,705
2036	2,408,102,705	97,143,406	-	53,138,244	2,558,384,356
2037	2,558,384,356	103,139,644	-	53,138,244	2,714,662,244
2038	2,714,662,244	109,375,131	-	53,138,244	2,877,175,619
2039	2,877,175,619	115,859,415	-	53,138,244	3,046,173,279
2040	3,046,173,279	118,964,685	(46,107,404)	39,853,683	3,158,884,242
2041	3,158,884,242	122,564,709	(183,640,070)	-	3,097,808,881
2042	3,097,808,881	120,194,985	(317,582,210)	-	2,900,421,655
2043	2,900,421,655	112,536,360	(370,640,837)	-	2,642,317,178
2044	2,642,317,178	102,521,907	(350,340,524)	-	2,394,498,560
2045	2,394,498,560	92,906,544	(128,900,685)	-	2,358,504,419
2046	2,358,504,419	91,509,971	(97,673,330)	-	2,352,341,061
2047	2,352,341,061	91,270,833	(93,432,389)	-	2,350,179,505
2048	2,350,179,505	91,186,965	(9,723,492)	-	2,431,642,977
2049	2,431,642,977	94,347,748	(5,151,409)	-	2,520,839,316
2050	2,520,839,316	97,808,565	(16,531,533)	-	2,602,116,348
2051	2,602,116,348	100,962,114	(17,052,647)	-	2,686,025,816
2052	2,686,025,816	104,217,802	(17,652,945)	-	2,772,590,673
2053	2,772,590,673	107,576,518	(18,147,067)	-	2,862,020,123
2054	2,862,020,123	111,046,381	(18,721,153)	-	2,954,345,351
2055	2,954,345,351	114,628,600	(19,313,981)	-	3,049,659,969
2056	3,049,659,969	118,326,807	(19,997,249)	-	3,147,989,527
2057	3,147,989,527	122,141,994	(20,558,771)	-	3,249,572,749
2058	3,249,572,749	126,083,423	(83,990,420)	-	3,291,665,752
2059	3,291,665,752	127,716,631	(21,886,651)	-	3,397,495,732
2060	3,397,495,732	131,822,834	(22,665,572)	-	3,506,652,994

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2061	3,506,652,994	136,058,136	(23,303,379)	-	3,619,407,751
2062	3,619,407,751	140,433,021	(24,047,588)	-	3,735,793,184
2063	3,735,793,184	144,948,776	(61,197,934)	-	3,819,544,026
2064	3,819,544,026	148,198,308	(25,703,347)	-	3,942,038,987
2065	3,942,038,987	152,951,113	(26,429,672)	-	4,068,560,428
2066	4,068,560,428	157,860,145	(35,229,498)	-	4,191,191,074
2067	4,191,191,074	162,618,214	(28,151,766)	-	4,325,657,522
2068	4,325,657,522	167,835,512	(147,326,866)	-	4,346,166,168
2069	4,346,166,168	168,631,247	(29,990,555)	-	4,484,806,860
2070	4,484,806,860	174,010,506	(30,955,832)	-	4,627,861,535
2071	4,627,861,535	179,561,028	(31,953,327)	-	4,775,469,235
2072	4,775,469,235	185,288,206	(33,109,202)	-	4,927,648,240
2073	4,927,648,240	191,192,752	(34,049,643)	-	5,084,791,348
2074	5,084,791,348	197,289,904	(35,150,824)	-	5,246,930,428
2075	5,246,930,428	203,580,901	(36,288,517)	-	5,414,222,812
2076	5,414,222,812	210,071,845	(37,608,033)	-	5,586,686,624
2077	5,586,686,624	216,763,441	(38,679,194)	-	5,764,770,870
2078	5,764,770,870	223,673,110	(39,935,059)	-	5,948,508,921
2079	5,948,508,921	230,802,146	(41,233,194)	-	6,138,077,873
2080	6,138,077,873	238,157,421	(103,188,342)	-	6,273,046,953
2081	6,273,046,953	243,394,222	(43,961,721)	-	6,472,479,453
2082	6,472,479,453	251,132,203	(45,394,993)	-	6,678,216,663
2083	6,678,216,663	259,114,807	(46,876,929)	-	6,890,454,540
2084	6,890,454,540	267,349,636	(48,599,730)	-	7,109,204,447
2085	7,109,204,447	275,837,133	(120,299,432)	-	7,264,742,147
2086	7,264,742,147	281,871,995	(51,628,781)	-	7,494,985,362
2087	7,494,985,362	290,805,432	(98,144,013)	-	7,687,646,781
2088	7,687,646,781	298,280,695	(70,729,161)	-	7,915,198,315
2089	7,915,198,315	307,109,695	(56,879,387)	-	8,165,428,623
2090	8,165,428,623	316,818,631	(58,749,441)	-	8,423,497,813
2091	8,423,497,813	326,831,715	(60,683,165)	-	8,689,646,363
2092	8,689,646,363	337,158,279	(62,936,622)	-	8,963,868,019
2093	8,963,868,019	347,798,079	(64,749,691)	-	9,246,916,407
2094	9,246,916,407	358,780,357	(714,209,192)	-	8,891,487,572
2095	8,891,487,572	344,989,718	(69,097,887)	-	9,167,379,403
2096	9,167,379,403	355,694,321	(71,677,036)	-	9,451,396,688
2097	9,451,396,688	366,714,191	(73,747,312)	-	9,744,363,568
2098	9,744,363,568	378,081,306	(76,191,911)	-	10,046,252,963
2099	10,046,252,963	389,794,615	(78,720,142)	-	10,357,327,436
2100	10,357,327,436	401,864,305	(81,334,596)	-	10,677,857,144
2101	10,677,857,144	414,300,857	(84,038,673)	-	11,008,119,328
2102	11,008,119,328	427,115,030	(86,835,368)	-	11,348,398,990
2103	11,348,398,990	440,317,881	(89,727,936)	-	11,698,988,936
2104	11,698,988,936	453,920,771	(93,110,410)	-	12,059,799,296
2105	12,059,799,296	467,920,213	(95,814,142)	-	12,431,905,367
2106	12,431,905,367	482,357,928	(99,015,470)	-	12,815,247,825
2107	12,815,247,825	497,231,616	(102,326,757)	-	13,210,152,683
2108	13,210,152,683	512,553,924	(390,992,392)	-	13,331,714,215

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External Levelized	2109	13,331,714,215	517,270,512	(109,295,366)	-	13,739,689,360
	2110	13,739,689,360	533,099,947	(112,960,897)	-	14,159,828,410
	2111	14,159,828,410	549,401,342	(116,752,806)	-	14,592,476,946
	2112	14,592,476,946	566,188,106	(121,196,461)	-	15,037,468,591
	2113	15,037,468,591	583,453,781	(291,131,503)	-	15,329,790,870
	2114	15,329,790,870	594,795,886	(128,933,604)	-	15,795,653,151
	2115	15,795,653,151	612,871,342	(133,278,206)	-	16,275,246,287
	2116	16,275,246,287	631,479,556	(174,928,791)	-	16,731,797,052
	2117	16,731,797,052	649,193,726	(142,424,086)	-	17,238,566,692
	2118	17,238,566,692	668,856,388	(692,140,942)	-	17,215,282,138
	2119	17,215,282,138	667,952,947	(152,216,478)	-	17,731,018,607
	2120	17,731,018,607	687,963,522	(158,063,673)	-	18,260,918,457
	2121	18,260,918,457	708,523,636	(162,701,217)	-	18,806,740,876
	2122	18,806,740,876	729,701,546	(168,219,094)	-	19,368,223,328
	2123	19,368,223,328	751,487,065	(173,928,999)	-	19,945,781,395
	2124	19,945,781,395	773,896,318	(180,640,350)	-	20,539,037,362
	2125	20,539,037,362	796,914,650	(185,953,348)	-	21,149,998,664
	2126	21,149,998,664	820,619,948	(192,282,111)	-	21,778,336,501
	2127	21,778,336,501	844,999,456	(198,831,823)	-	22,424,504,135
	2128	22,424,504,135	870,070,760	(260,036,434)	-	23,034,538,461
	2129	23,034,538,461	893,740,092	(212,627,336)	-	23,715,651,217
	2130	23,715,651,217	920,167,267	(504,269,347)	-	24,131,549,138
	2131	24,131,549,138	936,304,107	(227,405,628)	-	24,840,447,616
	2132	24,840,447,616	963,809,367	(236,257,050)	-	25,567,999,933
	2133	25,567,999,933	992,038,397	(243,238,861)	-	26,316,799,470
	2134	26,316,799,470	1,021,091,819	(251,574,463)	-	27,086,316,826
	2135	27,086,316,826	1,050,949,093	(593,752,953)	-	27,543,512,966
	2136	27,543,512,966	1,068,688,303	(270,373,979)	-	28,341,827,290
	2137	28,341,827,290	1,099,662,899	(491,744,433)	-	28,949,745,756
	2138	28,949,745,756	1,123,250,135	(287,954,697)	-	29,785,041,194
	2139	29,785,041,194	1,155,659,598	(297,864,324)	-	30,642,836,468
	2140	30,642,836,468	1,188,942,055	(309,554,541)	-	31,522,223,983
	2141	31,522,223,983	1,223,062,291	(318,743,919)	-	32,426,542,354
	2142	32,426,542,354	1,258,149,843	(329,740,045)	-	33,354,952,153
	2143	33,354,952,153	1,294,172,144	(341,124,410)	-	34,307,999,887
	2144	34,307,999,887	1,331,150,396	(3,472,280,013)	-	32,166,870,270
	2145	32,166,870,270	1,248,074,566	(365,115,127)	-	33,049,829,709
	2146	33,049,829,709	1,282,333,393	(377,751,152)	-	33,954,411,950
	2147	33,954,411,950	1,317,431,184	(390,834,361)	-	34,881,008,773
	2148	34,881,008,773	1,353,383,140	(406,295,384)	-	35,828,096,529
	2149	35,828,096,529	1,390,130,145	(418,409,506)	-	36,799,817,168
	2150	36,799,817,168	1,427,832,906	(432,934,605)	-	37,794,715,469
	2151	37,794,715,469	1,466,434,960	(447,975,740)	-	38,813,174,690
	2152	38,813,174,690	1,505,951,178	(465,764,564)	-	39,853,361,304
	2153	39,853,361,304	1,546,310,419	(479,680,623)	-	40,919,991,099
	2154	40,919,991,099	1,587,695,655	(496,383,525)	-	42,011,303,229
	2155	42,011,303,229	1,630,038,565	(513,681,171)	-	43,127,660,624
	2156	43,127,660,624	1,673,353,232	(534,154,640)	-	44,266,859,215

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2157	44,266,859,215	1,717,554,138	(550,146,384)	-	45,434,266,970
2158	45,434,266,970	1,762,849,558	(1,973,468,752)	-	45,223,647,776
2159	45,223,647,776	1,754,677,534	(589,258,630)	-	46,389,066,680
2160	46,389,066,680	1,799,895,787	(612,829,268)	-	47,576,133,199
2161	47,576,133,199	1,845,953,968	(631,212,755)	-	48,790,874,412
2162	48,790,874,412	1,893,085,927	(653,320,674)	-	50,030,639,665
2163	50,030,639,665	1,941,188,819	(1,503,425,556)	-	50,468,402,928
2164	50,468,402,928	1,958,174,034	(703,362,928)	-	51,723,214,033
2165	51,723,214,033	2,006,860,704	(724,503,530)	-	53,005,571,208
2166	53,005,571,208	2,056,616,163	(932,571,782)	-	54,129,615,589
2167	54,129,615,589	2,100,229,085	(776,308,097)	-	55,453,536,577
2168	55,453,536,577	2,151,597,219	(3,734,317,443)	-	53,870,816,353
2169	53,870,816,353	2,090,187,675	(831,894,181)	-	55,129,109,847
2170	55,129,109,847	2,139,009,462	(861,192,031)	-	56,406,927,278
2171	56,406,927,278	2,188,588,778	(891,541,482)	-	57,703,974,575
2172	57,703,974,575	2,238,914,214	(927,569,021)	-	59,015,319,767
2173	59,015,319,767	2,289,794,407	(955,551,799)	-	60,349,562,375
2174	60,349,562,375	2,341,563,020	(989,293,656)	-	61,701,831,739
2175	61,701,831,739	2,394,031,071	(1,024,249,263)	-	63,071,613,547
2176	63,071,613,547	2,447,178,606	(1,065,771,821)	-	64,453,020,331
2177	64,453,020,331	2,500,777,189	(1,097,981,660)	-	65,855,815,860
2178	65,855,815,860	2,555,205,655	(1,136,851,916)	-	67,274,169,599
2179	67,274,169,599	2,610,237,780	(1,177,123,660)	-	68,707,283,720
2180	68,707,283,720	2,665,842,608	(2,678,250,675)	-	68,694,875,653
2181	68,694,875,653	2,665,361,175	(1,262,077,736)	-	70,098,159,092
2182	70,098,159,092	2,719,808,573	(1,306,868,489)	-	71,511,099,176
2183	71,511,099,176	2,774,630,648	(1,353,277,166)	-	72,932,452,657
2184	72,932,452,657	2,829,779,163	(1,408,475,204)	-	74,353,756,617
2185	74,353,756,617	2,884,925,757	(3,169,230,239)	-	74,069,452,134
2186	74,069,452,134	2,873,894,743	(1,502,812,846)	-	75,440,534,031
2187	75,440,534,031	2,927,092,720	(2,658,734,308)	-	75,708,892,443
2188	75,708,892,443	2,937,505,027	(1,619,972,256)	-	77,026,425,214
2189	77,026,425,214	2,988,625,298	(1,669,177,478)	-	78,345,873,035
2190	78,345,873,035	3,039,819,874	(1,728,697,286)	-	79,656,995,623
2191	79,656,995,623	3,090,691,430	(1,790,374,909)	-	80,957,312,145
2192	80,957,312,145	3,141,143,711	(2,299,952,176)	-	81,798,503,680
2193	81,798,503,680	3,173,781,943	(2,709,957,035)	-	82,262,328,588
2194	82,262,328,588	3,191,778,349	(18,389,673,213)	-	67,064,433,724
2195	67,064,433,724	2,602,100,029	(2,784,272,942)	-	66,882,260,811
2196	66,882,260,811	2,595,031,719	(3,143,577,860)	-	66,333,714,671
2197	66,333,714,671	2,573,748,129	(1,036,106,441)	-	67,871,356,359
2198	67,871,356,359	2,633,408,627	(1,074,790,175)	-	69,429,974,812
2199	69,429,974,812	2,693,883,023	(1,114,923,637)	-	71,008,934,197
2200	71,008,934,197	2,755,146,647	(1,156,561,349)	-	72,607,519,495
2201	72,607,519,495	2,817,171,756	(1,199,759,967)	-	74,224,931,284
2202	74,224,931,284	2,879,927,334	(1,244,578,071)	-	75,860,280,547
2203	75,860,280,547	2,943,378,885	(1,291,076,702)	-	77,512,582,730
2204	77,512,582,730	3,007,488,210	(1,354,117,808)	-	79,165,953,133

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2205	79,165,953,133	3,071,638,982	(1,389,369,860)	-	80,848,222,254
2206	80,848,222,254	3,136,911,023	(1,441,298,096)	-	82,543,835,181
2207	82,543,835,181	3,202,700,805	(1,495,173,905)	-	84,251,362,081
2208	84,251,362,081	3,268,952,849	(9,806,372,450)	-	77,713,942,479
2209	77,713,942,479	3,015,300,968	(1,609,064,436)	-	79,120,179,011
2210	79,120,179,011	3,069,862,946	(1,669,233,906)	-	80,520,808,051
2211	80,520,808,051	3,124,207,352	(1,731,660,812)	-	81,913,354,592
2212	81,913,354,592	3,178,238,158	(1,816,280,288)	-	83,275,312,462
2213	83,275,312,462	3,231,082,124	(6,306,425,667)	-	80,199,968,919
2214	80,199,968,919	3,111,758,794	(1,933,352,113)	-	81,378,375,599
2215	81,378,375,599	3,157,480,973	(2,005,690,912)	-	82,530,165,661
2216	82,530,165,661	3,202,170,428	(3,088,700,372)	-	82,643,635,716
2217	82,643,635,716	3,206,573,066	(2,158,616,416)	-	83,691,592,366
2218	83,691,592,366	3,247,233,784	(17,773,668,861)	-	69,165,157,289
2219	69,165,157,289	2,683,608,103	(3,270,644,502)	-	68,578,120,890
2220	68,578,120,890	2,660,831,091	(3,254,028,175)	-	67,984,923,806
2221	67,984,923,806	2,637,815,044	(3,346,304,744)	-	67,276,434,106
2222	67,276,434,106	2,610,325,643	(3,469,628,612)	-	66,417,131,137
2223	66,417,131,137	2,576,984,688	(3,778,792,209)	-	65,215,323,616
2224	65,215,323,616	2,530,354,556	(3,761,038,200)	-	63,984,639,973
2225	63,984,639,973	2,482,604,031	(3,867,770,341)	-	62,599,473,662
2226	62,599,473,662	2,428,859,578	(4,010,466,022)	-	61,017,867,219
2227	61,017,867,219	2,367,493,248	(4,366,616,469)	-	59,018,743,998
2228	59,018,743,998	2,289,927,267	(4,347,705,961)	-	56,960,965,304
2229	56,960,965,304	2,210,085,454	(4,471,173,515)	-	54,699,877,243
2230	54,699,877,243	2,122,355,237	(11,699,321,686)	-	45,122,910,795
2231	45,122,910,795	1,750,768,939	(3,851,092,714)	-	43,022,587,020
2232	43,022,587,020	1,669,276,376	(4,036,338,919)	-	40,655,524,477
2233	40,655,524,477	1,577,434,350	(4,400,488,254)	-	37,832,470,573
2234	37,832,470,573	1,467,899,858	(4,298,989,892)	-	35,001,380,538
2235	35,001,380,538	1,358,053,565	(13,962,146,846)	-	22,397,287,257
2236	22,397,287,257	869,014,746	(4,958,780,258)	-	18,307,521,744
2237	18,307,521,744	710,331,844	(10,911,993,202)	-	8,105,860,385
2238	8,105,860,385	314,507,383	(4,978,574,001)	-	3,441,793,768
2239	3,441,793,768	133,541,598	(5,480,588,240)	-	(1,905,252,875)
2240	(1,905,252,875)	(73,923,812)	(6,855,267,471)	-	(8,834,444,157)
2241	(8,834,444,157)	(342,776,433)	9,177,220,591	-	0

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Prairie Island Unit 1

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$437,068,622	$8,807,181	$0	$24,632	$445,900,435
2021	445,900,435	18,219,642	-	12,399,703	476,519,779
2022	476,519,779	20,098,666	-	44,412,832	541,031,277
2023	541,031,277	22,698,479	-	44,412,832	608,142,588
2024	608,142,588	25,403,065	-	44,412,832	677,958,485
2025	677,958,485	28,216,646	-	44,412,832	750,587,963
2026	750,587,963	31,143,613	-	44,412,832	826,144,408
2027	826,144,408	34,188,538	-	44,412,832	904,745,779
2028	904,745,779	37,356,173	-	44,412,832	986,514,784
2029	986,514,784	40,651,464	-	44,412,832	1,071,579,080
2030	1,071,579,080	44,079,556	-	44,412,832	1,160,071,468
2031	1,160,071,468	47,645,799	-	44,412,832	1,252,130,099
2032	1,252,130,099	51,355,762	-	44,412,832	1,347,898,692
2033	1,347,898,692	52,466,914	(39,900,645)	29,756,597	1,390,221,559
2034	1,390,221,559	53,523,530	(122,923,789)	-	1,320,821,300
2035	1,320,821,300	50,851,620	(171,342,706)	-	1,200,330,214
2036	1,200,330,214	46,212,713	(175,316,670)	-	1,071,226,257
2037	1,071,226,257	41,242,211	(141,970,869)	-	970,497,598
2038	970,497,598	37,364,158	(89,804,897)	-	918,056,859
2039	918,056,859	35,345,189	(67,496,013)	-	885,906,035
2040	885,906,035	34,107,382	(44,142,529)	-	875,870,889
2041	875,870,889	33,721,029	(33,346,820)	-	876,245,098
2042	876,245,098	33,735,436	(17,924,460)	-	892,056,074
2043	892,056,074	34,344,159	(3,298,897)	-	923,101,336
2044	923,101,336	35,539,401	(3,412,486)	-	955,228,251
2045	955,228,251	36,776,288	(12,519,435)	-	979,485,104
2046	979,485,104	37,710,177	(9,767,008)	-	1,007,428,272
2047	1,007,428,272	38,785,988	(10,041,546)	-	1,036,172,715
2048	1,036,172,715	39,892,650	(3,774,339)	-	1,072,291,026
2049	1,072,291,026	41,283,205	(10,616,830)	-	1,102,957,401
2050	1,102,957,401	42,463,860	(14,409,596)	-	1,131,011,665
2051	1,131,011,665	43,543,949	(14,434,291)	-	1,160,121,323
2052	1,160,121,323	44,664,671	(15,293,912)	-	1,189,492,081
2053	1,189,492,081	45,795,445	(4,260,650)	-	1,231,026,876
2054	1,231,026,876	47,394,535	(4,376,473)	-	1,274,044,938
2055	1,274,044,938	49,050,730	(16,620,838)	-	1,306,474,829
2056	1,306,474,829	50,299,281	(12,991,276)	-	1,343,782,835
2057	1,343,782,835	51,735,639	(13,321,361)	-	1,382,197,113
2058	1,382,197,113	53,214,589	(4,882,272)	-	1,430,529,430
2059	1,430,529,430	55,075,383	(13,618,873)	-	1,471,985,940
2060	1,471,985,940	56,671,459	(14,580,762)	-	1,514,076,637

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2061	1,514,076,637	58,291,951	(14,955,385)	-	1,557,413,203
2062	1,557,413,203	59,960,408	(5,463,818)	-	1,611,909,793
2063	1,611,909,793	62,058,527	(36,319,822)	-	1,637,648,498
2064	1,637,648,498	63,049,467	(26,355,381)	-	1,674,342,583
2065	1,674,342,583	64,462,189	(16,813,761)	-	1,721,991,011
2066	1,721,991,011	66,296,654	(6,132,573)	-	1,782,155,092
2067	1,782,155,092	68,612,971	(6,314,924)	-	1,844,453,139
2068	1,844,453,139	71,011,446	(30,311,651)	-	1,885,152,934
2069	1,885,152,934	72,578,388	(25,041,086)	-	1,932,690,235
2070	1,932,690,235	74,408,574	(6,901,958)	-	2,000,196,852
2071	2,000,196,852	77,007,579	(7,111,749)	-	2,070,092,681
2072	2,070,092,681	79,698,568	(40,114,477)	-	2,109,676,773
2073	2,109,676,773	81,222,556	(7,554,224)	-	2,183,345,105
2074	2,183,345,105	84,058,787	(7,787,417)	-	2,259,616,475
2075	2,259,616,475	86,995,234	(49,814,607)	-	2,296,797,103
2076	2,296,797,103	88,426,688	(8,370,242)	-	2,376,853,549
2077	2,376,853,549	91,508,862	(8,538,208)	-	2,459,824,202
2078	2,459,824,202	94,703,232	(48,825,568)	-	2,505,701,865
2079	2,505,701,865	96,469,522	(9,084,684)	-	2,593,086,704
2080	2,593,086,704	99,833,838	(9,477,016)	-	2,683,443,525
2081	2,683,443,525	103,312,576	(9,671,174)	-	2,777,084,928
2082	2,777,084,928	106,917,770	(53,166,613)	-	2,830,836,085
2083	2,830,836,085	108,987,189	(10,300,543)	-	2,929,522,731
2084	2,929,522,731	112,786,625	(10,751,594)	-	3,031,557,761
2085	3,031,557,761	116,714,974	(10,975,979)	-	3,137,296,756
2086	3,137,296,756	120,785,925	(11,332,081)	-	3,246,750,601
2087	3,246,750,601	124,999,898	(11,700,994)	-	3,360,049,505
2088	3,360,049,505	129,361,906	(352,881,169)	-	3,136,530,242
2089	3,136,530,242	120,756,414	(12,479,247)	-	3,244,807,410
2090	3,244,807,410	124,925,085	(12,889,528)	-	3,356,842,967
2091	3,356,842,967	129,238,454	(13,314,649)	-	3,472,766,772
2092	3,472,766,772	133,701,521	(13,911,529)	-	3,592,556,763
2093	3,592,556,763	138,313,435	(14,211,507)	-	3,716,658,692
2094	3,716,658,692	143,091,360	(14,684,440)	-	3,845,065,611
2095	3,845,065,611	148,035,026	(55,521,905)	-	3,937,578,733
2096	3,937,578,733	151,596,781	(43,596,891)	-	4,045,578,623
2097	4,045,578,623	155,754,777	(44,807,876)	-	4,156,525,524
2098	4,156,525,524	160,026,233	(16,753,450)	-	4,299,798,307
2099	4,299,798,307	165,542,235	(47,731,200)	-	4,417,609,343
2100	4,417,609,343	170,077,960	(64,949,099)	-	4,522,738,203
2101	4,522,738,203	174,125,421	(67,028,133)	-	4,629,835,492
2102	4,629,835,492	178,248,666	(69,176,905)	-	4,738,907,253
2103	4,738,907,253	182,447,929	(19,790,534)	-	4,901,564,649
2104	4,901,564,649	188,710,239	(20,701,202)	-	5,069,573,686
2105	5,069,573,686	195,178,587	(76,066,033)	-	5,188,686,239
2106	5,188,686,239	199,764,420	(59,642,826)	-	5,328,807,833
2107	5,328,807,833	205,159,102	(61,583,707)	-	5,472,383,228
2108	5,472,383,228	210,686,754	(23,690,752)	-	5,659,379,230

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External Levelized	2109	5,659,379,230	217,886,100	(65,666,217)	-	5,811,599,114
	2110	5,811,599,114	223,746,566	(67,812,566)	-	5,967,533,114
	2111	5,967,533,114	229,750,025	(70,032,172)	-	6,127,250,967
	2112	6,127,250,967	235,899,162	(27,139,719)	-	6,336,010,411
	2113	6,336,010,411	243,936,401	(168,584,203)	-	6,411,362,609
	2114	6,411,362,609	246,837,460	(125,588,918)	-	6,532,611,152
	2115	6,532,611,152	251,505,529	(97,452,280)	-	6,686,664,401
	2116	6,686,664,401	257,436,579	(31,119,433)	-	6,912,981,547
	2117	6,912,981,547	266,149,790	(31,838,209)	-	7,147,293,128
	2118	7,147,293,128	275,170,785	(142,751,689)	-	7,279,712,224
	2119	7,279,712,224	280,268,921	(119,085,462)	-	7,440,895,683
	2120	7,440,895,683	286,474,484	(35,712,738)	-	7,691,657,429
	2121	7,691,657,429	296,128,811	(36,544,556)	-	7,951,241,684
	2122	7,951,241,684	306,122,805	(193,494,680)	-	8,063,869,808
	2123	8,063,869,808	310,458,988	(39,163,662)	-	8,335,165,134
	2124	8,335,165,134	320,903,858	(41,015,217)	-	8,615,053,774
	2125	8,615,053,774	331,679,570	(213,117,617)	-	8,733,615,728
	2126	8,733,615,728	336,244,206	(43,462,769)	-	9,026,397,165
	2127	9,026,397,165	347,516,291	(45,001,992)	-	9,328,911,464
	2128	9,328,911,464	359,163,091	(235,348,539)	-	9,452,726,016
	2129	9,452,726,016	363,929,952	(48,251,836)	-	9,768,404,131
	2130	9,768,404,131	376,083,559	(49,966,646)	-	10,094,521,044
	2131	10,094,521,044	388,639,060	(51,744,322)	-	10,431,415,782
	2132	10,431,415,782	401,609,508	(267,958,531)	-	10,565,066,759
	2133	10,565,066,759	406,755,070	(55,497,745)	-	10,916,324,084
	2134	10,916,324,084	420,278,477	(57,478,402)	-	11,279,124,159
	2135	11,279,124,159	434,246,280	(59,531,867)	-	11,653,838,573
	2136	11,653,838,573	448,672,785	(62,374,450)	-	12,040,136,908
	2137	12,040,136,908	463,545,271	(63,867,759)	-	12,439,814,420
	2138	12,439,814,420	478,932,855	(1,619,934,496)	-	11,298,812,779
	2139	11,298,812,779	435,004,292	(68,528,292)	-	11,665,288,778
	2140	11,665,288,778	449,113,618	(71,808,993)	-	12,042,593,403
	2141	12,042,593,403	463,639,846	(73,537,858)	-	12,432,695,391
	2142	12,432,695,391	478,658,773	(76,181,819)	-	12,835,172,344
	2143	12,835,172,344	494,154,135	(78,923,046)	-	13,250,403,433
	2144	13,250,403,433	510,140,532	(82,710,122)	-	13,677,833,843
	2145	13,677,833,843	526,596,603	(279,365,669)	-	13,925,064,777
	2146	13,925,064,777	536,114,994	(221,800,138)	-	14,239,379,633
	2147	14,239,379,633	548,216,116	(229,376,110)	-	14,558,219,639
	2148	14,558,219,639	560,491,456	(95,308,029)	-	15,023,403,066
	2149	15,023,403,066	578,401,018	(245,337,404)	-	15,356,466,681
	2150	15,356,466,681	591,223,967	(330,033,563)	-	15,617,657,084
	2151	15,617,657,084	601,279,798	(341,253,483)	-	15,877,683,399
	2152	15,877,683,399	611,290,811	(354,118,484)	-	16,134,855,726
	2153	16,134,855,726	621,191,945	(112,553,549)	-	16,643,494,122
	2154	16,643,494,122	640,774,524	(116,636,018)	-	17,167,632,628
	2155	17,167,632,628	660,953,856	(453,999,461)	-	17,374,587,024
	2156	17,374,587,024	668,921,600	(312,215,936)	-	17,731,292,688

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2157	17,731,292,688	682,654,768	(321,488,093)	-	18,092,459,364
2158	18,092,459,364	696,559,686	(134,530,600)	-	18,654,488,449
2159	18,654,488,449	718,197,805	(344,069,468)	-	19,028,616,787
2160	19,028,616,787	732,601,746	(357,625,941)	-	19,403,592,591
2161	19,403,592,591	747,038,315	(368,279,706)	-	19,782,351,200
2162	19,782,351,200	761,620,521	(155,221,615)	-	20,388,750,106
2163	20,388,750,106	784,966,879	(860,953,811)	-	20,312,763,175
2164	20,312,763,175	782,041,382	(650,992,499)	-	20,443,812,058
2165	20,443,812,058	787,086,764	(422,075,262)	-	20,808,823,559
2166	20,808,823,559	801,139,707	(179,149,446)	-	21,430,813,821
2167	21,430,813,821	825,086,332	(185,695,142)	-	22,070,205,011
2168	22,070,205,011	849,702,893	(745,034,452)	-	22,174,873,452
2169	22,174,873,452	853,732,628	(626,153,406)	-	22,402,452,674
2170	22,402,452,674	862,494,428	(206,823,862)	-	23,058,123,240
2171	23,058,123,240	887,737,745	(214,395,121)	-	23,731,465,863
2172	23,731,465,863	913,661,436	(1,010,119,041)	-	23,635,008,258
2173	23,635,008,258	909,947,818	(230,390,300)	-	24,314,565,777
2174	24,314,565,777	936,110,782	(238,835,623)	-	25,011,840,936
2175	25,011,840,936	962,955,876	(1,115,191,107)	-	24,859,605,705
2176	24,859,605,705	957,094,820	(259,613,730)	-	25,557,086,795
2177	25,557,086,795	983,947,842	(266,098,471)	-	26,274,936,166
2178	26,274,936,166	1,011,585,042	(1,234,613,741)	-	26,051,907,467
2179	26,051,907,467	1,002,998,437	(286,002,157)	-	26,768,903,748
2180	26,768,903,748	1,030,602,794	(299,898,516)	-	27,499,608,026
2181	27,499,608,026	1,058,734,909	(307,411,637)	-	28,250,931,299
2182	28,250,931,299	1,087,660,855	(1,414,511,813)	-	27,924,080,341
2183	27,924,080,341	1,075,077,093	(330,441,505)	-	28,668,715,928
2184	28,668,715,928	1,103,745,563	(346,509,982)	-	29,425,951,510
2185	29,425,951,510	1,132,899,133	(355,215,042)	-	30,203,635,601
2186	30,203,635,601	1,162,839,971	(368,296,726)	-	30,998,178,845
2187	30,998,178,845	1,193,429,886	(381,864,954)	-	31,809,743,777
2188	31,809,743,777	1,224,675,135	(8,441,230,755)	-	24,593,188,157
2189	24,593,188,157	946,837,744	(410,534,211)	-	25,129,491,690
2190	25,129,491,690	967,485,430	(425,673,604)	-	25,671,303,516
2191	25,671,303,516	988,345,185	(441,376,437)	-	26,218,272,264
2192	26,218,272,264	1,009,403,482	(462,869,306)	-	26,764,806,441
2193	26,764,806,441	1,030,445,048	(539,592,893)	-	27,255,658,596
2194	27,255,658,596	1,049,342,856	(660,256,157)	-	27,644,745,295
2195	27,644,745,295	1,064,322,694	(1,943,629,715)	-	26,765,438,274
2196	26,765,438,274	1,030,469,374	(1,453,237,453)	-	26,342,670,195
2197	26,342,670,195	1,014,192,802	(1,386,722,044)	-	25,970,140,953
2198	25,970,140,953	999,850,427	(838,535,393)	-	26,131,455,987
2199	26,131,455,987	1,006,061,055	(1,486,852,317)	-	25,650,664,725
2200	25,650,664,725	987,550,592	(1,900,522,353)	-	24,737,692,965
2201	24,737,692,965	952,401,179	(2,095,624,284)	-	23,594,469,859
2202	23,594,469,859	908,387,090	(2,169,643,287)	-	22,333,213,662
2203	22,333,213,662	859,828,726	(819,210,334)	-	22,373,832,054
2204	22,373,832,054	861,392,534	(904,458,872)	-	22,330,765,715

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2205	22,330,765,715	859,734,480	(2,359,220,264)	-	20,831,279,931
2206	20,831,279,931	802,004,277	(1,899,030,751)	-	19,734,253,458
2207	19,734,253,458	759,768,758	(2,019,060,241)	-	18,474,961,975
2208	18,474,961,975	711,286,036	(1,044,164,448)	-	18,142,083,563
2209	18,142,083,563	698,470,217	(2,109,635,585)	-	16,730,918,196
2210	16,730,918,196	644,140,351	(2,242,955,630)	-	15,132,102,917
2211	15,132,102,917	582,585,962	(2,323,067,139)	-	13,391,621,740
2212	13,391,621,740	515,577,437	(1,205,701,024)	-	12,701,498,153
2213	12,701,498,153	489,007,679	(4,998,775,694)	-	8,191,730,138
2214	8,191,730,138	315,381,610	(3,878,358,483)	-	4,628,753,265
2215	4,628,753,265	178,207,001	(2,673,687,091)	-	2,133,273,175
2216	2,133,273,175	82,131,017	(1,392,505,507)	-	822,898,685
2217	822,898,685	31,681,599	(2,701,156,647)	-	(1,846,576,362)
2218	(1,846,576,362)	(71,093,190)	1,917,669,552	-	(0)

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Prairie Island Unit 2

	Beginning Balance	Assumed Interest	Decommissioning Payment	Annuity	Ending Balance
2020	$487,163,479	$9,746,216	$0	$294,670	$497,204,366
2021	497,204,366	20,018,407	-	6,511,608	523,734,381
2022	523,734,381	21,702,797	-	37,671,093	583,108,271
2023	583,108,271	24,077,753	-	37,671,093	644,857,117
2024	644,857,117	26,547,707	-	37,671,093	709,075,916
2025	709,075,916	29,116,459	-	37,671,093	775,863,468
2026	775,863,468	31,787,961	-	37,671,093	845,322,521
2027	845,322,521	34,566,323	-	37,671,093	917,559,937
2028	917,559,937	37,455,819	-	37,671,093	992,686,849
2029	992,686,849	40,460,896	-	37,671,093	1,070,818,838
2030	1,070,818,838	43,586,175	-	37,671,093	1,152,076,106
2031	1,152,076,106	46,836,466	-	37,671,093	1,236,583,665
2032	1,236,583,665	50,216,768	-	37,671,093	1,324,471,527
2033	1,324,471,527	53,732,283	-	37,671,093	1,415,874,903
2034	1,415,874,903	54,969,923	(16,324,075)	31,267,007	1,485,787,757
2035	1,485,787,757	57,054,250	(104,939,456)	-	1,437,902,551
2036	1,437,902,551	55,215,458	(173,127,494)	-	1,319,990,515
2037	1,319,990,515	50,687,636	(210,891,850)	-	1,159,786,301
2038	1,159,786,301	44,535,794	(237,964,089)	-	966,358,006
2039	966,358,006	37,108,147	(77,052,824)	-	926,413,330
2040	926,413,330	35,574,272	(56,450,184)	-	905,537,418
2041	905,537,418	34,772,637	(53,750,522)	-	886,559,533
2042	886,559,533	34,043,886	(24,555,222)	-	896,048,196
2043	896,048,196	34,408,251	(3,279,265)	-	927,177,182
2044	927,177,182	35,603,604	(3,392,181)	-	959,388,604
2045	959,388,604	36,840,522	(12,498,433)	-	983,730,694
2046	983,730,694	37,775,259	(9,745,285)	-	1,011,760,667
2047	1,011,760,667	38,851,610	(10,019,075)	-	1,040,593,202
2048	1,040,593,202	39,958,779	(3,751,095)	-	1,076,800,886
2049	1,076,800,886	41,349,154	(10,592,785)	-	1,107,557,254
2050	1,107,557,254	42,530,199	(14,384,723)	-	1,135,702,730
2051	1,135,702,730	43,610,985	(14,408,561)	-	1,164,905,154
2052	1,164,905,154	44,732,358	(15,267,293)	-	1,194,370,219
2053	1,194,370,219	45,863,816	(4,233,111)	-	1,236,000,924
2054	1,236,000,924	47,462,435	(4,347,982)	-	1,279,115,377
2055	1,279,115,377	49,118,030	(16,591,361)	-	1,311,642,047
2056	1,311,642,047	50,367,055	(12,960,777)	-	1,349,048,324
2057	1,349,048,324	51,803,456	(13,289,806)	-	1,387,561,973
2058	1,387,561,973	53,282,380	(4,849,622)	-	1,435,994,731
2059	1,435,994,731	55,142,198	(13,585,090)	-	1,477,551,839
2060	1,477,551,839	56,737,991	(14,545,805)	-	1,519,744,025

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2061	1,519,744,025	58,358,171	(14,919,213)	-	1,563,182,983
2062	1,563,182,983	60,026,227	(5,426,387)	-	1,617,782,822
2063	1,617,782,822	62,122,860	(36,281,088)	-	1,643,624,595
2064	1,643,624,595	63,115,184	(26,315,298)	-	1,680,424,481
2065	1,680,424,481	64,528,300	(16,772,279)	-	1,728,180,502
2066	1,728,180,502	66,362,131	(6,089,644)	-	1,788,452,989
2067	1,788,452,989	68,676,595	(6,270,496)	-	1,850,859,089
2068	1,850,859,089	71,072,989	(30,265,670)	-	1,891,666,407
2069	1,891,666,407	72,639,990	(24,993,497)	-	1,939,312,900
2070	1,939,312,900	74,469,615	(6,852,703)	-	2,006,929,813
2071	2,006,929,813	77,066,105	(7,060,770)	-	2,076,935,148
2072	2,076,935,148	79,754,310	(40,061,710)	-	2,116,627,747
2073	2,116,627,747	81,278,505	(7,499,607)	-	2,190,406,646
2074	2,190,406,646	84,111,615	(7,730,882)	-	2,266,787,379
2075	2,266,787,379	87,044,635	(49,756,087)	-	2,304,075,928
2076	2,304,075,928	88,476,516	(8,309,666)	-	2,384,242,778
2077	2,384,242,778	91,554,923	(8,475,501)	-	2,467,322,199
2078	2,467,322,199	94,745,172	(48,760,655)	-	2,513,306,717
2079	2,513,306,717	96,510,978	(9,017,484)	-	2,600,800,211
2080	2,600,800,211	99,870,728	(9,407,448)	-	2,691,263,491
2081	2,691,263,491	103,344,518	(9,599,152)	-	2,785,008,857
2082	2,785,008,857	106,944,340	(53,092,050)	-	2,838,861,146
2083	2,838,861,146	109,012,268	(10,223,348)	-	2,937,650,067
2084	2,937,650,067	112,805,763	(10,671,672)	-	3,039,784,158
2085	3,039,784,158	116,727,712	(10,893,231)	-	3,145,618,639
2086	3,145,618,639	120,791,756	(11,246,405)	-	3,255,163,990
2087	3,255,163,990	124,998,297	(11,612,285)	-	3,368,550,002
2088	3,368,550,002	129,352,320	(352,789,317)	-	3,145,113,004
2089	3,145,113,004	120,772,339	(12,384,140)	-	3,253,501,204
2090	3,253,501,204	124,934,446	(12,791,048)	-	3,365,644,602
2091	3,365,644,602	129,240,753	(13,212,674)	-	3,481,672,680
2092	3,481,672,680	133,696,231	(13,805,934)	-	3,601,562,978
2093	3,601,562,978	138,300,018	(14,102,159)	-	3,725,760,837
2094	3,725,760,837	143,069,216	(14,571,205)	-	3,854,258,848
2095	3,854,258,848	148,003,540	(55,404,641)	-	3,946,857,747
2096	3,946,857,747	151,559,338	(43,475,453)	-	4,054,941,632
2097	4,054,941,632	155,709,759	(44,682,113)	-	4,165,969,278
2098	4,165,969,278	159,973,220	(16,623,205)	-	4,309,319,293
2099	4,309,319,293	165,477,861	(47,596,310)	-	4,427,200,844
2100	4,427,200,844	170,004,512	(64,809,397)	-	4,532,395,959
2101	4,532,395,959	174,044,005	(66,883,444)	-	4,639,556,520
2102	4,639,556,520	178,158,970	(69,027,048)	-	4,748,688,442
2103	4,748,688,442	182,349,636	(19,635,321)	-	4,911,402,757
2104	4,911,402,757	188,597,866	(20,540,440)	-	5,079,460,183
2105	5,079,460,183	195,051,271	(75,899,520)	-	5,198,611,934
2106	5,198,611,934	199,626,698	(59,470,352)	-	5,338,768,280
2107	5,338,768,280	205,008,702	(61,405,055)	-	5,482,371,927
2108	5,482,371,927	210,523,082	(23,505,698)	-	5,669,389,311

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External Levelized	2109	5,669,389,311	217,704,550	(65,474,528)	-	5,821,619,333
	2110	5,821,619,333	223,550,182	(67,614,000)	-	5,977,555,516
	2111	5,977,555,516	229,538,132	(69,826,480)	-	6,137,267,168
	2112	6,137,267,168	235,671,059	(26,926,640)	-	6,346,011,587
	2113	6,346,011,587	243,686,845	(168,363,469)	-	6,421,334,963
	2114	6,421,334,963	246,579,263	(125,360,249)	-	6,542,553,977
	2115	6,542,553,977	251,234,073	(97,215,387)	-	6,696,572,663
	2116	6,696,572,663	257,148,390	(30,874,016)	-	6,922,847,037
	2117	6,922,847,037	265,837,326	(31,583,956)	-	7,157,100,407
	2118	7,157,100,407	274,832,656	(142,488,278)	-	7,289,444,785
	2119	7,289,444,785	279,914,680	(118,812,559)	-	7,450,546,905
	2120	7,450,546,905	286,101,001	(35,429,996)	-	7,701,217,911
	2121	7,701,217,911	295,726,768	(36,251,615)	-	7,960,693,063
	2122	7,960,693,063	305,690,614	(193,191,167)	-	8,073,192,510
	2123	8,073,192,510	310,010,592	(38,849,190)	-	8,344,353,912
	2124	8,344,353,912	320,423,190	(40,689,386)	-	8,624,087,716
	2125	8,624,087,716	331,164,968	(212,780,010)	-	8,742,472,674
	2126	8,742,472,674	335,710,951	(43,112,956)	-	9,035,070,668
	2127	9,035,070,668	346,946,714	(44,639,527)	-	9,337,377,855
	2128	9,337,377,855	358,555,310	(234,972,957)	-	9,460,960,208
	2129	9,460,960,208	363,300,872	(47,862,655)	-	9,776,398,424
	2130	9,776,398,424	375,413,699	(49,563,369)	-	10,102,248,755
	2131	10,102,248,755	387,926,352	(51,326,432)	-	10,438,848,675
	2132	10,438,848,675	400,851,789	(267,525,492)	-	10,572,174,972
	2133	10,572,174,972	405,971,519	(55,049,000)	-	10,923,097,491
	2134	10,923,097,491	419,446,944	(57,013,375)	-	11,285,531,060
	2135	11,285,531,060	433,364,393	(59,049,960)	-	11,659,845,492
	2136	11,659,845,492	447,738,067	(61,875,044)	-	12,045,708,515
	2137	12,045,708,515	462,555,207	(63,350,210)	-	12,444,913,512
	2138	12,444,913,512	477,884,679	(1,619,398,138)	-	11,303,400,053
	2139	11,303,400,053	434,050,562	(67,972,432)	-	11,669,478,183
	2140	11,669,478,183	448,107,962	(71,232,915)	-	12,046,353,230
	2141	12,046,353,230	462,579,964	(72,940,818)	-	12,435,992,376
	2142	12,435,992,376	477,542,107	(75,563,045)	-	12,837,971,438
	2143	12,837,971,438	492,978,103	(78,281,739)	-	13,252,667,803
	2144	13,252,667,803	508,902,444	(82,045,451)	-	13,679,524,795
	2145	13,679,524,795	525,293,752	(278,676,774)	-	13,926,141,773
	2146	13,926,141,773	534,763,844	(221,086,127)	-	14,239,819,490
	2147	14,239,819,490	546,809,068	(228,636,058)	-	14,557,992,501
	2148	14,557,992,501	559,026,912	(94,540,975)	-	15,022,478,438
	2149	15,022,478,438	576,863,172	(244,542,352)	-	15,354,799,258
	2150	15,354,799,258	589,624,292	(329,209,482)	-	15,615,214,068
	2151	15,615,214,068	599,624,220	(340,399,302)	-	15,874,438,986
	2152	15,874,438,986	609,578,457	(353,233,090)	-	16,130,784,353
	2153	16,130,784,353	619,422,119	(111,635,792)	-	16,638,570,680
	2154	16,638,570,680	638,921,114	(115,684,703)	-	17,161,807,092
	2155	17,161,807,092	659,013,392	(453,013,348)	-	17,367,807,136
	2156	17,367,807,136	666,923,794	(311,193,741)	-	17,723,537,190

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2157	17,723,537,190	680,583,828	(320,428,481)	-	18,083,692,537
2158	18,083,692,537	694,413,793	(133,432,189)	-	18,644,674,140
2159	18,644,674,140	715,955,487	(342,930,824)	-	19,017,698,803
2160	19,017,698,803	730,279,634	(356,445,577)	-	19,391,532,861
2161	19,391,532,861	744,634,862	(367,056,078)	-	19,769,111,644
2162	19,769,111,644	759,133,887	(153,953,122)	-	20,374,292,409
2163	20,374,292,409	782,372,828	(859,638,794)	-	20,297,026,443
2164	20,297,026,443	779,405,815	(649,629,237)	-	20,426,803,022
2165	20,426,803,022	784,389,236	(420,661,968)	-	20,790,530,290
2166	20,790,530,290	798,356,363	(177,684,266)	-	21,411,202,387
2167	21,411,202,387	822,190,172	(184,176,156)	-	22,049,216,402
2168	22,049,216,402	846,689,910	(743,459,668)	-	22,152,446,645
2169	22,152,446,645	850,653,951	(624,520,755)	-	22,378,579,841
2170	22,378,579,841	859,337,466	(205,131,199)	-	23,032,786,108
2171	23,032,786,108	884,458,987	(212,640,223)	-	23,704,604,872
2172	23,704,604,872	910,256,827	(1,008,299,599)	-	23,606,562,101
2173	23,606,562,101	906,491,985	(228,503,922)	-	24,284,550,164
2174	24,284,550,164	932,526,726	(236,879,825)	-	24,980,197,065
2175	24,980,197,065	959,239,567	(1,113,163,314)	-	24,826,273,319
2176	24,826,273,319	953,328,895	(257,511,271)	-	25,522,090,943
2177	25,522,090,943	980,048,292	(263,918,574)	-	26,238,220,662
2178	26,238,220,662	1,007,547,673	(1,232,353,532)	-	26,013,414,803
2179	26,013,414,803	998,915,128	(283,658,653)	-	26,728,671,278
2180	26,728,671,278	1,026,380,977	(297,468,625)	-	27,457,583,630
2181	27,457,583,630	1,054,371,211	(304,892,150)	-	28,207,062,692
2182	28,207,062,692	1,083,151,207	(1,411,899,401)	-	27,878,314,498
2183	27,878,314,498	1,070,527,277	(327,732,716)	-	28,621,109,059
2184	28,621,109,059	1,099,050,588	(343,701,232)	-	29,376,458,415
2185	29,376,458,415	1,128,056,003	(352,302,618)	-	30,152,211,800
2186	30,152,211,800	1,157,844,933	(365,276,772)	-	30,944,779,961
2187	30,944,779,961	1,188,279,550	(378,733,471)	-	31,754,326,040
2188	31,754,326,040	1,219,366,120	(8,437,983,596)	-	24,535,708,565
2189	24,535,708,565	942,171,209	(407,167,072)	-	25,070,712,701
2190	25,070,712,701	962,715,368	(422,182,022)	-	25,611,246,047
2191	25,611,246,047	983,471,848	(437,755,781)	-	26,156,962,114
2192	26,156,962,114	1,004,427,345	(459,114,771)	-	26,702,274,689
2193	26,702,274,689	1,025,367,348	(535,699,496)	-	27,191,942,541
2194	27,191,942,541	1,044,170,594	(656,218,728)	-	27,579,894,407
2195	27,579,894,407	1,059,067,945	(1,939,442,890)	-	26,699,519,462
2196	26,699,519,462	1,025,261,547	(1,448,895,668)	-	26,275,885,341
2197	26,275,885,341	1,008,993,997	(1,382,219,528)	-	25,902,659,810
2198	25,902,659,810	994,662,137	(833,866,156)	-	26,063,455,790
2199	26,063,455,790	1,000,836,702	(1,482,010,148)	-	25,582,282,344
2200	25,582,282,344	982,359,642	(1,895,500,807)	-	24,669,141,179
2201	24,669,141,179	947,295,021	(2,090,416,675)	-	23,526,019,526
2202	23,526,019,526	903,399,150	(2,164,242,678)	-	22,265,175,997
2203	22,265,175,997	854,982,758	(813,609,528)	-	22,306,549,227
2204	22,306,549,227	856,571,490	(898,650,405)	-	22,264,470,312

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Nuclear Decommissioning Accrual
200-Year Decommissioning Period
DECON Method

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Proposed

EXTERNAL FUND CALCULATION

2205	22,264,470,312	854,955,660	(2,353,196,390)	-	20,766,229,582
2206	20,766,229,582	797,423,216	(1,892,783,435)	-	19,670,869,363
2207	19,670,869,363	755,361,384	(2,012,581,147)	-	18,413,649,600
2208	18,413,649,600	707,084,145	(1,037,444,927)	-	18,083,288,817
2209	18,083,288,817	694,398,291	(2,102,666,665)	-	16,675,020,443
2210	16,675,020,443	640,320,785	(2,235,728,002)	-	15,079,613,225
2211	15,079,613,225	579,057,148	(2,315,571,146)	-	13,343,099,227
2212	13,343,099,227	512,375,010	(1,197,926,647)	-	12,657,547,591
2213	12,657,547,591	486,049,827	(4,990,712,537)	-	8,152,884,881
2214	8,152,884,881	313,070,779	(3,869,995,763)	-	4,595,959,897
2215	4,595,959,897	176,484,860	(2,665,013,618)	-	2,107,431,139
2216	2,107,431,139	80,925,356	(1,383,509,673)	-	804,846,822
2217	804,846,822	30,906,118	(2,691,826,408)	-	(1,856,073,468)
2218	(1,856,073,468)	(71,273,221)	1,927,346,689	-	(0)

Xcel Energy
Nuclear Decommissioning Customer Rate Impact

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2022 Accrual Amounts

Current Accrual	27,418,421
42-Year Scenario (DECON)	25,180,796
60-Year Scenario (DECON)	31,368,901
100-Year Scenario (DECON)	107,102,909
200-Year Scenario (DECON)	181,041,337
42-Year Scenario Monticello 10 yr License Extension (DECON)	17,079,949
60-Year Scenario Monticello 10 yr License Extension (DECON)	21,221,819
100-Year Scenario Monticello 10 yr License Extension (DECON)	80,155,734
200-Year Scenario Monticello 10 yr License Extension (DECON)	135,222,169
42-Year Scenario (SAFSTOR)	60,268,424
60-Year Scenario (SAFSTOR)	63,802,472
100-Year Scenario (SAFSTOR)	147,160,819
200-Year Scenario (SAFSTOR)	234,946,875

Analysis by Customer Class		**Residential**	**C&I Non-Demand**	**C&I Demand**	**Lighting**	**Total**
Stratification[1]						
Capacity Component (D10S)	19.0%	38.55%	3.41%	58.04%	0.00%	100.00%
Energy Component (E8760)	81.0%	29.93%	3.16%	66.57%	0.34%	100.00%
Combined		**31.57%**	**3.21%**	**64.95%**	**0.28%**	**100.00%**
Combined Allocation to Class						
Current Accrual		8,655,392	879,446	17,808,073	75,510	27,418,421
42-Year Scenario (DECON)		7,949,023	807,674	16,354,751	69,348	25,180,796
60-Year Scenario (DECON)		9,902,472	1,006,158	20,373,882	86,390	31,368,901
100-Year Scenario (DECON)		33,810,032	3,435,326	69,562,589	294,961	107,102,909
200-Year Scenario (DECON)		57,150,767	5,806,901	117,585,081	498,588	181,041,337
42-Year Scenario Monticello 10 yr License Extension (DECON)		5,391,764	547,839	11,093,307	47,038	17,079,949
60-Year Scenario Monticello 10 yr License Extension (DECON)		6,699,261	680,690	13,783,423	58,445	21,221,819
100-Year Scenario Monticello 10 yr License Extension (DECON)		25,303,402	2,570,995	52,060,588	220,749	80,155,734
200-Year Scenario Monticello 10 yr License Extension (DECON)		42,686,664	4,337,251	87,825,852	372,402	135,222,169
42-Year Scenario (SAFSTOR)		19,025,416	1,933,110	39,143,920	165,979	60,268,424
60-Year Scenario (SAFSTOR)		20,141,037	2,046,464	41,439,259	175,712	63,802,472
100-Year Scenario (SAFSTOR)		46,455,433	4,720,183	95,579,922	405,281	147,160,819
200-Year Scenario (SAFSTOR)		74,167,560	7,535,921	152,596,351	647,044	234,946,875
Class MWh Sales[2]		**8,450,856**	**846,130**	**19,350,754**	**122,675**	**28,770,415**

Xcel Energy
Nuclear Decommissioning Customer Rate Impact

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Average Class Amount per kWh					
Current Accrual	0.001024	0.001039	0.000920	0.000616	
42-Year Scenario (DECON)	0.000941	0.000955	0.000845	0.000565	
60-Year Scenario (DECON)	0.001172	0.001189	0.001053	0.000704	
100-Year Scenario (DECON)	0.004001	0.004060	0.003595	0.002404	
200-Year Scenario (DECON)	0.006763	0.006863	0.006077	0.004064	
42-Year Scenario Monticello 10 yr License Extension (DECON)	0.000638	0.000647	0.000573	0.000383	
60-Year Scenario Monticello 10 yr License Extension (DECON)	0.000793	0.000804	0.000712	0.000476	
100-Year Scenario Monticello 10 yr License Extension (DECON)	0.002994	0.003039	0.002690	0.001799	
200-Year Scenario Monticello 10 yr License Extension (DECON)	0.005051	0.005126	0.004539	0.003036	
42-Year Scenario (SAFSTOR)	0.002251	0.002285	0.002023	0.001353	
60-Year Scenario (SAFSTOR)	0.002383	0.002419	0.002141	0.001432	
100-Year Scenario (SAFSTOR)	0.005497	0.005579	0.004939	0.003304	
200-Year Scenario (SAFSTOR)	0.008776	0.008906	0.007886	0.005274	
Average Customer Monthly kWh[(2)]	**601**	**814**	**33,166**	**2,328**	
Average Customer Monthly Amount					
Current Accrual	$0.61	$0.85	$30.51	$1.43	
42-Year Scenario (DECON)	$0.57	$0.78	$28.03	$1.32	
60-Year Scenario (DECON)	$0.70	$0.97	$34.92	$1.64	
100-Year Scenario (DECON)	$2.40	$3.30	$119.23	$5.60	
200-Year Scenario (DECON)	$4.06	$5.58	$201.55	$9.46	
42-Year Scenario Monticello 10 yr License Extension (DECON)	$0.38	$0.53	$19.00	$0.89	
60-Year Scenario Monticello 10 yr License Extension (DECON)	$0.48	$0.65	$23.61	$1.11	
100-Year Scenario Monticello 10 yr License Extension (DECON)	$1.80	$2.47	$89.22	$4.19	
200-Year Scenario Monticello 10 yr License Extension (DECON)	$3.03	$4.17	$150.54	$7.07	
42-Year Scenario (SAFSTOR)	$1.35	$1.86	$67.09	$3.15	
60-Year Scenario (SAFSTOR)	$1.43	$1.97	$71.01	$3.33	
100-Year Scenario (SAFSTOR)	$3.30	$4.54	$163.81	$7.69	
200-Year Scenario (SAFSTOR)	$5.27	$7.25	$261.55	$12.28	

(1) Docket No. E002/GR-19-564, Nuclear Stratification Percentages (Peppin Direct Testimony, Table 6) (Peppin Testimony, Schedule 4, Page 14)
(2) Year Ending December 31, 2020. Sales and Revenue by Rate Schedule (Huso Direct Testimony, Schedule 3, Page 1)

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End-of-life nuclear fuel refers to the book recovery of unused nuclear fuel at the time of reactor shutdown. The unit of production method assures full recovery. However, the Company does not want a dramatic increase in recovery in the final period. To mitigate this possibility, the increase over usual depreciation levels was isolated and a sinking fund method was established to spread this amount over the remaining life of the nuclear units. The Company received approval from the Minnesota Public Utilities Commission to recover for end-of-life nuclear fuel.

At the end of the final period or the last cycle, each reactor unit will contain fuel that is partially burned and fuel that is fully burned. Normally, the partially burned fuel would have been recovered in future periods, but without those future periods, the unit of production method takes the remaining depreciation in the last several cycles prior to permanent shutdown causing a spike in expense rates. To eliminate this spike, the remaining recovery associated with the partially burned fuel becomes the amount to recover over the remaining life of the plant, using the sinking fund method.

Before quantifying this spike through the use of in-house plant specific core design models, fuel management strategies to minimize the amount of unburned fuel in each reactor at end of licensed life ("EOLL") were developed. As the reactors at Prairie Island and Monticello approach their EOLL, a spike in fuel expense is indicated since all useful energy in the fuel will not be recovered. By minimizing the amount of useful energy remaining in the fuel at EOLL, the spikes in fuel expense rate in the last several cycles of operation are lowered, thereby reducing the overall dollar amount to be recovered prior to permanent shutdown.

The strategy for Prairie Island Unit 1 and Unit 2 uses the ability to interchange fuel between the two reactors and the re-insertion of fuel burned from previous cycles. In this EOLL study, the last cycle of Unit 1 (Cycle 38 with an August 9, 2033 shutdown) utilizes 16 fresh assemblies. The last cycle for Unit 2 (Cycle 38 with an October 29, 2034 shutdown) utilizes 53 burned assemblies discharged from Unit 1 that contained the most useful remaining energy. Re-using these burned assemblies from Unit 1 permits more energy to be extracted from these assemblies resulting in reduced end of life expense. Moreover, it eliminates the need to purchase a large number of fresh fuel assemblies for the final cycle of Unit 2. 8 fresh assemblies are loaded in the last cycle of Unit 2 based on operational considerations. This significantly reduces the EOLL cost for the combined Prairie Island units.

The last cycle for both units used less fresh assemblies (4 less for each unit) compared to the previous EOLL study and resulted in continuing to support one less refueling outage through the end of life as identified in the previous EOLL update which reduces the fuel expense required for the life of both plants.

Monticello is on a two-year operating cycle and was uprated from its previous thermal capacity of 1,775 megawatt thermal ("MWth") to 2,004 MWth in 2014. The current operating conditions have resulted in typical cycle lengths ranging from approximately 15,200 to 15,800 megawatt days per metric ton of uranium ("MWd/MTU") and requires between 148-164 fresh fuel assemblies to be loaded into the core each new cycle. Due to operational factors associated with the two-year cycle lengths, the current EOLL study for Monticello does not utilize the reinsertion scheme employed like Prairie Island to reduce the number of fresh assemblies in the final cycle.

The multi-cycle Monticello fuel management strategy in this EOLL study loads 120 fresh assemblies into Monticello's final cycle (Cycle 35 with September 7, 2030 shutdown). Cycle 35 has a shortened cycle length requirement of about 10,470 MWd/MTU. The combination of shorter cycle length and fresh fuel loading in the last cycle results in about 100 days of gradual power coast down at the end of license life in order to minimize the fresh fuel reload costs.

Because the strategy is to manage the fuel for the entire station at Prairie Island as indicated by the plan to re-insert partially burned fuel from Unit 1 into Unit 2, only one net figure is shown for the Prairie Island Station. The result of this analysis produced the following future amounts to be recovered:

Amount to Be Recovered

Monticello	$51,267,783
Prairie Island	$33,584,742
	$84,852,525

The above amounts represent the total cost to be recovered and do not take into account the amounts already collected to date as part of historic actual monthly nuclear fuel expense rates.

This projected recovery of $84,852,525 compares to $122,875,791 in the 2014 filing. For the most part, this $38 million decrease in the amount to recover is brought about by the following factors:

- Prairie Island Unit 2 leveling of $/MWHe through optimization of the multi-cycle core fuel designs close to EOLL,
- Lower projected nuclear fuel commodity prices throughout the forecast period.

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End-of-Life Nuclear Fuel Accrual
Present to Proposed Accrual Comparison
Minnesota Retail Jurisdiction
January - December 2022

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	Present	Proposed	Difference
EXTERNAL FUND			
Monticello	$1,033,680	$890,472	($143,208)
Prairie Island	2,129,100	89,160	(2,039,940)
TOTAL (Total Company)	$3,162,780	$979,632	($2,183,148)
Minnesota Jurisdiction Factor	72.9219%	72.9219%	72.9219%
TOTAL (Minnesota Jurisdiction)	$2,306,359	$714,366	($1,591,993)

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End-of-Life Nuclear Fuel Accrual
Minnesota Retail Jurisdiction
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Proposed Assumptions

ANNUAL ACCRUAL

Generating Plant	Sinking Fund Rate	Remaining Life 1/1/22	Amount to Recover	Amount Recovered	Annual Accrual
	(1)	(2)	(3)	(4)	(5)
Monticello	6.43%	8.75	$ 51,267,783	$41,224,987	$890,472
Prairie Island	6.43%	12.30	33,584,742	31,986,733	89,160
			$84,852,525	$73,211,720	$979,632

INPUT DATA

Tax Rate 28.74% (a)

Rate of Return - Internal

	Percent	Cost	Weight	
Short-Term	1.69	4.31	0.07	
Long-Term	45.81	4.75	2.18	
Total Debt	47.50		2.25	(c)
Preferred	0.00	0.00	0.00	
Common	52.50	9.20	4.83	
Total	100.00		7.08	(d)

After-Tax Rate 6.43% (e)

NOTES

Input Data

(e) = (d) - [(c) x (a)]

(2) = Remaining life based on E,G002/D-15-46

(3) = Final Core Analysis from 2017 filing

Annual Accrual

(5) = {[(3) - (4)] x (1)} / {[(1 + (1)) ^ (2)] -1}

Xcel Energy
End-of-Life Nuclear Fuel Accrual
Minnesota Retail Jurisdiction
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Current Assumptions

ANNUAL ACCRUAL

Generating Plant	Sinking Fund Rate	Remaining Life 1/1/22	Amount to Recover	Amount Recovered	Annual Accrual
	(1)	(2)	(3)	(4)	(5)
Monticello	6.38%	8.75	$52,856,869	$41,224,987	$1,033,680
Prairie Island	6.38%	12.30	70,018,922	31,986,733	2,129,100
			$122,875,791	$73,211,720	$3,162,780

INPUT DATA

Tax Rate 28.11% (a)

Rate of Return - Internal

	Percent	Cost	Weight	
Short-Term	1.69	4.31	0.07	
Long-Term	45.81	4.75	2.18	
Total Debt	47.50		2.25	(c)
Preferred	0.00	0.00	0.00	
Common	52.50	9.06	4.76	
Total	100.00		7.01	(d)

After-Tax Rate 6.38% (e)

NOTES

Input Data

(e) = (d) - [(c) x (a)]
(2) = Remaining life based on E,G002/D-15-46
(3) = Final Core Analysis from 2014 filing

Annual Accrual

(5) = {[(3) - (4)] x (1)} / {[(1 + (1)) ^ (2)] -1}

This section discusses the issues surrounding premature decommissioning of nuclear generating facilities, which can be either accident or non-accident related. Presently, insurance is unavailable for non-accident related premature decommissioning such as those caused by regulatory directives. Therefore, the insurance analysis deals with accident related premature decommissioning.

The Company has insurance for accident-related premature decommissioning, covering property, liability, and replacement energy costs. In 1981, an internal sinking fund for the accrual of nuclear decommissioning costs was established. In 1990, an external fund was also created. In 2005, all internal funds were transferred to external funds. Further, in 2006 the Company established an external escrow fund. In 2016 the external escrow fund was transferred to the Qualified Trust, in accordance with the order in the 2014 Filing. Amounts have been accumulating in the Qualified Trust and would apply to all premature decommissioning expenses. The total fund accumulation as of June 30, 2020, for the Minnesota Jurisdiction is approximately $1,306 million.

Availability of Insurance

In the event of an accident-related premature decommissioning, the Company's property insurance coverage would apply to any resulting property damage and the cost of site decontamination and clean up. Insurance coverage for public liability and business interruption also would apply, if necessary. Marsh USA, a commercial nuclear insurance broker, is also the Company's insurance consultant and assists in providing the proper insurance coverage.

Property Insurance

The Company maintains property insurance in the amount of $2.65 billion per site. The insurance is currently provided by Nuclear Electric Insurance Limited (NEIL) and European Mutual Association for Nuclear Insurance (EMANI). These insurance policies cover property damage to the Company's nuclear facilities plus site decontamination clean up caused by an accident.

The primary policy provides coverage limits of $1.5 billion per site; the excess policy provides an additional $1.15 billion of insurance limits on a combined basis. There is a $5 million deductible per loss that would have to be satisfied. NEIL, a mutual insurance company owned by the insured utilities, including the Company, initiated a program in November 1981 to offer additional nuclear property insurance for each site. After receiving the approval of the Commission

in Docket No. E002/M-81-560, the Company purchased $118 million of NEIL nuclear property insurance.

Public Liability Insurance

The Price-Anderson liability provisions of the Atomic Energy Act of 1954 (Act) previously set a limit of $640 million for public liability claims that could arise from a nuclear incident. In August 1988, an extension of the Act was signed continuing the provision for another 15 years and increasing the liability limits. In August 2005, an additional 20 year extension of the Act was signed into law. The Company purchases the maximum available private insurance of $450 million to satisfy requirements under the Act. Claims above $450 million up to $13.9 billion would be satisfied by an NRC assessment against all owners of licensed nuclear generating units.

In the event of such an assessment by the NRC in response to an accident, the Company could be charged up to $137.6 million per accident for each of its three licensed nuclear reactors but limited to a maximum cash payment of $20.5 million per reactor per accident for any one year. The following is a breakdown of the coverage provided by the Act.

Price Anderson Act

Liability Coverage (Millions)		
Private Insurance	$450	
NRC Assessment	13,480	
	$13,930	Per accident
NRC Assessment (Millions)		
Per Unit Assessment	$137.6	
No. Of Nuclear Units	X 98	
Total Assessment	$13,485	

Accidental Outage Insurance

The Company purchases insurance to offset the potential additional outage-related expenses that would follow an accident at its nuclear generating plants.

The cost of replacement energy is included in this coverage. NEIL has provided this coverage since September 15, 1980.

NEIL accidental outage insurance provides coverage for a period of one hundred sixty-two weeks following a 12-week waiting period deductible. Accidental outage insurance coverage amounts for the first 52 weeks are $2.5 million, per week, for each unit at Prairie Island and Monticello, respectively. Thereafter, payments would be reduced by 20 percent for another 110 weeks, at which time the coverage would be exhausted.

In the event of an accident at Prairie Island that causes outages at both units, accidental outage insurance payments for each unit would be 80 percent of the amount payable had the outage affected only one unit.

Accidental Outage Insurance

	Monticello	Prairie Island Unit 1	Prairie Island Unit 2
Deductible (weeks)	12	12	12
Coverage Dollar Amount (millions)*			
52 Weeks	$2.5	$2.5	$2.5
52 Weeks	$2.0	$2.0	$2.0
58 Weeks	$2.0	$2.0	$2.0
Total Limits (millions)	$350	$350	$350

*Coverage dollar amounts are in millions per week.

Federal Agency Programs and Studies

There are no known new federal agency programs or studies to report since the 2005 Triennial Nuclear Decommissioning Accrual filing.

Steps Taken To Minimize Possible Loss

The Company monitors NRC rulemaking to define methods for reducing risks associated with premature decommissioning. The Company purchases nuclear property and liability insurance from the commercial and captive markets in

amounts adequate to cover a maximum foreseeable loss. In addition, replacement power insurance is purchased to cover the cost of replacing megawatt hours lost while a unit is shut down.

Additionally, with Commission approval, the Company has accrued funds in an internal sinking fund for future decommissioning expenses since 1981. The internal fund amounts for the Minnesota Jurisdiction were transferred to the external fund under an accelerated schedule, with completion in 2005. The potential expense of a premature, non-accident related nuclear decommissioning would be partially offset by the external fund accumulations.

The Company's decommissioning fund plan and insurance levels are consistent with the NRC guidelines in NUREG-0584, Assuring the Availability of Funds for Decommissioning Nuclear Facilities, Page 49:

> Although premature decommissioning insurance would be preferable, as long as adequate levels of on-site accident decontamination insurance are maintained by licensees, the author believes that such insurance, together with an internal reserve, would provide a reasonable level of assurance.

Financial Ability to Withstand Premature Nuclear Decommissioning

The Commission attempts to coordinate several goals:

1. to ensure that funds are available at the time decommissioning takes place;
2. to avoid intergenerational subsidies which occur when ratepayers in one generation subsidize ratepayers in another generation; and
3. to avoid the rate shock that would result from placing an excessive burden on a specific group of ratepayers.

There are economic and financial consequences for any premature decommissioning in general and specific expenses associated with an accident-related decommissioning. The ability to manage these uncertainties will provide customers and shareholders with financial security.

Premature Decommissioning – General

There are five major financial consequences associated with any premature decommissioning. These consequences consist of the expense of

decommissioning, the replacement energy costs, the replacement capacity costs, the recovery of un-recovered plant investment and premature decommissioning specific.

Expense of Decommissioning

As a part of this filing, seven decommissioning cost estimates have been filed, showing various possible decommissioning scenarios.

The decommissioning cost estimates in 2020 dollars for DECON using dry storage is $3.4 billion for the estimate using a 42-year decommissioning period. The decommissioning cost estimate is $3.7 billion in 2020 dollars for the estimate using a 60-year decommissioning period that assumes no recasking occurs. The decommissioning cost estimate is $5.9 billion in 2020 dollars for the estimate using a 100-year decommissioning period. The decommissioning cost estimate is $10.3 billion in 2020 dollars for the estimate using a 200-year decommissioning period.

The decommissioning cost estimates in 2020 dollars for SAFSTOR is $4.4 billion for the estimate using a 42-year decommissioning period. The decommissioning cost estimate is $4.6 billion in 2020 dollars for the estimate using a 60-year decommissioning period that assumes no recasking occurs. The decommissioning cost estimate is $6.6 billion in 2020 dollars for the estimate using a 100-year decommissioning period. The decommissioning cost estimate is $10.9 billion in 2020 dollars for the estimate using a 200-year decommissioning period.

Presently the Qualified Trust would be used to offset the potential costs resulting from premature decommissioning. The maximum annual, after-tax cash requirement for a worst-case premature decommissioning scenario involving all three Company's nuclear units is considerably reduced because of 100 percent external funding.

Replacement Energy Costs

A significant cost resulting from a premature shutdown is the cost of replacement energy. Replacement energy costs for a transitional period (until a more permanent asset could be constructed) would consist of increased fuel costs due to the use of more expensive coal, natural gas, and oil, costs associated with the increased operation of our existing generation fleet or the

purchase of power from others, and the loss of revenues associated with a reduction in sales to other utilities. On a more permanent nature, replacement energy costs would likely consist of a combination of increased fuel cost due to more expensive use of more natural gas, wind, solar and possibly coal. The unplanned nature of the power requirement, as well as the substantial increase in demand this replacement would represent in the open market also would be expected to command a substantial premium.

The variable operating costs associated with electric generation from nuclear facilities is less than for all other current forms of generation. Due to the low cost of nuclear production, relative to fossil production, the cost of replacement energy for a nuclear facility is larger than potential replacement energy costs for a fossil-generating unit. This cost could be compounded if the replacement energy is needed during a peak period. Nuclear plants provide base load capacity and produce more energy annually than most fossil units. Therefore, more expensive energy would have to replace nuclear energy if a nuclear unit were shut down prematurely.

Replacement Capacity Costs

Current nuclear plant net capability is 1,771 MW; 671 MW for Monticello and 1,100 MW for Prairie Island Units 1 and 2. If the Company's nuclear generating capability were lost, the Company's reserve margins would be below the 15.3 percent minimum reserve level currently specified by the Midcontinent Independent System Operator, Inc., as necessary to maintain adequate electric system reliability. Therefore, nearly all of the 1,771 of MW of lost nuclear capability would have to be replaced.

A premature shutdown of this magnitude may cause a severe capacity shortage, which would become more severe as demand increases. To overcome this, the capacity shortage would have to be handled in a two-step process. This process would be to 1) purchase temporary replacement capacity and 2) to construct replacement facilities that would likely be a combination of natural gas combustion turbines and combined cycle generating units. Current cost estimates for the construction of new natural gas combustion turbines and combined cycle units can be found in the Company’s most current resource plan.

Due to the length of time to complete construction of new base load plants, premature retirement of a nuclear unit or a major coal unit would necessitate

the purchase of temporary replacement capacity. The purchase of this quantity of temporary replacement capacity would become a significant challenge in meeting customer demand.

Recovery of Un-recovered Investment

If there were a premature, non-accident related decommissioning, an un-recovered investment (original cost less accumulated depreciation) would continue as a revenue requirement. The un-recovered nuclear plant investment on January 1, 2020 was $2,106 million, $901 million at Monticello and $1,205 million at Prairie Island. These figures do not include land, nuclear fuel, and general plant equipment, such as office furniture. It also does not include the un-recovered decommissioning costs. However, it does include the licensing costs at both facilities. These amounts are aligned with the 2020 Remaining Life Filing, Docket No. E,G002/D-19-723.

Premature Decommissioning - Specific

An accident-related decommissioning would add additional expenses to those mentioned in the foregoing discussion. Potential contamination clean-up costs are the most significant expenses of an accident-related decommissioning. As an example, General Public Utilities has indicated that the total estimated cost for clean-up for the Three Mile Island nuclear site was approximately $1 billion, occurring over an estimated 11 to 12 year time period beginning in 1979. The damaged unit, at this time, is in SAFSTOR until Three Mile Island Unit 1 is ready to be decommissioned.

The Company's property insurance coverage of $2.65 billion would largely offset the potential impact of an accident-related decommissioning. Although accident-related decommissioning expenses are significant, the length of time involved in a clean-up process, insurance payments, tax deductibility of expenses, and related rate relief would affect the yearly expense. Although accident related premature decommissioning would impact both the Company and its customers, it is anticipated that, under reasonable regulation, the financial integrity of the Company would be maintained.

Xcel Energy **Docket No. E002/M-20-___**
Nuclear Asset Retirement Obligation Balances **Schedule I**
Page 1 of 1

ARO Balance Sheet Accounts	FERC Acct. Num.	2019	2020	
ASSETS				
Nuclear Plant In-Service - ARC		$ (6,803,320)	$ (6,803,320)	[1]
Beginning Accumulated Depreciation - Nuclear ARC	108	(163,368,094)	(152,928,633)	
Depreciation Expense		10,439,460	5,219,732	
Ending Accumulated Depreciation - Nuclear ARC		$ (152,928,633)	$ (147,708,901)	[1]
Regulatory Asset Nuclear - Beginning	182.3	$ 2,138,489,471	$ 2,227,527,557	
Asset Balance Adjustment		-	-	
Reserve Balance Adjustment		-	-	
ARO Liability Adjustment		-	-	
Accretion Expense		99,477,546	51,611,528	
Depreciation Expense		(10,439,460)	(5,219,732)	
Regulatory Asset Nuclear - Ending		$ 2,227,527,557	$ 2,273,919,353	[1]
Total Assets		$ 2,067,795,604	$ 2,119,407,132	
LIABILITIES				
Asset Retirement Obligation - Beginning	230	$ (1,968,318,057)	$ (2,067,795,604)	
Accretion Expense - Nuclear		(99,477,546)	(51,611,528)	
Liabilities Incurred		-	-	
Asset Retirement Obligation - Ending		$ (2,067,795,604)	$ (2,119,407,132)	[1]
Total Liabilities		$ (2,067,795,604)	$ (2,119,407,132)	

[1] As of June 30, 2020

Document X01-1775-002, Rev. 0

DECOMMISSIONING COST ANALYSIS

for the

MONTICELLO NUCLEAR GENERATING PLANT

prepared for

Xcel Energy

prepared by

TLG Services, LLC
Bridgewater, Connecticut

October 2020

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REVISION LOG

No.	Date	Item Revised	Reason for Revision
0	10-21-2020		Original Issue

EXECUTIVE SUMMARY

This report presents estimates of the cost to decommission the Monticello Nuclear Generating Plant (Monticello) for the identified decommissioning scenarios following a cessation of plant operations in 2030. The estimates are designed to provide Xcel Energy with the information to assess its current decommissioning liability, as it relates to Monticello.

The analysis relies upon site-specific, technical information from an evaluation prepared in 2017, [1] updated to reflect current assumptions pertaining to the disposition of the nuclear plant and relevant industry experience in undertaking such projects. The costs are based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site restoration requirements.

While the analysis is not a detailed engineering evaluation, it represents the estimates prepared in advance of the detailed engineering required to carry out the decommissioning of the nuclear unit. It may also not reflect the actual plan to decommission Monticello; the plan may differ from the assumptions made in this analysis based on facts that exist at the time of decommissioning.

The primary goal of the decommissioning is the removal and disposal of the contaminated systems and structures so that the plant's operating license can be terminated. The analysis recognizes that spent fuel will be stored at the site in the reactor building's storage pool and/or in an Independent Spent Fuel Storage Installation (ISFSI) until such time that it can be transferred to a Department of Energy (DOE) facility. Consequently, the estimates also include those costs to manage and subsequently decommission these storage facilities.

The current cost estimates assume that Monticello ceases operations in 2030. The cost estimates assume that the shutdown date of the nuclear unit is scheduled and pre-planned (i.e., there is no delay in transitioning the plant and workforce from operations or in obtaining regulatory relief from operating requirements, etc.). This estimate includes additional resources to support the engineering, planning, and licensing efforts for the station; this is done to support a decommissioning schedule similar to the prior estimate. The estimates include the continued operation of the reactor building as an interim wet fuel storage facility for approximately four years after operations cease. The spent fuel will remain in the ISFSI until the DOE is able to

1 "Decommissioning Cost Analysis for the Monticello Nuclear Generating Plant," Document No. X01-1725-002, Rev. 0, TLG Services, Inc., October 2017

complete the transfer of the fuel to a federal facility (e.g., a monitored retrievable storage facility). [2] The estimates also include the dismantling of non-essential structures and limited restoration of the site.

The 2017 plant inventory, the basis for the decontamination and dismantling requirements and cost, and the decommissioning waste streams, was reviewed for this analysis. Over the three-year period between estimates the plant confirmed there were no substantive changes to the configuration of the plant or site facilities (that would significantly impact decommissioning).

The costs to decommission Monticello, for the scenarios evaluated, are tabulated at the end of this section. Costs are reported in 2020 dollars and include monies anticipated to be spent for radiological remediation and operating license termination, spent fuel management, and site restoration activities.

A complete discussion of the assumptions relied upon in this analysis is provided in Section 3, along with schedules of annual expenditures for each scenario. A sequence of significant project activities is provided in Section 4 with a timeline for each scenario. Detailed cost reports used to generate the summary tables contained within this document are provided in Appendices C through J.

Alternatives and Regulations

The ultimate objective of the decommissioning process is to reduce the inventory of contaminated and activated material so that the license can be terminated. The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule adopted on June 27, 1988.[3] In this rule, the NRC set forth technical and financial criteria for decommissioning licensed nuclear power facilities. The regulations addressed planning needs, timing, funding methods, and environmental review requirements for decommissioning. The rule also defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB.

> DECON is defined as "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are

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2 Projected expenditures for spent fuel management identified in the cost analysis do not consider any compensation for damages with regard to the delays incurred by Xcel Energy in the timely removal of spent fuel by the DOE.

3 U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70 and 72, "General Requirements for Decommissioning Nuclear Facilities," Nuclear Regulatory Commission, 53 Fed. Reg. 24018, June 27, 1988

removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations."[4]

SAFSTOR is defined as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use."[5] Decommissioning is to be completed within 60 years, although longer time periods will be considered when necessary to protect public health and safety.

ENTOMB is defined as "the alternative in which radioactive contaminants are encased in a structurally long-lived material, such as concrete; the entombed structure is appropriately maintained and continued surveillance is carried out until the radioactivity decays to a level permitting unrestricted release of the property."[6] As with the SAFSTOR alternative, decommissioning is currently required to be completed within 60 years, although longer time periods will also be considered when necessary to protect public health and safety.

The 60-year restriction has limited the practicality for the ENTOMB alternative at commercial reactors that generate significant amounts of long-lived radioactive material. In 1997, the Commission directed its staff to re-evaluate this alternative and identify the technical requirements and regulatory actions that would be necessary for entombment to become a viable option. The resulting evaluation provided several recommendations, however, rulemaking has been deferred based upon several factors (e.g., no licensee has committed to pursuing the entombment option, the unresolved issues associated with the disposition of greater-than-Class C material (GTCC), and the NRC's current priorities) at least until after the additional research studies are complete. The Commission concurred with the staff's recommendation. In a draft regulatory basis document published in March 2017 in support of rulemaking that would amend NRC regulations concerning nuclear plant decommissioning, the NRC staff proposes removing any discussion of the ENTOMB option from existing guidance documents since the method is not deemed practically feasible.

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4 Ibid. Page FR24022, Column 3

5 Ibid.

6 Ibid. Page FR24023, Column 2

In 1996, the NRC published revisions to its general requirements for decommissioning nuclear power plants to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in the decommissioning process.[7] The amendments allow for greater public participation and better define the transition process from operations to decommissioning. Regulatory Guide 1.184 Revision 1, issued in October 2013, further described the methods and procedures that are acceptable to the NRC staff for implementing the requirements of the 1996 revised rule that relate to the initial activities and the major phases of the decommissioning process. The costs and schedules presented in this analysis follow the general guidance and sequence in the amended regulations. The format and content of the estimates is also consistent with the recommendations of Regulatory Guide 1.202, issued February 2005. [8]

In 2011, the NRC published amended regulations to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site.[9] The regulations require licensees to report additional details in their decommissioning cost estimate, including a decommissioning estimate for the ISFSI. This estimate is provided in Appendix K.

Decommissioning Scenarios

The following scenarios were evaluated and are intended to bound the liability associated with the removal of spent fuel from the site. The current operating license expires in 2030. The scenarios consist of four spent fuel management scenarios, each with a DECON and a SAFSTOR decommissioning alternative for eight total scenarios. The duration of the spent fuel scenarios has little impact to the decommissioning costs and timing of the power block systems and structures. The spent fuel in the plant's spent fuel storage pool is transferred to the ISFSI within the first four years. The equipment, structures, and portions of the plant containing radioactive contaminants are removed or decontaminated to a level that permits the facility to be released for unrestricted use. Remaining site structures are then demolished. Spent fuel storage operations continue at the ISFSI until the transfer of the fuel to the DOE is completed (as shown in the "Last Spent Fuel Assembly" column in the following table).

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7 U.S. Code of Federal Regulations, Title 10, Parts 2, 50 and 51, "Decommissioning of Nuclear Power Reactors," Nuclear Regulatory Commission, 61 Fed. Reg. 39278, July 29, 1996

8 "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors," Regulatory Guide 1.202, Nuclear Regulatory Commission, February 2005

9 U.S. Code of Federal Regulations, Title 10, Parts 20, 30, 40, 50, 70, and 72, "Decommissioning Planning," Nuclear Regulatory Commission, Federal Register Volume 76, (p 35512 et seq.), June 17, 2011

Scenario	1st Spent Fuel Canister Replacement	1st Spent Fuel Assembly Removed from Monticello*	Last Spent Fuel Assembly Removed from Monticello	Scenario Identification
1	n/a	2052	2072	DECON with 42 Year DFS+
2	n/a	2078	2090	DECON with 60 Year DFS
3	2058	2118	2130	DECON with 100 Year DFS
4	2058	2218	2230	DECON with 200 Year DFS
5	n/a	2052	2072	SAFSTOR with 42 Year DFS
6	n/a	2078	2090	SAFSTOR with 60 Year DFS
7	2058	2118	2130	SAFSTOR with 100 Year DFS
8	2058	2218	2230	SAFSTOR with 200 Year DFS

* Spent fuel stored at Morris is removed prior to fuel stored at the Monticello site.
+ Dry Fuel Storage

For Scenarios 1 and 5, although they only provide a total fuel storage period of 42 years following shutdown, some of the Monticello casks have been in storage since 2008. Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters for those casks that exceed 50 years. The assumption to not transfer spent fuel at 50-years total storage duration for these two scenarios was premised on the likelihood that the life of the canisters could be successfully extended for the additional years.

For Scenarios 2 and 6, although they provide a total fuel storage period of nominally 60 years following shutdown, Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters at the 50-year mark.

In Scenarios 3, 4, 7 and 8, the Dry Shielded Canisters (DSCs) are assumed to be replaced after fifty years of use. Since the reactor building spent fuel storage pool and fuel handling facilities are removed by the year 2038, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. For Scenarios 3 and 7, two such transfer is needed over the time frame assumed. For Scenarios 4 and 8, the spent fuel will be transferred four times following initial placement in the ISFSI.

Methodology

The methodology used to develop the estimates follows the basic approach originally presented in the cost estimating guidelines [10] developed by the Atomic Industrial Forum (now Nuclear Energy Institute). This reference describes a unit cost factor method for estimating decommissioning activity costs. The unit cost factors used in this analysis incorporate site-specific costs and the latest available information about worker productivity in decommissioning.

An activity duration critical path is used to determine the total decommissioning program schedule. This is required for calculating the carrying costs, which include program management, administration, field engineering, equipment rental, quality assurance, and security. This systematic approach for assembling decommissioning estimates ensures a high degree of confidence in the reliability of the resulting costs.

The estimates also reflect lessons learned from TLG's involvement in the Shippingport Station Decommissioning Project, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells and associated facilities, completed in 1997. In addition, the planning and engineering for the Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Oyster Creek, Connecticut Yankee, Crystal River, Vermont Yankee, Fort Calhoun, Pilgrim, and Indian Point nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Contingency

Consistent with cost estimating practice, contingencies are applied to the decontamination and dismantling costs developed as "specific provision for unforeseeable elements of cost within the defined project scope, particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur."[11] The cost elements in the estimates are based on ideal conditions; therefore, the types of unforeseeable events that are almost certain to occur in decommissioning, based on industry experience, are addressed through a percentage contingency applied on a line-item basis. This contingency factor is a nearly universal element in all large-scale construction and demolition projects. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of

10 T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986

11 Project and Cost Engineers' Handbook, Second Edition, American Association of Cost Engineers, Marcel Dekker, Inc., New York, New York, p. 239

decommissioning over the remaining operating life of the station, or duration of the decommissioning program and dry fuel storage period.

Contingency funds are expected to be fully expended throughout the program. As such, inclusion of contingency is necessary to provide assurance that sufficient funding will be available to accomplish the intended tasks.

Low-Level Radioactive Waste Disposal

The contaminated and neutron-activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for "shallow-land" disposal. With the passage of the "Low-Level Radioactive Waste Policy Act" in 1980, [12] and its Amendments of 1985, [13] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders. It was expected that groups of states would combine together to jointly deal with their radioactive wastes; these organizations are referred to as waste disposal compacts.

With the exception of Texas, no new compact facilities have been successfully sited, licensed, and constructed. The Texas Compact disposal facility is now operational and waste is being accepted from generators within the Compact by the operator, Waste Control Specialists (WCS). The facility is also able to accept limited quantities of non-Compact waste.

Disposition of the various waste streams produced by the decommissioning process considered all options and services currently available to Xcel Energy. The majority of the low-level radioactive waste designated for direct disposal (Class A [14]) can be sent to Energy*Solutions*' facility in Clive, Utah. Therefore, disposal costs for Class A waste were based upon current contract rates. This facility is not licensed to receive the higher activity portion of the decommissioning waste stream (Classes B and C resins and activated metal from the reactor vessel[15]).

The Texas facility is licensed to receive the higher activity waste forms (Classes B and C). As such, for this analysis, disposal costs for the Class B and C waste were based upon the Xcel-provided information on the cost for such from WCS.

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12 "Low-Level Radioactive Waste Policy Act," Public Law 96-573, 1980

13 "Low-Level Radioactive Waste Policy Amendments Act of 1985," Public Law 99-240, 1986

14 Waste is classified in accordance with U.S. Code of Federal Regulations, Title 10, Part 61.55

15 U.S. Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste"

The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow-land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste.

The DOE issued its final Environmental Impact Statement for the disposal of GTCC on January 2016.[16] The study evaluated the potential environmental impacts associated with constructing and operating a new facility or using an existing facility, disposal methods, and locations. DOE is awaiting Congressional action on the report and its recommendations. At this time, the federal government has not identified a specific cost for disposing of GTCC or a schedule for acceptance.

For purposes of this analysis, the GTCC radioactive waste is assumed to be packaged and disposed of in a similar manner as high-level waste and at a cost equivalent to that envisioned for the spent fuel. The GTCC is packaged in the same canisters used for spent fuel and either stored on site or shipped directly to a DOE facility as it is generated (depending upon the timing of the decommissioning and whether the spent fuel has been removed from the site prior to the start of physical decommissioning).

A significant portion of the waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be analyzed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to isolate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates reflect the savings from waste recovery/volume reduction.

<u>High-Level Radioactive Waste Management</u>

Congress passed the "Nuclear Waste Policy Act" [17] (NWPA) in 1982, assigning the federal government's long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The DOE was to

16 "Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375)," January 2016

17 "Nuclear Waste Policy Act of 1982 and Amendments," DOE's Office of Civilian Radioactive Management, 1982

begin accepting spent fuel by January 31, 1998; however, to date no progress in the removal of spent fuel from commercial generating sites has been made.

Today, the country is at an impasse on high-level waste disposal, even with the License Application for a geologic repository submitted by the DOE to the NRC in 2008. The Obama administration cut the budget for the repository program while promising to "conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle … and make recommendations for a new plan."[18] Towards this goal, the administration appointed a Blue Ribbon Commission on America's Nuclear Future (Blue Ribbon Commission) to make recommendations for a new plan for nuclear waste disposal. The Blue Ribbon Commission's charter includes a requirement that it consider "[o]ptions for safe storage of used nuclear fuel while final disposition pathways are selected and deployed."[19]

On January 26, 2012, the Blue Ribbon Commission issued its "Report to the Secretary of Energy" containing a number of recommendations on nuclear waste disposal. Two of the recommendations that may impact decommissioning planning are:

- "[T]he United States [should] establish a program that leads to the timely development of one or more consolidated storage facilities"[20]
- "[T]he United States should undertake an integrated nuclear waste management program that leads to the timely development of one or more permanent deep geological facilities for the safe disposal of spent fuel and high-level nuclear waste."[21]

In January 2013, the DOE issued the "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," in response to the recommendations made by the Blue Ribbon Commission and as "a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel..."[22] This document states:

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18 Blue Ribbon Commission on America's Nuclear Future's Charter, http://cybercemetery.unt.edu/archive/brc/20120620215336/http://brc.gov/index.php?q=page/charter

19 Ibid.

20 "Blue Ribbon Commission on America's Nuclear Future, Report to the Secretary of Energy,", p. 32, January 2012

21 Ibid., p.27

22 "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," U.S. DOE, January 11, 2013

"With the appropriate authorizations from Congress, the Obama Administration planned to implement a program over the next 10 years that would have:

- Sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites;
- Advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
- Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048."[23]

The NRC's review of DOE's license application to construct a geologic repository at Yucca Mountain was suspended in 2011 when the Obama Administration significantly reduced the budget for completing that work. However, the US Court of Appeals for the District of Columbia Circuit issued a writ of mandamus (in August 2013) [24] ordering NRC to comply with federal law and restart its review of DOE's Yucca Mountain repository license application to the extent of previously appropriated funding for the review. That review is now complete with the publication of the five-volume safety evaluation report. A supplement to DOE's environmental impact statement and an adjudicatory hearing on the contentions filed by interested parties must be completed before a licensing decision can be made. Although the DOE proposed it would start fuel acceptance in 2025, no progress has been made in the repository program since DOE's 2013 strategy was issued except for the completion of the Yucca Mountain safety evaluation report.

Holtec International submitted a license application to the NRC on March 30, 2017 for a consolidated interim spent fuel storage facility in southeast New Mexico called HI-STORE CIS (Consolidated Interim Storage) under the provisions of 10 CFR Part 72. The application is currently under NRC review.

A centralized interim storage project was initiated by Waste Control Specialists (WCS) for a site in Andrews County, Texas, adjacent to WCS's existing low-level radioactive waste and hazardous waste storage and disposal facilities. The NRC license application for this project was filed in April 2016. In April 2017, WCS

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23 Ibid., p.2

24 United States Court of Appeals for the District Of Columbia Circuit, In Re: Aiken County, et al, August 2013

asked the NRC to suspend the review of this application. Subsequently, WCS and Orano USA (formerly Areva Nuclear Materials) formed a joint venture to license the facility. In response to letters to the NRC in June and July 2018 from the joint venture, Interim Storage Partners, the NRC restarted its review of the application

On May 10, 2018, the U.S. House of Representatives passed H.R. 3053, the "Nuclear Waste Policy Amendments Act of 2018." Proposed to amend the Nuclear Waste Policy Act of 1982, the legislation, if approved by the Senate and signed by the President, would provide the DOE the authority to site, construct, and operate one or more Monitored Retrieval Storage (MRS) facilities while a permanent repository is licensed and constructed and/or to enter into an MRS agreement with a non-Federal entity for temporary storage.

Completion of the decommissioning process is dependent upon the DOE's ability to remove spent fuel from the site in a timely manner. DOE's repository program had originally assumed that spent fuel allocations would be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was discharged from the reactor.[25] However, the Blue Ribbon Commission, in its final report, noted that: "[A]ccepting spent fuel according to the OFF [Oldest Fuel First] priority ranking instead of giving priority to shutdown reactor sites could greatly reduce the cost savings that could be achieved through consolidated storage if priority could be given to accepting spent fuel from shutdown reactor sites before accepting fuel from still-operating plants. …. The magnitude of the cost savings that could be achieved by giving priority to shutdown sites appears to be large enough (i.e., in the billions of dollars) to warrant DOE exercising its right under the Standard Contract to move this fuel first."

The state of Minnesota directed the Public Utilities Commission, "when considering approval of a plan for the accrual of funds for the decommissioning of nuclear facilities" …to "include an evaluation of the costs, if any, arising from storage of used nuclear fuel that may be incurred by the state of Minnesota, and any tribal community, county, city, or township where used nuclear fuel is located following the cessation of operations at a nuclear plant."[26]

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25 U.S. Code of Federal Regulations, Title 10, Part 961.11, Article IV – Responsibilities of the Parties, B. DOE Responsibilities, 5.(a) … DOE shall issue an annual acceptance priority ranking for receipt of SNF and/or HLW at the DOE repository. This priority ranking shall be based on the age of SNF and/or HLW as calculated from the date of discharge of such materials from the civilian nuclear power reactor. The oldest fuel or waste will have the highest priority for acceptance …"

26 Minnesota Statute 216B.2445, "Nuclear Power Plant Decommissioning and Storage of Used Nuclear Fuel"

The state of Minnesota statute also prescribed the parameters to be used in evaluating spent fuel management costs. "To assist the commission in making the determination … the filing shall provide cost estimates, including ratepayer impacts, assuming used nuclear fuel will be stored in the state for 60 years, 100 years, and 200 years following the cessation of operation of the nuclear plant." [27]

Xcel Energy's current spent fuel management plan for the Monticello spent fuel is based in general upon:

1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
3) Fuel will be shipped in the existing NUHOMS DSCs (Scenarios 1, 2, 5, and 6); the NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility. [28]
6) Currently Monticello is storing spent fuel assemblies at the Morris Operation facility of GE Hitachi Nuclear Energy in Morris, Illinois. These assemblies will be shipped for final disposal to DOE prior to the removal of fuel from the Monticello site.

The NRC requires that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy, pursuant to 10 CFR Part 50.54(bb). [29] This requirement is prepared for through inclusion of certain cost elements in the

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27 Ibid.

28 "Order Approving Nuclear Decommissioning Study, Assumptions, and Annual Accrual, and Setting Filing Requirements", Page 8, Items 12e and 12g, Minnesota Public Utilities Commission Docket E-002/M-14-761 October 4, 2015

29 U.S. Code of Federal Regulations, Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," Subpart 54 (bb), "Conditions of Licenses"

decommissioning estimates, for example, associated with the isolation and continued operation of the spent fuel pool and the ISFSI.

The spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core at shutdown. The assemblies are packaged into dry shielded canisters (DSCs) over the first four years after shutdown for transfer to the ISFSI for interim storage. It is assumed that this period provides the necessary cooling for the final core to meet the transport and/or storage requirements for decay heat.

An ISFSI, operated under a Part 50 General License (in accordance with 10 CFR 72, Subpart K [30]), has been constructed to support continued plant operations. The facility is assumed to be expanded to support decommissioning. This will allow decommissioning activities to proceed within the reactor building.

DOE has breached its obligations to remove fuel from reactor sites, and has also failed to provide the plant owners with information about how it will ultimately perform. DOE officials have stated that DOE does not have an obligation to accept already-canistered fuel without an amendment to DOE's contracts with plant licensees to remove the fuel (the "Standard Contract"), but DOE has not explained what any such amendment would involve. Consequently, Xcel Energy has no information or expectations on how DOE will remove fuel from the site in the future. In the absence of information about how DOE will perform, and for purposes of this analysis only, it is assumed that DOE will accept already-canistered fuel. If this assumption is incorrect, it is assumed that DOE will have liability for costs incurred to transfer the fuel to DOE-supplied containers.

Xcel Energy's position is that the DOE has a contractual obligation to accept Monticello's fuel earlier than the projections set out above consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, including the cost of storing spent fuel in this study is appropriate to ensure the availability of sufficient decommissioning funds at the end of the station's life if the DOE has not met its obligation. The cost for the interim storage of spent fuel has been calculated and is separately presented as "Spent Fuel Management" expenditures in this report.

Site Restoration

The efficient removal of the contaminated materials at the site may result in damage to many of the site structures. Blasting, coring, drilling, and the other

[30] U.S. Code of Federal Regulations, Title 10, Part 72, Subpart K, "General License for Storage of Spent Fuel at Power Reactor Sites"

decontamination activities can substantially damage power block structures, potentially weakening the footings and structural supports. It is unreasonable to anticipate that these structures would be repaired and preserved after the radiological contamination is removed. The cost to dismantle site structures with a work force already mobilized is more efficient and less costly than if the process were deferred. Experience at shutdown generating stations has shown that plant facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public and the demolition work force.

This estimate assumes that some site features will remain following the decommissioning project. These include the existing electrical switchyard, which is assumed to remain functional in support of the regional electrical distribution system. The existing shoreline will also be left intact.

Consequently, non-essential site structures addressed by this analysis are completely removed (including foundations) as required by Minnesota statute [31]. The site is then graded and stabilized. The cost for the site restoration of non-essential and/or non-contaminated structures has been calculated and is separately presented as "Site Restoration" expenditures in this report.

Summary

The costs to decommission the Monticello station were evaluated for several spent fuel removal scenarios, using both the DECON and SAFSTOR decommissioning alternatives. Regardless of the timing of the decommissioning activities, the estimates to decommission Monticello assume the removal of all contaminated and activated plant components and structural materials such that Xcel Energy may then have unrestricted use of the site with no further requirements for an operating license. In most of the scenarios, spent fuel remains on site following the decommissioning and site restoration of the power block structures. The spent fuel remains in storage at the site until such time that the transfer to a DOE facility can be completed. Once the transfer is complete, the storage facilities are also decommissioned.

The alternatives evaluated in this analysis are described in Section 2. The assumptions are presented in Section 3, along with schedules of annual expenditures. The major cost contributors are identified in Section 6, with detailed activity costs, waste volumes, and associated manpower requirements delineated in Appendices C through J. The major cost components are also identified in the cost summary provided at the end of this section.

31 Minnesota Administrative Rule part 7035.0400 "General Requirements"

The estimates presented in this document reflect the total cost to decontaminate the nuclear unit, manage the spent fuel until the DOE is able to complete the transfer to a federal facility, dismantle the plant and restore the site for alternative use.

The cost elements in the estimates for the four DECON and SAFSTOR alternatives are assigned to one of three subcategories: NRC License Termination (radiological remediation), Spent Fuel Management, and Site Restoration. The subcategory "NRC License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). The cost reported for this subcategory is generally sufficient to terminate the unit's operating license, recognizing that there may be some additional cost impact from spent fuel management. The License Termination cost subcategory also includes costs to decommission the ISFSI (as required by 10 CFR §72.30). Section 3.4.1 provides the basis for the ISFSI decommissioning cost.

The "Spent Fuel Management" subcategory contains costs associated with the containerization and transfer of spent fuel from the wet storage pool to the ISFSI, as well as the transfer of the spent fuel in storage at the ISFSI to the DOE. Costs are included for the operation of the storage pool and the management of the ISFSI until such time that the transfer is complete. It does not include any spent fuel management expenses incurred prior to the cessation of plant operations, nor does it include any costs related to the final disposal of the spent fuel.

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are completely removed (including foundations) and backfilled to conform to local surface elevation.

It should be noted that the costs assigned to these subcategories are allocations. Delegation of cost elements is for the purposes of comparison (e.g., with NRC financial guidelines) or to permit specific financial treatment (e.g., Asset Retirement Obligation determinations). In reality, there can be considerable interaction between the activities in the three subcategories. For example, Xcel Energy may decide to remove non-contaminated structures early in the project to improve access to highly contaminated facilities or plant components. In these instances, the non-contaminated removal costs could be reassigned from Site Restoration to an NRC License Termination support activity. However, in general, the allocations represent a reasonable accounting of those costs that can be expected to be incurred for the specific subcomponents of the total estimated program cost, if executed as described.

As noted within this document, the estimates were developed and costs are presented in 2020 dollars. As such, the estimates do not reflect the escalation of costs (due to inflationary and market forces) over the remaining operating life of the plant or during the decommissioning period.

SCENARIO 1: DECON WITH 42 YEARS DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total
Decontamination	24,330
Removal	124,923
Packaging	26,543
Transportation	14,145
Waste Disposal	114,148
Off-site Waste Processing	57,444
Program Management [1]	291,793
Site Security	300,359
Spent Fuel Pool Isolation	14,576
Spent Fuel Storage (Direct Costs) [2]	243,342
Insurance and Regulatory Fees	39,755
Energy	10,030
Characterization and Licensing Surveys	23,012
Property Taxes	55,377
Miscellaneous Equipment	7,411
Railroad Track Maintenance	6,915
Retention and Severance	41,002
Security Modifications	10,000
Total [3]	1,405,104

Cost Element	Total
NRC License Termination	776,139
Spent Fuel Management	555,579
Site Restoration	73,386
Total [3]	1,405,104

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total
Decontamination	24,330
Removal	124,923
Packaging	26,543
Transportation	14,145
Waste Disposal	114,148
Off-site Waste Processing	57,444
Program Management [1]	317,534
Site Security	389,439
Spent Fuel Pool Isolation	14,576
Spent Fuel Storage (Direct Costs) [2]	301,663
Insurance and Regulatory Fees	53,689
Energy	10,030
Characterization and Licensing Surveys	23,012
Property Taxes	73,368
Miscellaneous Equipment	7,411
Railroad Track Maintenance	9,505
Retention and Severance	41,002
Security Modifications	10,000
Total [3]	1,612,762

Cost Element	Total
NRC License Termination	776,139
Spent Fuel Management	763,237
Site Restoration	73,386
Total [3]	1,612,762

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total
Decontamination	24,330
Removal	125,011
Packaging	26,543
Transportation	14,145
Waste Disposal	114,148
Off-site Waste Processing	57,444
Program Management [1]	502,435
Site Security	587,397
Spent Fuel Pool Isolation	14,576
Spent Fuel Storage (Direct Costs) [2]	875,124
Insurance and Regulatory Fees	84,655
Energy	10,030
Characterization and Licensing Surveys	23,012
Property Taxes	113,348
Miscellaneous Equipment	7,411
Railroad Track Maintenance	15,260
Retention and Severance	41,002
Security Modifications	10,000
Total [3]	2,645,871

Cost Element	Total
NRC License Termination	776,228
Spent Fuel Management	1,795,906
Site Restoration	73,737
Total [3]	2,645,871

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total
Decontamination	24,330
Removal	125,011
Packaging	26,543
Transportation	14,145
Waste Disposal	114,148
Off-site Waste Processing	57,444
Program Management [1]	782,364
Site Security	1,082,311
Spent Fuel Pool Isolation	14,576
Spent Fuel Storage (Direct Costs) [2]	1,961,162
Insurance and Regulatory Fees	162,073
Energy	10,030
Characterization and Licensing Surveys	23,012
Property Taxes	213,298
Miscellaneous Equipment	7,411
Railroad Track Maintenance	29,650
Retention and Severance	41,002
Security Modifications	10,000
Total [3]	4,698,509

Cost Element	Total
NRC License Termination	776,228
Spent Fuel Management	3,848,543
Site Restoration	73,737
Total [3]	4,698,509

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total
Decontamination	30,303
Removal	130,385
Packaging	17,375
Transportation	10,222
Waste Disposal	82,277
Off-site Waste Processing	67,679
Program Management [1]	415,951
Site Security	379,377
Spent Fuel Pool Isolation	14,576
Spent Fuel Storage (Direct Costs) [2]	233,722
Insurance and Regulatory Fees	61,212
Energy	23,983
Characterization and Licensing Surveys	24,381
Property Taxes	227,954
Miscellaneous Equipment	21,371
Railroad Track Maintenance	9,258
Retention and Severance	41,002
Security Modifications	10,000
Total [3]	1,801,028

Cost Element	Total
NRC License Termination	1,258,686
Spent Fuel Management	479,749
Site Restoration	62,593
Total [3]	1,801,028

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total
Decontamination	30,303
Removal	130,503
Packaging	17,378
Transportation	10,223
Waste Disposal	82,289
Off-site Waste Processing	67,679
Program Management [1]	433,069
Site Security	431,859
Spent Fuel Pool Isolation	14,576
Spent Fuel Storage (Direct Costs) [2]	289,013
Insurance and Regulatory Fees	66,507
Energy	23,983
Characterization and Licensing Surveys	24,381
Property Taxes	238,521
Miscellaneous Equipment	21,371
Railroad Track Maintenance	9,258
Retention and Severance	41,002
Security Modifications	10,000
Total [3]	1,941,915

Cost Element	Total
NRC License Termination	1,250,097
Spent Fuel Management	629,040
Site Restoration	62,778
Total [3]	1,941,915

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total
Decontamination	29,939
Removal	130,623
Packaging	22,597
Transportation	10,222
Waste Disposal	82,285
Off-site Waste Processing	67,679
Program Management [1]	544,148
Site Security	611,726
Spent Fuel Pool Isolation	14,576
Spent Fuel Storage (Direct Costs) [2]	863,002
Insurance and Regulatory Fees	97,864
Energy	24,005
Characterization and Licensing Surveys	24,381
Property Taxes	278,126
Miscellaneous Equipment	21,371
Railroad Track Maintenance	14,886
Retention and Severance	41,002
Security Modifications	10,000
Total [3]	2,888,431

Cost Element	Total
NRC License Termination	1,248,652
Spent Fuel Management	1,580,426
Site Restoration	59,354
Total [3]	2,888,431

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total
Decontamination	29,939
Removal	130,623
Packaging	22,597
Transportation	10,222
Waste Disposal	82,285
Off-site Waste Processing	67,679
Program Management [1]	824,077
Site Security	1,061,840
Spent Fuel Pool Isolation	14,576
Spent Fuel Storage (Direct Costs) [2]	1,949,073
Insurance and Regulatory Fees	175,282
Energy	24,005
Characterization and Licensing Surveys	24,381
Property Taxes	378,076
Miscellaneous Equipment	21,371
Railroad Track Maintenance	29,275
Retention and Severance	41,002
Security Modifications	10,000
Total [3]	4,896,303

Cost Element	Total
NRC License Termination	1,248,733
Spent Fuel Management	3,588,216
Site Restoration	59,354
Total [3]	4,896,303

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

1. INTRODUCTION

This report presents estimates of the cost to decommission the Monticello Nuclear Generating Plant (Monticello) and the operation and eventual decommissioning of the on-site Independent Spent Fuel Storage Installation (ISFSI) for the selected decommissioning scenarios following the scheduled cessation of plant operations. The estimates are designed to provide Xcel Energy with the information to assess its current decommissioning liability, as it relates to Monticello.

The analysis relies upon site-specific, technical information from an earlier evaluation prepared in 2017, [1]* updated to reflect current assumptions pertaining to the disposition of the nuclear plant and relevant industry experience in undertaking such projects. The costs are based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site restoration requirements.

The analysis is not a detailed engineering evaluation, but an estimate prepared in advance of the detailed engineering required to carry out the decommissioning of the nuclear unit. It may also not reflect the actual plan to decommission Monticello; the plan may differ from the assumptions made in this analysis based on facts that exist at the time of decommissioning.

The 2017 plant inventory was reviewed for this analysis. It serves as the basis for the decontamination and dismantling requirements, cost, and the decommissioning waste streams. The review confirmed that there were no substantive changes to the configuration of the plant or site facilities that would impact decommissioning over the last three years.

1.1 OBJECTIVES OF STUDY

The objectives of this study are to prepare comprehensive estimates of the cost to decommission Monticello, to provide a sequence or schedule for the associated activities, and to develop waste stream projections from the decontamination and dismantling activities.

The operating license was originally issued for the plant on September 8th, 1970, and was valid for a period of 40 years. In early 2005, Nuclear Management Company (as agent for Xcel Energy), submitted an application for

* Annotated references for citations in Sections 1-6 are provided in Section 7

a renewed license (i.e., 20 year extension). The application was approved by the NRC in November 2006. Therefore, for the purposes of this study, the final shutdown date (license expiration) for Monticello is September 8th, 2030, assuming a 60-year operating life (the current operating license's expiration date).

1.2 SITE DESCRIPTION

Monticello is located on the Mississippi River within the city limits of Monticello, in Wright County, Minnesota. The plant is located approximately 30 miles northwest of the Minneapolis-St. Paul area.

The Nuclear Steam Supply System (NSSS) consists of a single cycle, forced circulation, low power density boiling water reactor. The reactor recirculation system is comprised of the reactor vessel; the two loop reactor recirculation system with its pumps, pipes, and valves; the main steam piping up to the main steam isolation valves; and the reactor auxiliary systems piping. The system is housed within a "containment system," consisting of a steel light bulb-shaped drywell, a steel doughnut-shaped pressure suppression chamber, and interconnecting vent pipes. This system provides the first containment barrier surrounding the reactor vessel and reactor primary system. The reactor building provides secondary containment and is designed as a controlled leakage structure.

The saturated steam leaving the reactor vessel flows through the four main steam lines to the main turbine located in the turbine building. After passing through the main turbine, low-pressure steam is condensed, the non-condensable gases are removed, and the condensate is demineralized before being returned to the reactor vessel through the reactor feedwater system heaters. The turbine-generator system converts the thermodynamic energy of the steam into electrical energy. The unit's turbine-generator consists of one single-flow, high-pressure, and two double-flow, low-pressure turbines driving a direct-coupled generator at 1800 rpm. Heat rejected in the main condenser is removed by the circulating water system.

The circulating water system has been designed for open cycle once-through cooling towers, closed cycle with cooling towers, or for variations of these modes, i.e., partial recirculation. The system for open cycle operation consists of an intake structure with two half-capacity circulating water pumps, piping river water through the condenser to a discharge structure where the water enters a 1000-foot long canal that returns the water to the river downstream from the intake. Two induced-draft cooling towers are used during the open

and closed cycle operations. Cooled effluent returns by gravity to the intake structure from the cooling tower basins.

1.3 REGULATORY GUIDANCE

The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule "General Requirements for Decommissioning Nuclear Facilities," issued in June 1988.[2] This rule set forth financial criteria for decommissioning licensed nuclear power facilities. The regulation addressed decommissioning planning needs, timing, funding methods, and environmental review requirements. The intent of the rule was to ensure that decommissioning would be accomplished in a safe and timely manner and that adequate funds would be available for this purpose. Subsequent to the rule, the NRC issued Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors,[3]" which provided additional guidance to the licensees of nuclear facilities on the financial methods acceptable to the NRC staff for complying with the requirements of the rule. The regulatory guide addressed the funding requirements and provided guidance on the content and form of the financial assurance mechanisms indicated in the rule.

The rule defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB. The DECON alternative assumes that any contaminated or activated portion of the plant's systems, structures, and facilities are removed or decontaminated to levels that permit the site to be released for unrestricted use shortly after the cessation of plant operations while the SAFSTOR and ENTOMB alternatives defer the process.

The rule also placed limits on the time allowed to complete the decommissioning process. For the SAFSTOR alternative, the process is restricted in overall duration to 60 years, unless it can be shown that a longer duration is necessary to protect public health and safety. The guidelines for ENTOMB are similar, providing the NRC with both sufficient leverage and flexibility to ensure that these deferred options are only used in situations where it is reasonable and consistent with the definition of decommissioning. At the conclusion of a 50 to 60-year dormancy period (or longer for ENTOMB if the NRC approves such a case), the site would still require significant remediation to meet the unrestricted release limits for license termination.

The ENTOMB alternative has not been viewed as a viable option for power reactors due to the significant time required to isolate the long-lived radionuclides for decay to permissible levels. However, with rulemaking permitting the controlled release of a site, [4] the NRC did re-evaluate the

alternative. The resulting feasibility study, based upon an assessment by Pacific Northwest National Laboratory, concluded that the method did have conditional merit for some, if not most reactors. The staff also found that additional rulemaking would be needed before this option could be treated as a generic alternative.

The NRC had considered rulemaking to alter the 60-year time for completing decommissioning and to clarify the use of engineered barriers for reactor entombments.[5] However, the NRC's staff has recommended that rulemaking be deferred, based upon several factors, e.g., no licensee has committed to pursuing the entombment option, the unresolved issues associated with the disposition of greater-than-Class C material (GTCC), and the NRC's current priorities, at least until after the additional research studies are complete. The Commission concurred with the staff's recommendation. In a draft regulatory basis document published in March 2017 in support of rulemaking that would amend NRC regulations concerning nuclear plant decommissioning, the NRC staff proposes removing any discussion of the ENTOMB option from existing guidance documents since the method is not deemed practically feasible.

In 1996, the NRC published revisions to the general requirements for decommissioning nuclear power plants. [6] When the regulations were originally adopted in 1988, it was assumed that the majority of licensees would decommission at the end of the facility's operating licensed life. Since that time, several licensees permanently and prematurely ceased operations. Exemptions from certain operating requirements were required once the reactor was defueled to facilitate the decommissioning. Each case was handled individually, without clearly defined generic requirements. The NRC amended the decommissioning regulations in 1996 to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in the decommissioning process. The new amendments allow for greater public participation and better define the transition process from operations to decommissioning.

Under the revised regulations, licensees will submit written certification to the NRC within 30 days after permanent shutdown. Certification will also be required once the fuel is permanently removed from the reactor vessels. Submittal of these notices will entitle the licensee to a fee reduction and eliminate the obligation to follow certain requirements needed only during operation of the reactor. Prior to or within two years following permanent cessation of operations, the licensee is required to submit a Post-Shutdown Decommissioning Activities Report (PSDAR) to the NRC, and a copy to the affected State(s) (10 CFR 50.82(a)(4)(i)). The PSDAR describes the planned decommissioning activities, the associated sequence and schedule, and an

estimate of expected costs. Prior to completing decommissioning, the licensee is required to submit applications to the NRC to terminate the license, which will include a License Termination Plan (LTP).

In 2011, the NRC published amended regulations to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site.[7] The regulations require licensees to report additional details in their decommissioning cost estimate including a decommissioning estimate for the ISFSI. This estimate is provided in Appendix K.

1.3.1 High-Level Radioactive Waste Management

Congress passed the "Nuclear Waste Policy Act" [8] (NWPA) in 1982, assigning the federal government's long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The DOE was to begin accepting spent fuel by January 31, 1998; however, to date no progress in the removal of spent fuel from commercial generating sites has been made.

Today, the country is at an impasse on high-level waste disposal, even with the License Application for a geologic repository submitted by the DOE to the NRC in 2008. The Obama administration cut the budget for the repository program while promising to "conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle … and make recommendations for a new plan." Towards this goal, the administration appointed a Blue Ribbon Commission on America's Nuclear Future (Blue Ribbon Commission) to make recommendations for a new plan for nuclear waste disposal. The Blue Ribbon Commission's charter includes a requirement that it consider "[o]ptions for safe storage of used nuclear fuel while final disposition pathways are selected and deployed."[9]

On January 26, 2012, the Blue Ribbon Commission issued its "Report to the Secretary of Energy" containing a number of recommendations on nuclear waste disposal. Two of the recommendations that may impact decommissioning planning are:

- "[T]he United States [should] establish a program that leads to the timely development of one or more consolidated storage facilities"[10]
- "[T]he United States should undertake an integrated nuclear waste management program that leads to the timely

development of one or more permanent deep geological facilities for the safe disposal of spent fuel and high-level nuclear waste."

In January 2013, the DOE issued the "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," in response to the recommendations made by the Blue Ribbon Commission and as "a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel..." [11] This document states:

"With the appropriate authorizations from Congress, the Obama Administration planned to implement a program over the next 10 years that would have:

- Sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites;
- Advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
- Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048."

The NRC's review of DOE's license application to construct a geologic repository at Yucca Mountain was suspended in 2011 when the Obama Administration significantly reduced the budget for completing that work. However, the US Court of Appeals for the District of Columbia Circuit issued a writ of mandamus (in August 2013) [12] ordering NRC to comply with federal law and restart its review of DOE's Yucca Mountain repository license application to the extent of previously appropriated funding for the review. That review is now complete with the publication of the five-volume safety evaluation report. A supplement to DOE's environmental impact statement and an adjudicatory hearing on the contentions filed by interested parties must be completed before a licensing decision can be made. Although the DOE proposed it would start fuel acceptance in 2025, no progress has been made in the repository program since DOE's 2013 strategy was issued except for the completion of the Yucca Mountain safety evaluation report.

Holtec International submitted a license application to the NRC on March 30, 2017 for a consolidated interim spent fuel storage facility in southeast New Mexico called HI-STORE CIS (Consolidated Interim Storage) under the provisions of 10 CFR Part 72. The application is currently under NRC review.

A centralized interim storage project was initiated by Waste Control Specialists (WCS) for a site in Andrews County, Texas, adjacent to WCS's existing low-level radioactive waste and hazardous waste storage and disposal facilities. The NRC license application for this project was filed in April 2016. In April 2017, WCS asked the NRC to suspend the review of this application. Subsequently, WCS and Orano USA (formerly Areva Nuclear Materials) formed a joint venture to license the facility. In response to letters to the NRC in June and July 2018 from the joint venture, Interim Storage Partners, the NRC restarted its review of the application.

On May 10, 2018, the U.S. House of Representatives passed H.R. 3053, the "Nuclear Waste Policy Amendments Act of 2018." Proposed to amend the Nuclear Waste Policy Act of 1982, the legislation, if approved by the Senate and signed by the President, would provide the DOE the authority to site, construct, and operate one or more Monitored Retrieval Storage (MRS) facilities while a permanent repository is licensed and constructed and/or to enter into an MRS agreement with a non-Federal entity for temporary storage.

Completion of the decommissioning process is dependent upon the DOE's ability to remove spent fuel from the site in a timely manner. DOE's repository program had originally assumed that spent fuel allocations would be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was discharged from the reactor.[13] However, the Blue Ribbon Commission, in its final report, noted that: "[A]ccepting spent fuel according to the OFF [Oldest Fuel First] priority ranking instead of giving priority to shutdown reactor sites could greatly reduce the cost savings that could be achieved through consolidated storage if priority could be given to accepting spent fuel from shutdown reactor sites before accepting fuel from still-operating plants. …. The magnitude of the cost savings that could be achieved by giving priority to shutdown sites appears to be large enough (i.e., in the billions of dollars) to warrant DOE exercising its right under the Standard Contract to move this fuel first."

The state of Minnesota directed the Public Utilities Commission, "when considering approval of a plan for the accrual of funds for the decommissioning of nuclear facilities" …to "include an evaluation of the costs, if any, arising from storage of used nuclear fuel that may be incurred by the state of Minnesota, and any tribal community, county, city, or township where used nuclear fuel is located following the cessation of operations at a nuclear plant."[14]

The state of Minnesota statute also prescribed the parameters to be used in evaluating spent fuel management costs. "To assist the commission in making the determination … the filing shall provide cost estimates, including ratepayer impacts, assuming used nuclear fuel will be stored in the state for 60 years, 100 years, and 200 years following the cessation of operation of the nuclear plant."

Xcel Energy's current spent fuel management plan for the Monticello spent fuel is based in general upon:

1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
3) Fuel will be shipped in the existing NUHOMS DSCs (Scenarios 1, 2, 5, and 6); the NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility. [15]
6) Currently Monticello is storing spent fuel assemblies at the Morris Operation facility of GE Hitachi Nuclear Energy in Morris, Illinois. These assemblies will be shipped for final disposal to DOE prior to the removal of fuel from the Monticello site.

The NRC requires that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy,

pursuant to 10 CFR Part 50.54(bb). [16] This requirement is prepared for through inclusion of certain cost elements in the decommissioning estimates, for example, associated with the isolation and continued operation of the spent fuel pool and the ISFSI.

The spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core at shutdown. In the DECON and SAFSTOR scenarios, the assemblies are packaged into dry shielded canisters (DSCs) over the first four years after shutdown for transfer to the ISFSI for interim storage. It is assumed that this period provides the necessary cooling for the final core to meet the transport and/or storage requirements for decay heat.

An ISFSI, operated under a Part 50 General License (in accordance with 10 CFR 72, Subpart K [17]), has been constructed to support continued plant operations. The facility is assumed to be expanded to support decommissioning. This will allow decommissioning activities to proceed within the reactor building.

DOE has breached its obligations to remove fuel from reactor sites, and has also failed to provide the plant owners with information about how it will ultimately perform. DOE officials have stated that DOE does not have an obligation to accept already-canistered fuel without an amendment to DOE's contracts with plant licensees to remove the fuel (the "Standard Contract"), but DOE has not explained what any such amendment would involve. Consequently, Xcel Energy has no information or expectations on how DOE will remove fuel from the site in the future. In the absence of information about how DOE will perform, and for purposes of this analysis only, it is assumed that DOE will accept already-canistered fuel. If this assumption is incorrect, it is assumed that DOE will have liability for costs incurred to transfer the fuel to DOE-supplied containers.

Xcel Energy's position is that the DOE has a contractual obligation to accept Monticello's fuel earlier than the projections set out above, consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, including the cost of storing spent fuel in this study is appropriate to ensure the availability of sufficient decommissioning funds at the end of the station's life if the DOE has not met its obligation. The cost for the interim storage of spent fuel has been calculated and is separately presented as "Spent Fuel Management" expenditures in this report.

1.3.2 Low-Level Radioactive Waste Disposal

The contaminated and activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for "shallow-land" disposal. With the passage of the "Low-Level Radioactive Waste Policy Act" in 1980, [18] and its Amendments of 1985, [19] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders. It was expected that groups of states would combine together to jointly deal with their radioactive wastes; these organizations are referred to as waste disposal compacts.

With the exception of Texas, no new compact facilities have been successfully sited, licensed, and constructed. The Texas Compact disposal facility is now operational and waste is being accepted from generators within the Compact by the operator, Waste Control Specialists (WCS). The facility is also able to accept limited quantities of non-Compact waste.

Disposition of the various waste streams produced by the decommissioning process considered all options and services currently available to Xcel Energy. The majority of the low-level radioactive waste designated for direct disposal (Class A [20]) can be sent to Energy*Solutions*' facility in Clive, Utah. Therefore, disposal costs for Class A waste were based upon current contract rates. This facility is not licensed to receive the higher activity portion (Classes B and C) of the decommissioning waste stream.

The Texas facility is licensed to receive the higher activity waste forms (Classes B and C). As such, for this analysis, disposal costs for the Class B and C waste were based upon the preliminary and indicative information on the cost for such from WCS.

The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow-land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste.

The DOE issued its final Environmental Impact Statement for the disposal of GTCC on January 2016.[21] The study evaluated the potential environmental impacts associated with constructing and operating a new facility or using an existing facility, disposal methods, and locations. DOE is awaiting Congressional action on the report and its recommendations. At this time, the federal government has not identified a specific cost for disposing of GTCC or a schedule for acceptance.

For purposes of this analysis, the GTCC radioactive waste is assumed to be packaged and disposed of in a similar manner as high-level waste and at a cost equivalent to that envisioned for the spent fuel. The GTCC is packaged in the same canisters used for spent fuel and either stored on site or shipped directly to a DOE facility as it is generated (depending upon the timing of the decommissioning and whether the spent fuel has been removed from the site prior to the start of decommissioning).

A significant portion of the metallic waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be surveyed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to isolate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates reflect the savings from waste recovery/volume reduction.

1.3.3 Radiological Criteria for License Termination

In 1997, the NRC published Subpart E, "Radiological Criteria for License Termination," [22] amending 10 CFR §20. This subpart provides radiological criteria for releasing a facility for unrestricted use. The regulation states that the site can be released for unrestricted use if radioactivity levels are such that the average member of a critical group would not receive a Total Effective Dose Equivalent (TEDE) in excess of 25 millirem per year, and provided that residual radioactivity has been reduced to levels that are As Low As Reasonably Achievable (ALARA). The decommissioning estimates assume that the Monticello site will be remediated to a residual level consistent with the NRC-prescribed level.

It should be noted that the NRC and the Environmental Protection Agency (EPA) differ on the amount of residual radioactivity considered acceptable in site remediation. The EPA has two limits that apply to radioactive materials. An EPA limit of 15 millirem per year is derived from criteria established by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund). [23] An additional and separate limit of 4 millirem per year, as defined in 40 CFR §141.66, is applied to drinking water. [24]

On October 9, 2002, the NRC signed an agreement with the EPA on the radiological decommissioning and decontamination of NRC-licensed sites. The Memorandum of Understanding (MOU) [25] provides that EPA will defer exercise of authority under CERCLA for the majority of facilities decommissioned under NRC authority. The MOU also includes provisions for NRC and EPA consultation for certain sites when, at the time of license termination, (1) groundwater contamination exceeds EPA-permitted levels; (2) NRC contemplates restricted release of the site; and/or (3) residual radioactive soil concentrations exceed levels defined in the MOU.

The MOU does not impose any new requirements on NRC licensees and should reduce the involvement of the EPA with NRC licensees who are decommissioning. Most sites are expected to meet the NRC criteria for unrestricted use, and the NRC believes that only a few sites will have groundwater or soil contamination in excess of the levels specified in the MOU that trigger consultation with the EPA. However, if there are other hazardous materials on the site, the EPA may be involved in the cleanup. As such, the possibility of dual regulation remains for certain licensees. The present study does not include any costs for this occurrence.

FIGURE 1.1
MONTICELLO NUCLEAR GENERATING PLANT
GENERAL PLAN

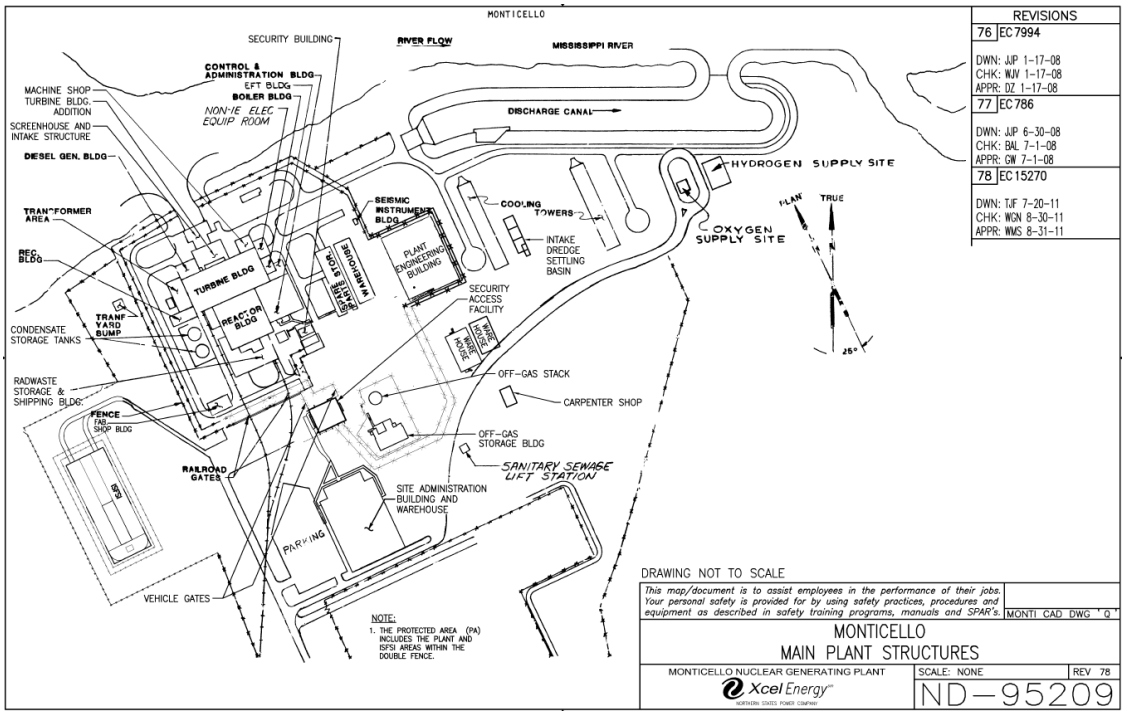
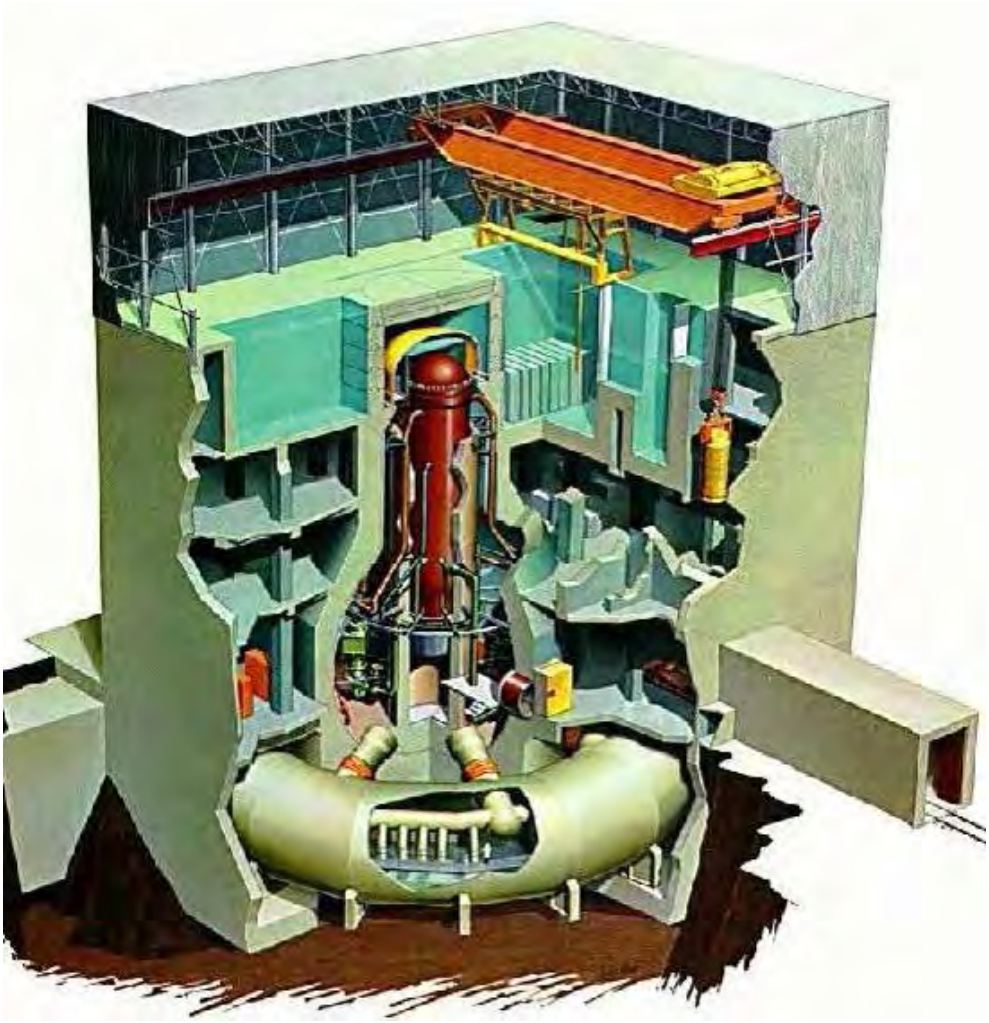


FIGURE 1.2
MONTICELLO NUCLEAR GENERATING PLANT
AERIAL VIEW

FIGURE 1.3
MONTICELLO NUCLEAR GENERATING PLANT
REACTOR BUILDING SECTION



2. DECOMMISSIONING ALTERNATIVES

Detailed cost estimates were developed to decommission Monticello based upon the approved decommissioning alternatives: DECON and SAFSTOR. Although the alternatives differ with respect to technique, process, cost, and schedule, they attain the same result: the ultimate release of the site for unrestricted use.

The following scenarios were evaluated and are intended to bound the liability associated with the removal of spent fuel from the site. The current operating license expires in 2030. The scenarios consist of four spent fuel management scenarios, each with a DECON and a SAFSTOR decommissioning scenario for eight total scenarios, The duration of the spent fuel scenarios has little impact to the decommissioning costs and timing of the power block systems and structures. The spent fuel in the plant's spent fuel storage pool is transferred to the ISFSI within the first four years. The equipment, structures, and portions of the plant containing radioactive contaminants are removed or decontaminated to a level that permits the facility to be released for unrestricted use. Non-essential structures are then demolished. Spent fuel storage operations continue at the ISFSI until the transfer of the fuel to the DOE is completed (as shown in the "Last Spent Fuel Assembly" column in the following table).

Scenario	1st Spent Fuel Canister Replacement	1st Spent Fuel Assembly Removed from Monticello	Last Spent Fuel Assembly Removed from Monticello	Scenario Identification
1	n/a	2052	2072	DECON with 42 Year DFS+
2	n/a	2078	2090	DECON with 60 Year DFS
3	2058	2118	2130	DECON with 100 Year DFS
4	2058	2218	2230	DECON with 200 Year DFS
5	n/a	2052	2072	SAFSTOR with 42 Year DFS
6	n/a	2078	2090	SAFSTOR with 60 Year DFS
7	2058	2118	2130	SAFSTOR with 100 Year DFS
8	2058	2218	2230	SAFSTOR with 200 Year DFS

* Spent fuel stored at Morris is removed after fuel stored at the Monticello site.
+ Dry Fuel Storage

For Scenarios 1 and 5, although they only provide a total fuel storage period of 42 years following shutdown, some of the Monticello casks have been in storage since 2008. Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters for those casks that exceed 50 years. The assumption to not transfer spent fuel at 50-years total storage duration for these two scenarios was premised on the likelihood that the life of the canisters could be successfully extended for the additional years.

For Scenarios 2 and 6, although they provide a total fuel storage period of nominally 60 years following shutdown, Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters at the 50-year mark.

In Scenarios 3, 4, 7 and 8, the Dry Shielded Canisters (DSCs) are assumed to be replaced after fifty years of use. Since the Reactor Building spent fuel storage pool and fuel handling facilities are removed by the year 2038, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. For Scenarios 3 and 7, two such transfer is needed over the time frame assumed. For Scenarios 4 and 8, the spent fuel will be transferred four times following initial placement in the ISFSI.

The following sections describe the basic activities associated with each alternative. Although detailed procedures for each activity identified are not provided, and the actual sequence of work may vary, the activity descriptions provide a basis not only for estimating but also for the expected scope of work (i.e., engineering and planning at the time of decommissioning).

The conceptual approach that the NRC has described in its regulations divides decommissioning into three phases. The initial phase commences with the effective date of permanent cessation of operations and involves the transition of both plant and licensee from reactor operations (i.e., power production) to facilitate de-activation and closure. During the first phase, notification is to be provided to the NRC certifying the permanent cessation of operations and the removal of fuel from the reactor vessel. The licensee would then be prohibited from reactor operation.

The second phase encompasses activities during the storage period or during major decommissioning activities, or a combination of the two. The third phase pertains to the activities involved in license termination. The decommissioning estimates developed for Monticello are also divided into phases or periods; however, demarcation of the phases is based upon major milestones within the project or significant changes in the projected expenditures.

2.1 DECON

The DECON alternative, as defined by the NRC, is "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations." This study does not address the cost to dispose of the spent fuel residing at the site; such costs are funded through a surcharge on electrical generation. However, the study does estimate the costs incurred with the interim on-site storage of the fuel pending shipment by the DOE to an off-site disposal facility. Those costs are separately presented as "Spent Fuel Management" expenditures in this report.

2.1.1 Period 1 - Preparations

In anticipation of the cessation of plant operations, detailed preparations are undertaken to provide a smooth transition from plant operations to site decommissioning. Through implementation of a staffing transition plan, the organization required to manage the intended decommissioning activities is assembled from available plant staff and outside resources. Preparations include the planning for permanent defueling of the reactor, revision of technical specifications applicable to the operating conditions and requirements, a characterization of the facility and major components, and the development of the PSDAR.

Engineering and Planning

The PSDAR, required prior to, or within two years of permanent cessation of operations, provides a description of the licensee's planned decommissioning activities, a timetable, a site-specific decommissioning cost estimate, and the associated financial requirements of the intended decommissioning program. Upon receipt of the PSDAR, the NRC will make the document available to the public for comment in a local meeting to be held in the vicinity of the reactor site. Ninety days following submittal and NRC receipt of the PSDAR, the licensee may begin to perform major decommissioning activities under a modified 10 CFR §50.59 procedure, (10 CFR §50.59 establishes the conditions under which licensees may make changes to the facility or procedures and conduct test or experiments, i.e., without prior NRC approval). Major activities are defined as any activity that results in permanent removal of major radioactive components, permanently modifies the structure of the containment, or results in dismantling components (for shipment)

containing GTCC, as defined by 10 CFR §61. Major components are further defined as comprising the reactor vessel and internals, large bore reactor recirculation system piping, and other large components that are radioactive. The NRC includes the following additional criteria for use of the §50.59 process in decommissioning. The proposed activity must not:

- foreclose release of the site for possible unrestricted use,
- significantly increase decommissioning costs,
- cause any significant environmental impact not previously reviewed, or
- result in there no longer being reasonable assurance that adequate funds will be available for decommissioning

Existing operational technical specifications are reviewed and modified to reflect plant conditions and the safety concerns associated with permanent cessation of operations. The environmental impact associated with the planned decommissioning activities is also considered. Typically, a licensee will not be allowed to proceed if the consequences of a particular decommissioning activity are greater than that bounded by previously evaluated environmental assessments or impact statements. In this instance, the licensee would have to submit a license amendment for the specific activity and update the environmental report.

The decommissioning program outlined in the PSDAR will be designed to accomplish the required tasks within the ALARA guidelines (as defined in 10 CFR §20) for protection of personnel from exposure to radiation hazards. It will also address the continued protection of the health and safety of the public and the environment during the dismantling activity. Consequently, with the development of the PSDAR, activity specifications, cost-benefit and safety analyses, and work packages and procedures, would be assembled to support the proposed decontamination and dismantling activities.

Site Preparations

Following final plant shutdown, and in preparation for actual decommissioning activities, the following activities are initiated:

- Characterization of the site and surrounding environs. This includes radiation surveys of work areas, major components (including the

reactor vessel and its internals), internal piping, and primary shield cores.

- An ISFSI has been constructed to support continued plant operation and will need to be expanded following the cessation of operations to offload the spent fuel pool in support of the decommissioning program.
- Isolation of the spent fuel storage pool and fuel handling systems, such that decommissioning operations can commence on the balance of the plant. Decommissioning operations are scheduled around the fuel handling area to optimize the overall project schedule. It is assumed that the fuel pool remains operational for the transfer of fuel for approximately four years following the cessation of operations.
- Specification of transport and disposal requirements for activated materials and/or hazardous materials, including shielding and waste stabilization.
- Development of procedures for occupational exposure control, control and release of liquid and gaseous effluent, processing of radwaste (including dry-active waste, resins, filter media, metallic and non-metallic components generated in decommissioning), site security and emergency programs, and industrial safety.
- Perform chemical decontamination of the NSSS to reduce radiation levels in support of removal operations.

2.1.2 Period 2 - Decommissioning Operations

This period includes the physical decommissioning activities associated with the removal and disposal of contaminated and activated components and structures, including the successful amendment of the 10 CFR §50 operating license (releasing the site, exclusive of the ISFSI). Significant decommissioning activities in this phase include:

- Construction of temporary facilities and/or modification of existing facilities to support dismantling activities. This may include a centralized processing area to facilitate equipment removal and component preparations for off-site disposal.
- Reconfiguration and modification of site structures and facilities as needed to support decommissioning operations. This may include the upgrading of roads (on- and off-site) to facilitate hauling and transport. Modifications may be required to the containment

structure to facilitate access of large/heavy equipment. Modifications may also be required to the refueling area of the reactor building to support the segmentation of the reactor vessel internals and component extraction.

- Transfer of the spent fuel from the spent fuel storage pool to the ISFSI pad for interim storage.
- Design and fabrication of temporary and permanent shielding to support removal and transportation activities, construction of contamination control envelopes, and the procurement of specialty tooling.
- Procurement (lease or purchase) of shipping canisters, cask liners, and industrial packages.
- Decontamination of components and piping systems as required to control (minimize) worker exposure.
- Removal of piping and components no longer essential to support decommissioning operations.
- Transfer of the steam separator and dryer assemblies to the dryer-separator pool for segmentation. Segmentation by weight and activity maximizes the loading of the shielded transport casks. The operations are conducted under water using remotely operated tooling and contamination controls.
- Disconnection of the control blades from the drives on the vessel lower head. Blades are transferred to the spent fuel pool for packaging.
- Disassembly, segmentation, and packaging of the core shroud and in-core guide tubes. Some of the material is expected to exceed Class C disposal requirements. As such, those segments are packaged in modified fuel storage canisters for geologic disposal.
- Removal and segmentation of the remaining internals including the jet pump assemblies, fuel support castings, and core plate assembly.
- Removal of spent fuel storage racks from spent fuel pool, and cleanup of spent fuel pool.
- Draining and decontamination of the reactor well and the permanent sealing of the spent fuel transfer gate. Installation of a shielded platform for segmentation of the reactor vessel. Cutting operations are performed in air using remotely operated equipment within a contamination control envelope, with the water level maintained just below the cut to minimize the working area dose rates. Sections are

transferred to the dryer-separator pool for packaging and interim storage.

- Disconnection of the control rod drives and instrumentation tubes from the reactor vessel lower head. The lower reactor head and vessel supporting structure are then segmented.
- Removal of the reactor recirculation pumps. Exterior surfaces are decontaminated and openings covered. Components can serve as their own burial containers provided that all penetrations are properly sealed.
- Demolition of the sacrificial shield wall activated concrete by controlled demolition.
- Expansion of the ISFSI and transfer of the spent fuel from the storage pool to the ISFSI pad for interim storage. Spent fuel storage operations continue throughout the active decommissioning period. Fuel transfer to DOE is expected to be completed by the end of the year 2072 (Scenario 1).

At least two years prior to the anticipated date of license termination, an LTP is required. Submitted as a supplement to the Final Safety Analysis Report (FSAR) or its equivalent, the plan must include: a site characterization, description of the remaining dismantling activities, plans for site remediation, procedures for the final radiation survey, designation of the end use of the site, an updated cost estimate to complete the decommissioning, and any associated environmental concerns. The NRC will notice the receipt of the plan, make the plan available for public comment, and schedule a local meeting. LTP approval will be subject to any conditions and limitations as deemed appropriate by the Commission. The licensee may then commence with the final remediation of site facilities and services, including:

- Removal of remaining plant systems and associated components as they become nonessential to the decommissioning program or worker health and safety (e.g., waste collection and treatment systems, electrical power and ventilation systems).
- Removal of the steel liners from the drywell, disposing of the activated and contaminated sections as radioactive waste. Removal of any activated/contaminated concrete.
- Removal of the steel liners from the dryer/separator pool, reactor well, and spent fuel storage pool.
- Surveys of the decontaminated areas of the containment structure.

- Removal of the contaminated equipment and material from the turbine and radwaste buildings, and any other contaminated facility. Use radiation and contamination control techniques until radiation surveys indicate that the structures can be released for unrestricted access and conventional demolition. This activity may necessitate the dismantling and disposition of most of the systems and components (both clean and contaminated) located within these buildings. This activity will facilitate surface decontamination and subsequent verification surveys required prior to obtaining release for demolition.
- Removal of the remaining components, equipment, and plant services in support of the area release survey(s).
- Routing of material removed in the decontamination and dismantling to a central processing area. Material certified to be free of contamination is released for unrestricted disposition, e.g., as scrap, recycle, or general disposal. Contaminated material is characterized and segregated for additional off-site processing (disassembly, chemical cleaning, volume reduction, and waste treatment), and/or packaged for controlled disposal at a low-level radioactive waste disposal facility.

Incorporated into the LTP is the Final Survey Plan. This plan identifies the radiological surveys to be performed once the decontamination activities are completed and is developed using the guidance provided in the "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)."[26] This document incorporates the statistical approaches to survey design and data interpretation used by the EPA. It also identifies commercially available instrumentation and procedures for conducting radiological surveys. Use of this guidance ensures that the surveys are conducted in a manner that provides a high degree of confidence that applicable NRC criteria are satisfied. Once the survey is complete, the results are provided to the NRC in a format that can be verified. The NRC then reviews and evaluates the information, performs an independent confirmation of radiological site conditions, and makes a determination on the requested change to the operating license (that would release the property, exclusive of the ISFSI, for unrestricted use).

The NRC will amend the operating license to reduce the licensed area to the ISFSI area if it determines that site remediation has been performed in accordance with the LTP, and that the terminal radiation survey and associated documentation demonstrate that the property (exclusive of the ISFSI) is suitable for release.

2.1.3 Period 3 - Site Restoration

Following completion of decommissioning operations, site restoration activities will begin. Efficient removal of the contaminated materials and verification that residual radionuclide concentrations are below the NRC limits will result in substantial damage to many of the structures. Although performed in a controlled and safe manner, blasting, coring, drilling, scarification (surface removal), and the other decontamination activities will substantially degrade power block structures including the reactor, turbine and radwaste buildings. Under certain circumstances, verifying that subsurface radionuclide concentrations meet NRC site release requirements will require removal of grade slabs and lower floors, potentially weakening footings and structural supports. This removal activity will be necessary for those facilities and plant areas where historical records, when available, indicate the potential for radionuclides having been present in the soil, where system failures have been recorded, or where it is required to confirm that subsurface process and drain lines were not breached over the operating life of the station.

Dismantling of site structures following decommissioning is clearly the most appropriate and cost-effective option. It is unreasonable to anticipate that these structures would be repaired and preserved after the radiological contamination is removed. The effort to dismantle site structures with a work force already mobilized on site is more efficient than if the process were deferred. Site facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public as well as to future workers. Abandonment creates a breeding ground for vermin infestation as well as other biological hazards.

This cost study presumes that non-essential structures and site facilities are dismantled as a continuation of the decommissioning activity. Foundations and exterior walls are completely removed, including foundations and basemats, as required by Minnesota regulations. [27] Site areas affected by the dismantling activities are restored and the plant area graded as required to prevent ponding, establish erosion control by the planting of native vegetation, and inhibit the refloating of subsurface materials.

Non-contaminated concrete rubble produced by demolition activities is processed to remove reinforcing steel and miscellaneous embedments. All non-contaminated materials are trucked to an off-site area for

disposal as construction debris. Subgrade voids are backfilled with clean construction fill, suitable under Minnesota regulations.

2.1.4 ISFSI Operations and Decommissioning

The ISFSI will continue to operate under a general license (10 CFR §50) following the amendment of the operating license to release the adjacent (power block) property. Assuming that Monticello spent fuel shipments begin in 2052, the process is not expected to be completed until 2072 (Scenario 1). Any delay in the transfer process, for example, due to a delay in the scheduled opening of the geologic repository, a slower acceptance rate, or a combination of both, can result in a longer on-site residence time for the fuel discharge from the reactor, as well as additional caretaking expenses. Scenarios 3 and 4 address extended delay periods, which includes the assumption that the spent fuel DSCs will need to be replaced every fifty years.

The assumed design for the ISFSI is based upon the use of a multi-purpose dry shielded storage canister and a NUHOMS horizontal storage module for pad storage.

At the conclusion of the spent fuel transfer process, the ISFSI will be decommissioned. The Commission will terminate the license if it determines that the remediation of the ISFSI has been performed in accordance with an ISFSI license termination plan and that the final radiation survey and associated documentation demonstrate that the facility is suitable for release. Once the requirements are satisfied, the NRC can terminate the license for the ISFSI.

For purposes of this cost analysis, it is assumed that once the DSCs containing the spent fuel assemblies have been removed, any required decontamination is performed on the storage overpacks (some minor neutron-induced activation is assumed), and the license for the facility terminated, the concrete overpacks can be dismantled using conventional techniques for the demolition of reinforced concrete. The concrete storage pad is then removed and the area regraded. This topic is discussed in greater detail in section 3.4.1.

2.2 SAFSTOR

The NRC defines SAFSTOR as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to

levels that permit release for unrestricted use." The facility is left intact (during the dormancy period), with structures maintained in a sound condition. Systems not required to operate in support of the spent fuel pool or site surveillance and security are drained, de-energized, and secured. Minimal cleaning/removal of loose contamination and/or fixation and sealing of remaining contamination are performed. Access to contaminated areas is secured to provide controlled access for inspection and maintenance.

The engineering and planning requirements are similar to those for the DECON alternative. Site preparations are also similar to those for the DECON alternative. However, with the exception of the required radiation surveys and site characterizations, the mobilization and preparation of site facilities is less extensive.

2.2.1 Period 1 - Preparations

Preparations for long-term storage include the planning for permanent defueling of the reactor, revision of technical specifications appropriate to the operating conditions and requirements, a characterization of the facility and major components, and the development of the PSDAR.

The process of placing the plant in safe-storage includes, but is not limited to, the following activities:

- Isolation of the spent fuel storage services and fuel handling systems located in the reactor building so that safe-storage operations may commence on the balance of the plant. This activity may be carried out by plant personnel in accordance with existing operating technical specifications. Activities are scheduled around the fuel handling systems to the greatest extent possible.
- Draining and de-energizing of the non-contaminated systems not required to support continued site operations or maintenance.
- Disposing of contaminated filter elements and resin beds not required for processing wastes from layup activities for future operations.
- Draining of the reactor vessel, with the internals left in place and the vessel head secured.
- Draining and de-energizing non-essential, contaminated systems with decontamination as required for future maintenance and inspection.

- Preparing lighting and alarm systems whose continued use is required; de-energizing portions of fire protection, electric power, and HVAC systems whose continued use is not required.
- Cleaning of the loose surface contamination from building access pathways.
- Performing an interim radiation survey of plant, posting warning signs where appropriate.
- Erecting physical barriers and/or securing all access to radioactive or contaminated areas, except as required for inspection and maintenance.
- Installing security and surveillance monitoring equipment and relocating security fence around secured structures, as required.

2.2.2 Period 2 - Dormancy

The second phase identified by the NRC in its rule addresses licensed activities during a storage period and is applicable to the dormancy phases of the deferred decommissioning alternatives. Dormancy activities include a 24-hour security force, preventive and corrective maintenance on security systems, area lighting, general building maintenance, heating and ventilation of buildings, routine radiological inspections of contaminated structures, maintenance of structural integrity, and a site environmental and radiation monitoring program. Resident maintenance personnel perform equipment maintenance, inspection activities, routine services to maintain safe conditions, adequate lighting, heating, and ventilation, and periodic preventive maintenance on essential site services.

An environmental surveillance program is carried out during the dormancy period to ensure that releases of radioactive material to the environment are prevented and/or detected and controlled. Appropriate emergency procedures are established and initiated for potential releases that exceed prescribed limits. The environmental surveillance program constitutes an abbreviated version of the program in effect during normal plant operations.

Security during the dormancy period is conducted primarily to protect the spent nuclear fuel while it is on site, prevent unauthorized entry, and to protect the public from the consequences of their own actions. The security fence, sensors, alarms, and other surveillance equipment provide security. Fire and radiation alarms are also monitored and

maintained. While remote surveillance is an option, it does not offer the immediate response time of a physical presence.

The length of the dormancy period is such that decommissioning (license termination) of the station (excluding the ISFSI) is accomplished within 60 years of final shutdown. During Scenario 5, the transfer of the spent fuel to a DOE facility continues during this period until complete. The Scenario 6 SAFSTOR has the site remain in dormancy following spent fuel removal to the maximum extent possible, such that the licenses are terminated within the required 60-year time period. Scenarios 7 and 8 address extended delay periods, which include the assumption that the spent fuel DSCs will need to be replaced every fifty years.

It is required that the licensee submit an application to terminate each license, along with a LTP (described in Section 2.1.2), thereby initiating delayed decommissioning.

2.2.3 Periods 3 and 4 - Delayed Decommissioning

With the beginning of the third phase, prior to the commencement of decommissioning operations, preparations are undertaken to reactivate site services and prepare for decommissioning. Preparations include engineering and planning, a detailed site characterization, and the assembly of a decommissioning management organization. Final planning for activities and the writing of activity specifications and detailed procedures are also initiated at this time.

Much of the work in developing a termination plan is relevant to the development of the detailed engineering plans and procedures. The activities associated with this phase and the follow-on decontamination and dismantling processes are detailed in Sections 2.1.1 and 2.1.2. The primary difference between the sequences anticipated for the DECON and SAFSTOR scenarios is the absence, in the latter, of any constraint on the availability of the fuel storage pool located within the reactor building for decommissioning.

Variations in the length of the dormancy period are expected to have some effect upon the quantities of radioactive wastes generated from system and structure removal operations. However, given the levels of radioactivity and spectrum of radionuclides expected from approximately sixty years of plant operation, no plant process system identified as being contaminated upon final shutdown will become releasable due to the decay period alone. (i.e., there is no significant

reduction in the waste generated from the decommissioning activities). Due to the lower activity levels, a greater percentage of the waste volume can be designated for off-site processing and recovery.

The delay in decommissioning also yields lower working area radiation levels. As such, the estimate for the delayed scenarios incorporate reduced ALARA controls for the SAFSTOR's lower occupational exposure potential.

Although the initial radiation levels due to ^{60}Co will substantially decrease during the dormancy period, the internal components of the reactor vessel will still exhibit sufficiently high radiation dose rates to require remote sectioning under water due to the presence of long-lived radionuclides such as ^{94}Nb, ^{59}Ni, and ^{63}Ni. Therefore, the dismantling procedures described for the DECON alternative would still be employed during this scenario. Portions of the sacrificial shield wall will still be radioactive due to the presence of activated trace elements with long half-lives (^{152}Eu and ^{154}Eu). Decontamination will require controlled removal and disposal. It is assumed that radioactive corrosion products on inner surfaces of piping and components will not have decayed to levels that will permit unrestricted use or allow conventional removal. These systems and components will be surveyed as they are removed and disposed of in accordance with the existing radioactive release criteria.

2.2.4 Period 5 - Site Restoration

Following completion of decommissioning operations, site-restoration activities can begin. Dismantling, as a continuation of the decommissioning process, is a cost-effective option, as described in Section 2.1.3. The basis for the dismantling cost in this scenario is consistent with that described for DECON, presuming the removal of structures and site facilities to include the existing foundations and basemats, and the limited restoration of the site.

2.2.5 ISFSI Operations and Decommissioning

For Scenarios 7 and 8, the ISFSI will continue to operate under a general license as authorized by 10 CFR Part 72 following the amendment of the operating license to release the adjacent (power block) property. Assuming that Monticello spent fuel shipments begin in 2118, the process is not expected to be completed until 2130 (Scenario 7). Assuming that Monticello spent fuel shipments begin in 2218, the

process is not expected to be completed until 2230 (Scenario 8). Any delay in the transfer process, for example, due to a delay in the scheduled opening of the geologic repository, a slower acceptance rate, or a combination of both, can result in a longer on-site residence time for the fuel, as well as additional caretaking expenses. ISFSI operations will include the assumption that the spent fuel DSCs will need to be replaced every fifty years.

Operations and decommissioning activities for Scenarios 7 and 8 during a SAFSTOR scenario proceed in a similar fashion to the Scenario 3 and 4 following DECON, as discussed in Section 2.1.4.

3. COST ESTIMATES

The cost estimates prepared for decommissioning Monticello consider the unique features of the site, including the NSSS, power generation systems, support services, site buildings, and ancillary facilities. The basis of the estimates, including the sources of information relied upon, the estimating methodology employed, site-specific considerations, and other pertinent assumptions, is described in this section.

3.1 BASIS OF ESTIMATES

The estimates were developed using the site-specific, technical information from the 2017 analysis. The plant inventory, the basis for the decontamination and dismantling requirements and cost, and the decommissioning waste streams, was reviewed for this analysis; no substantive changes were identified over the three-year period (between estimate) to the configuration of the plant or site facilities that would impact decommissioning. The site-specific considerations and assumptions used in the previous evaluation were also revisited; no necessary modifications were identified.

3.2 METHODOLOGY

The methodology used to develop the estimates follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates,"[28] and the DOE "Decommissioning Handbook."[29] These documents present a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/inch) were developed using local labor rates. The activity-dependent costs were estimated with the item quantities (cubic yards and tons), developed from plant drawings and inventory documents. Removal rates and material costs for the conventional disposition of components and structures relied upon information available in the industry publication, "Building Construction Cost Data," published by RSMeans. [30]

The unit factor method provides a demonstrable basis for establishing reliable cost estimates. The detail provided in the unit factors, including activity duration, labor costs (by craft), and equipment and consumable costs, ensures that essential elements have not been omitted. Appendix A presents the detailed development of a typical unit factor. Appendix B provides the values contained within one set of factors developed for this analysis.

Regulatory Guide 1.184 [31] describes the methods and procedures that are acceptable to the NRC staff for implementing the requirements that relate to the initial activities and the major phases of the decommissioning process. The costs and schedules presented in this analysis follow the general guidance and sequence in the regulations. The format and content of the estimates is also consistent with the recommendations of Regulatory Guide 1.202. [32]

This analysis reflects lessons learned from TLG's involvement in the Shippingport Station Decommissioning Project, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells, and associated facilities, completed in 1997. In addition, the planning and engineering for the Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Oyster Creek, Connecticut Yankee, Crystal River, Vermont Yankee, Fort Calhoun, Pilgrim, and Indian Point nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Work Difficulty Factors

The estimates follow the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

Work difficulty adjustment factors (WDFs) account for the inefficiencies in working in a power plant environment. The factors are assigned to each unique set of unit cost factors, commensurate with the inefficiencies associated with working in confined, hazardous environments. The ranges used for the WDFs are as follows:

- Access Factor 10% to 20%
- Respiratory Protection Factor 10% to 50%
- Radiation/ALARA Factor 10% to 40%
- Protective Clothing Factor 10% to 30%
- Work Break Factor 8.33%

The factors and their associated range of values were developed in conjunction with the AIF/NESP-036 study. The application of the factors is discussed in more detail in that publication.

Scheduling Program Durations

The unit factors, adjusted by the WDFs as described above, are applied against the inventory of materials to be removed in the radiologically controlled areas. The resulting man-hours, or crew-hours, are used in the development of the decommissioning program schedule, using resource loading and event sequencing considerations. The scheduling of conventional removal and dismantling activities are based upon productivity information available from the RSMeans "Building Construction Cost Data" publication. Dismantling of the fuel handing systems and decontamination of the spent fuel pool is also dependent upon the timetable for the transfer of the spent fuel assemblies from the pool to the ISFSI.

The program schedule is used to determine the period-dependent costs for program management, administration, field engineering, equipment rental, contracted services, etc. The study relies upon regional or site-specific salary and wage rates for the personnel associated with the intended program.

3.3 FINANCIAL COMPONENTS OF THE COST MODEL

TLG's proprietary decommissioning cost model, DECCER, produces a number of distinct cost elements. These direct expenditures, however, do not comprise the total cost to accomplish the project goal, i.e., license termination and site restoration.

3.3.1 Contingency

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In the DECCER cost model, contingency fulfills this role. Contingency is added to each line item to account for costs that are difficult or impossible to develop analytically. Such costs are historically inevitable over the duration of a job of this magnitude; therefore, this cost analysis includes funds to cover these types of expenses.

The activity- and period-dependent costs are combined to develop the total decommissioning cost. A contingency is then applied on a line-item basis, using one or more of the contingency types listed in the

AIF/NESP-036 study. "Contingencies" are defined in the American Association of Cost Engineers "Project and Cost Engineers' Handbook"[33] as "specific provision for unforeseeable elements of cost within the defined project scope; particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur." The cost elements in this analysis are based upon ideal conditions and maximum efficiency; therefore, consistent with industry practice, a contingency factor has been applied. In the AIF/NESP-036 study, the types of unforeseeable events that are likely to occur in decommissioning are discussed and guidelines are provided for percentage contingency in each category. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station.

The use and role of contingency within decommissioning estimates is not a "safety factor issue." Safety factors provide additional security and address situations that may never occur. Contingency funds are expected to be fully expended throughout the program. They also provide assurance that sufficient funding is available to accomplish the intended tasks. An estimate without contingency, or from which contingency has been removed, can disrupt the orderly progression of events and jeopardize a successful conclusion to the decommissioning process.

For example, the most technologically challenging task in decommissioning a commercial nuclear plant is the disposition of the reactor vessel and internal components, now highly radioactive after a lifetime of exposure to core activity. The disposition of these components forms the basis of the critical path (schedule) for decommissioning operations. Cost and schedule are interdependent, and any deviation in schedule has a significant impact on cost for performing a specific activity.

Disposition of the reactor vessel internals involves the underwater cutting of complex components that are highly radioactive. Costs are based upon optimum segmentation, handling, and packaging scenarios. The schedule is primarily dependent upon the turnaround time for the heavily shielded shipping casks, including preparation, loading, and decontamination of the containers for transport. The number of casks required is a function of the pieces generated in the segmentation activity, a value calculated on optimum performance of the tooling employed in cutting the various subassemblies. The expected

optimization, however, may not be achieved, resulting in delays and additional program costs. For this reason, contingency must be included to mitigate the consequences of the expected inefficiencies inherent in this complex activity, along with related concerns associated with the operation of highly specialized tooling, field conditions, and water clarity.

Contingency funds are an integral part of the total cost to complete the decommissioning process. Exclusion of this component puts at risk a successful completion of the intended tasks and, potentially, subsequent related activities. For this study, TLG examined the major activity-related problems (decontamination, segmentation, equipment handling, packaging, transport, and waste disposal) that necessitate a contingency. Individual activity contingencies ranged from 10% to 75%, depending on the degree of difficulty judged to be appropriate from TLG's actual decommissioning experience. The contingency values used in this study are as follows:

Decontamination	50%
Contaminated Component Removal	25%
Contaminated Component Packaging	10%
Contaminated Component Transport	15%
Low-Level Radioactive Waste Disposal	25%
Low-Level Radioactive Waste Processing	15%
Reactor Segmentation	75%
NSSS Component Removal	25%
Reactor Waste Packaging	25%
Reactor Waste Transport	25%
Reactor Vessel Component Disposal	50%
GTCC Disposal	15%
Staffing	15%
Spent Fuel Management	15%
Non-Radioactive Component Removal	15%
Heavy Equipment and Tooling	15%
Supplies	25%
Engineering	15%
Energy	15%
Insurance and Fees	10%

Characterization and Termination Surveys	30%
Operations and Maintenance Expense	15%
Construction	15%
Property Taxes	10%
ISFSI Decommissioning	25%

The contingency values are applied to the appropriate components of the estimates on a line item basis. A composite value is then reported at the end of each detailed estimate (as provided in Appendices C through J). Appendix K, the ISFSI decommissioning calculation, uses a flat 25% contingency added at the end of the calculation.

3.3.2 Financial Risk

In addition to the routine uncertainties addressed by contingency, another cost element that is sometimes necessary to consider when bounding decommissioning costs relates to uncertainty, or risk. Examples can include changes in work scope, pricing, job performance, and other variations that could conceivably, but not necessarily, occur. Consideration is sometimes necessary to generate a level of confidence in the estimate, within a range of probabilities. TLG considers these types of costs under the broad term "financial risk." Included within the category of financial risk are:

- Transition activities and costs: ancillary expenses associated with eliminating 50% to 80% of the site labor force shortly after the cessation of plant operations, added cost for worker separation packages throughout the decommissioning program, national or company-mandated retraining, and retention incentives for key personnel.
- Delays in approval of the decommissioning plan due to intervention, public participation in local community meetings, legal challenges, and national and local hearings.
- Changes in the project work scope from the baseline estimate, involving the discovery of unexpected levels of contaminants, contamination in places not previously expected, contaminated soil previously undiscovered (either radioactive or hazardous material contamination), variations in plant inventory or configuration not indicated by the as-built drawings.
- Regulatory changes (e.g., affecting worker health and safety, site release criteria, waste transportation, and disposal).

- Policy decisions altering national commitments (e.g., in the ability to accommodate certain waste forms for disposition) or in the timetable for such, for example, the start and rate of acceptance of spent fuel by the DOE.
- Pricing changes for basic inputs such as labor, energy, materials, and disposal. Items subject to widespread price competition (such as materials) may not show significant variation; however, others such as waste disposal could exhibit large pricing uncertainties, particularly in markets where limited access to services is available.

This cost study does not add any additional costs to the estimate for financial risk, since there is insufficient historical data from which to project future liabilities. Consequently, the areas of uncertainty or risk are revisited periodically and addressed through repeated revisions or updates of the base estimates.

3.4 SITE-SPECIFIC CONSIDERATIONS

There are a number of site-specific considerations that affect the method for dismantling and removal of equipment from the site and the degree of restoration required. The cost impacts of the considerations identified below are included in this cost study.

3.4.1 Spent Fuel Management

The cost to dispose of spent fuel generated from plant operations is not reflected within the estimates to decommission Monticello. Ultimate disposition of the spent fuel is within the province of the DOE's Waste Management System, as defined by the Nuclear Waste Policy Act. As such, the disposal cost was financed by a 1 mill/kWhr surcharge paid into the DOE's waste fund during operations. On November 19, 2013, the U.S. Court of Appeals for the D.C. Circuit ordered the Secretary of the Department of Energy to suspend collecting annual fees for nuclear waste disposal from nuclear power plant operators until the DOE has conducted a legally adequate fee assessment.

The NRC does, however, require licensees to establish a program to manage and provide funding for the management of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy. This requirement is prepared for through inclusion of certain high-level waste cost elements within the estimates, as described below.

Xcel Energy's current spent fuel management plan for the Monticello spent fuel is based in general upon:

1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
3) Fuel will be shipped in the existing NUHOMS DSCs (Scenarios 1, 2, 5, and 6); the NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility.
6) Currently Monticello is storing spent fuel assemblies at the Morris Operation facility of GE Hitachi Nuclear Energy in Morris, Illinois. These assemblies will be shipped for final disposal to DOE prior to the removal of fuel from the Monticello site.

This analysis assumes that the existing ISFSI is modified at the cessation of plant operations to accommodate the fuel present in the storage pool at shutdown.

The DOE's repository program assumes that spent fuel will be accepted for disposal from the nation's commercial nuclear plants in the order (the "queue") in which it was removed from service ("oldest fuel first").[34] Repository operations were based upon annual industry-wide receipt of 400 Metric Tons Heavy Metal (MTHM) in the first year of operation, a total of 3,800 MTHM in years 2 through 4 and 3,000 MTHM for year 5 and beyond.[35] This logic supports the spent fuel schedules for Scenarios 1 and 5. All other spent fuel scenarios are consistent with those identified by the Minnesota PSC.

Operation and maintenance costs for the spent fuel pool and ISFSI are included within the estimates and address the costs for staffing the facility, as well as security, insurance, and licensing fees. The estimates also include the costs to purchase, load, and transfer the NUHOMs

DSCs from the pool to the ISFSI. Costs are also provided for the final disposition of the ISFSI once the transfer of the DSCs from the ISFSI to the DOE is complete.

Storage Canister Design

The design and capacity of the ISFSI is based upon the Transnuclear NUHOMS system (with a 61-fuel assembly capacity). The system consists of a multi-purpose (storage and transport) dry shielded storage canister (DSC) and a horizontal storage module (HSM). The existing DSCs and HSMs will remain in the ISFSI until either shipment to the DOE, or until recasked.

Canister Loading and Transfer

The estimates include an average cost of $626,000 for the labor to load/transport the spent fuel from the pool to the ISFSI pad. For estimating purposes an allowance of $361,000 is used for the cost to transfer each fuel canister from the ISFSI pad to the DOE transport vehicle.

Operations and Maintenance

An annual cost (excluding labor) of approximately $845,000 and $112,000 are used for operation and maintenance of the spent fuel pool and the ISFSI, respectively.

At shutdown, the spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles). Over the next four years the assemblies are packaged into DSCs for transfer to the ISFSI for transfer to the DOE. It is assumed that the four years provides the necessary cooling period for the final core to meet the decay heat requirements for dry storage. Once the pool is emptied, the spent fuel storage and handling facilities are available for decommissioning.

Replacement of DSCs during ISFSI fuel storage period

Scenarios 1, 2, 5, and 6 do not assume any replacement of the spent fuel storage DSCs (recasking).

The other four cost estimates, Scenarios 3, 4, 7 and 8, include costs to recask the spent fuel, based upon an assumption that the DSC has a limited lifetime of approximately 50 years.

Scenarios 3 and 7, which are 100 years (nominally) in length, considers two repackaging efforts for each DSC in the ISFSI.

Scenario 4 and 8, which are a (nominal) 200-year scenario, assumes that when any DSC in the ISFSI reaches the 50 years of storage milestone, the DSC is replaced. The fuel will be recasked four times following final shutdown of Monticello.

Since the reactor building, spent fuel storage pool, and fuel handling facilities are removed by the year 2038, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. Scenarios 3, 4, 7 and 8 include the cost to construct such a transfer facility, as well as additional staffing positions for support of the dry transfer activities, and additional NRC oversight associated with the transfer operations. The decommissioning of this transfer facility is also included in these scenarios.

ISFSI Decommissioning

In accordance with 10 CFR §72.30, licensees must have a proposed decommissioning plan for the ISFSI site and facilities that includes a cost estimate for the plan. The plan should contain sufficient information on the proposed practices and procedures for the decontamination of the ISFSI and for the disposal of residual radioactive materials after all spent fuel, high-level radioactive waste, and reactor-related GTCC waste have been removed.

The NUHOMS multi-purpose dry shielded storage canister with a horizontal, reinforced concrete storage module is used as a basis for the ISFSI decommissioning cost analyses. The modules are assumed to have some level of neutron-induced activation, as a result of the long-term storage of the fuel, i.e., to levels exceeding free-release limits. As an allowance, 8 modules are assumed to require remediation, equivalent to the number of modules required to accommodate the final core offload at Monticello (484 assemblies). The cost of the disposition of this material, as well as the demolition of the ISFSI facility, is included in the estimates.

In accordance with the specific requirements of 10 CFR §72.30 for the ISFSI work scope, the cost estimate for decommissioning the ISFSI reflects: 1) the cost of an independent contractor performing the decommissioning activities; 2) an adequate contingency factor; and 3) the cost of meeting the criteria for unrestricted use. The cost summary

for decommissioning the ISFSI is presented in Appendix K. It contains four different scenarios reflecting the different number of casks present at the end of the ISFSI operations. The demolition of the ISFSI for all eight scenarios is reflected within the estimates.

GTCC

The dismantling of the reactor internals is expected to generate radioactive waste considered unsuitable for shallow land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste. [36]

Although the material is not classified as high-level waste, federal regulations under the Act designate that disposal of this material is a federal responsibility under Section 3(b)(1)(D). However, the DOE has not been forthcoming with an acceptance criteria or disposition schedule for this material, and numerous questions remain as to the ultimate disposal cost and waste form requirements.

As such, for purposes of this study, the GTCC has been packaged and disposed of in the same manner as high-level waste, at a cost equivalent to that envisioned for the spent fuel. The number of DSCs required and the packaged volume for GTCC was based upon experience at Maine Yankee (e.g., the constraints on loading as identified in the canister's certificate of compliance), but adjusted for the increased spent fuel capacity of the current DSCs.

It is assumed that the DOE would not accept this waste prior to completing the transfer of spent fuel. Therefore, until such time the DOE is ready to accept GTCC waste, it is reasonable to assume that this material would remain in storage at Monticello (for the four DECON scenarios (1 through 4) and the SAFSTOR scenarios 7 and 8. alternatives). In SAFSTOR scenarios 5 and 6, the GTCC material is shipped directly to a DOE facility as it is generated since the fuel will have been removed from the site prior to the completion of delayed dismantling. GTCC costs have been segregated and included within the "License Termination" expenditures.

3.4.2 Reactor Vessel and Internal Components

In the DECON scenarios, the reactor coolant system components are assumed to be decontaminated using chemical agents prior to the start of cutting operations. This type of decontamination can be expected to have a significant ALARA impact in the DECON scenarios, since the removal work is done within the first few years of shutdown. A decontamination factor (average reduction) of 10 is assumed for the process. Disposal of the decontamination solution effluent is included within the estimate as a "process liquid waste" charge. The SAFSTOR scenarios do not include any decontamination of the reactor system; radioactive decay from the delay period in the dormancy results in similar results.

The reactor pressure vessel and internal components are segmented for disposal in shielded, reusable transportation casks. Segmentation is performed underwater in the dryer-separator pool, where a turntable and remote cutter are installed. The vessel is segmented in place, using a mast-mounted cutter supported off the lower head and directed from a shielded work platform installed overhead in the reactor well. Transportation cask specifications and transportation regulations dictate the segmentation and packaging methodology.

Intact disposal of reactor vessel shells has been successfully demonstrated at several of the sites that have been decommissioned. Access to navigable waterways has allowed these large packages to be transported to the Barnwell disposal site with minimal overland travel. Intact disposal of the reactor vessel and internal components can provide savings in cost and worker exposure by eliminating the complex segmentation requirements, isolation of the GTCC material, and transport/storage of the resulting waste packages. Portland General Electric (PGE) was able to dispose of the Trojan reactor as an intact package (including the internals). However, its location on the Columbia River simplified the transportation analysis since:

- the reactor package could be secured to the transport vehicle for the entire journey, i.e., the package was not lifted during transport,
- there were no man-made or natural terrain features between the plant site and the disposal location that could produce a large drop, and

- transport speeds were very low, limited by the overland transport vehicle and the river barge.

As a member of the Northwest Compact, PGE had a site available for disposal of the package - the US Ecology facility in Washington State. The characteristics of this arid site proved favorable in demonstrating compliance with land disposal regulations.

It is not known whether this option will be available when Monticello ceases operation. Future viability of this option will depend upon the ultimate location of the disposal site, as well as the disposal site licensee's ability to accept highly radioactive packages and effectively isolate them from the environment. Additionally, with BWRs, the diameter of the reactor vessel may severely limit overland transport. Consequently, the study assumes the reactor vessel will require segmentation, as a bounding condition.

3.4.3 Primary System Components

Reactor recirculation piping is cut from the reactor vessel once the water level in the vessel (used for personnel shielding during dismantling and cutting operations in and around the vessel) is dropped below the nozzle zone. The piping is boxed and transported by shielded van. The reactor recirculation pumps and motors are lifted out intact, packaged, and transported for processing and/or disposal.

3.4.4 Main Turbine and Condenser

The main turbine will be dismantled using conventional maintenance procedures. The turbine rotors and shafts will be removed to a laydown area. The lower turbine casings will be removed from their anchors by controlled demolition. The main condensers will also be disassembled and moved to a laydown area. Material is then prepared for transportation to an off-site recycling facility where it will be surveyed and designated for either decontamination or volume reduction, or controlled disposal. Components will be packaged and readied for transport in accordance with the intended disposition.

3.4.5 Transportation Methods

Contaminated piping, components, and structural material other than the highly activated reactor vessel and internal components will qualify as LSA-I, II or III or Surface Contaminated Object, SCO-I or II, as

described in Title 49. [37] The contaminated material will be packaged in Industrial Packages (IP-1, IP-2, or IP-3, as defined in subpart 10 CFR 173.411) for transport unless demonstrated to qualify as their own shipping containers. The reactor vessel and internal components are expected to be transported in accordance with 10 CFR Part 71, as Type B. It is conceivable that the reactor, due to its limited specific activity, could qualify as LSA II or III. However, the high radiation levels on the outer surface would require that additional shielding be incorporated within the packaging so as to attenuate the dose to levels acceptable for transport.

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ^{137}Cs, ^{90}Sr, or transuranics) has been prevented from reaching levels exceeding those that permit the major reactor components to be shipped under current transportation regulations and disposal requirements.

Transport of the highly activated metal, produced in the segmentation of the reactor vessel and internal components, will be by shielded truck cask. Cask shipments may exceed 95,000 pounds, including vessel segment(s), supplementary shielding, cask tie-downs, and tractor-trailer. The maximum level of activity per shipment assumed permissible was based upon the license limits of the available shielded transport casks. The segmentation scheme for the vessel and internal segments is designed to meet these limits.

Transportation costs for Class A radioactive material requiring controlled disposal are based upon the mileage to the Energy*Solutions* facility in Clive, Utah. Transportation costs for the higher activity Class B and C radioactive material are based upon the mileage to the WCS facility in Andrews County, Texas. The transportation cost for the GTCC material is assumed to be contained within the disposal cost. Transportation costs for off-site waste processing are based upon the mileage to Oak Ridge, Tennessee. Truck transport costs were estimated using published tariffs from Tri-State Motor Transit. [38]

3.4.6 Low-Level Radioactive Waste Disposal

To the greatest extent practical, metallic material generated in the decontamination and dismantling processes is processed to reduce the total cost of controlled disposal. Material meeting the regulatory and/or site release criterion, is released as scrap, requiring no further cost

consideration. Conditioning (preparing the material to meet the waste acceptance criteria of the disposal site) and recovery of the waste stream is performed off site at a licensed processing center. Any material leaving the site is subject to a survey and release charge, at a minimum.

The mass of radioactive waste generated during the various decommissioning activities at the site is shown on a line-item basis in the detailed Appendices C through J, and summarized in Section 5. The quantified waste summaries shown in these tables are consistent with 10 CFR Part 61 classifications. Commercially available steel containers are presumed to be used for the disposal of piping, small components, and concrete. Larger components can serve as their own containers, with proper closure of all openings, access ways, and penetrations. The volumes are calculated based on the exterior package dimensions for containerized material or a specific calculation for components serving as their own waste containers.

The more highly activated reactor components will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume and weight, with surcharges added for the special handling requirements and the radiological characteristics of the payload. Packaging efficiencies are lower for the highly activated materials (greater than Type A quantity waste), where high concentrations of gamma-emitting radionuclides limit the capacity of the shipping canisters.

The cost to dispose of the lowest level and majority of the material generated from the decontamination and dismantling activities is based upon representative costs for disposal at Energy*Solutions* facility in Clive, Utah. Disposal costs for the higher activity waste (Class B and C) were based upon preliminary and indicative information from WCS for the Andrews County facility.

Material exceeding Class C limits (limited to material closest to the reactor core and comprising less than 1% of the total waste volume) is generally not suitable for shallow-land disposal. This material is packaged in the same multipurpose canisters used for spent fuel storage/transport, for eventual transfer to the DOE for disposal.

3.4.7 Site Conditions Following Decommissioning

The NRC will amend or terminate the unit license if it determines that site remediation has been performed in accordance with the license

termination plan, and that the terminal radiation survey and associated documentation demonstrate that the facility is suitable for release. The NRC's involvement in the decommissioning process will end at this point. Building codes and environmental regulations will dictate the next step in the decommissioning process, as well as Xcel Energy's own future plans for the site, e.g., the electrical switchyard will remain in support of the regional transmission and distribution system.

Asphalt surfaces in the immediate vicinity of site buildings are broken up and the material disposed of as construction debris. The site access road will remain.

Only existing site structures are considered in the dismantling cost. All subgrade structures are removed. The voids are backfilled with clean debris and capped with soil. The site is then re-graded to conform to the adjacent landscape. Vegetation is established to inhibit erosion. These "non-radiological costs" are included in the total cost of decommissioning.

Bulk excavation of soil and material in the immediate vicinity of the reactor building is included to remove various duct banks, catch basins, and underground utilities that may exist.

The estimates do not assume the remediation of any significant volume of contaminated soil. This assumption may be affected by continued plant operations and/or future regulatory actions, such as the development of site-specific release criteria.

3.5 ASSUMPTIONS

The following are the major assumptions made in the development of the estimates for decommissioning the site.

3.5.1 Estimating Basis

Decommissioning costs are reported in the year of projected expenditure; however, the values are provided in 2020 dollars. Costs are not inflated, escalated, or discounted over the periods of performance.

The estimates rely upon the physical plant inventory that was the basis for the 2017 analysis (updated to reflect any material changes to the plant over the past three years).

The study follows the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

3.5.2 Labor Costs

For purposes of this analysis, it is assumed that Xcel Energy will hire a Decommissioning Operations Contractor (DOC) to manage the decommissioning. Xcel Energy will provide site security, radiological health and safety, quality assurance and overall site administration during the decommissioning and demolition phases. Contract personnel will provide engineering services (e.g., for preparing the activity specifications, work procedures, neutron activation, and structural analyses) under the direction of Xcel Energy.

Utility labor costs were provided by Xcel Energy. Average costs were provided by department or work group and included payroll overheads. Decommissioning Operations Contractor (DOC) labor costs were based on utility labor costs with modified markups to account for employee benefits, DOC overhead and profit.

The craft labor required to decontaminate and dismantle the nuclear station will be acquired through standard site contracting practices. Craft labor costs were based upon information from Xcel Energy. Craft labor costs include applicable overheads and profit.

Security levels are assumed to be maintained at “operating levels” for approximately 18 months after operations ceases. Additional reductions in force size are assumed when the pool is empty and with the completion of the decommissioning and site restoration activities.

Staffing levels are assigned by sub-period and functional area. The types of positions and staffing levels are adjusted based upon the type of activity occurring in each sub-period.

Representative profiles of the staffing level for decommissioning, including contractors and craft, is provided in Figures 3.1 and 3.2 for the

DECON (Scenario 2) and SAFSTOR (Scenario 6) estimates. Utility staffing levels will gradually decrease after completing the removal of physical systems. Staffing levels and management support will vary based upon the amount and type of decommissioning work. Craft manpower levels decrease after systems removal and structures decontamination and drop substantially during the delay period and the license termination survey period. However, craft levels increase again during the site restoration period due to the work associated with structures demolition.

Security, while reduced from operating levels, is maintained throughout the decommissioning for access control, material control, and to safeguard the spent fuel (in accordance with the requirements of 10 CFR Part 37, Part 72, and Part 73). Once the fuel has been transferred to the DOE in Scenarios 5 and 6, the security organization will be reduced to Part 37 requirements.

3.5.3 Design Conditions

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ^{137}Cs, ^{90}Sr, or transuranics) has been prevented from reaching levels exceeding those that permit the major NSSS components to be shipped under current transportation regulations and disposal requirements.

The curie contents of the vessel and internals at final shutdown are derived from those listed in NUREG/CR-3474.[39] Actual estimates are derived from the curie/gram values contained therein and adjusted for the different mass of the Monticello components, projected operating life, and different periods of decay. Additional short-lived isotopes were derived from NUREG/CR-0130[40] and NUREG/CR-0672, [41] and benchmarked to the long-lived values from NUREG/CR-3474.

The disposal cost for the control blades removed from the vessel with the final core load was included within the estimates. Control blade residence time in the reactor is assumed to be controlled such that the blades do not become GTCC material. Disposition of any blades stored in the pool from operations was considered an operating expense and therefore not accounted for in the estimates.

Neutron activation of the reactor building structure is confined to the reactor sacrificial shield.

3.5.4 General

Transition Activities

Existing warehouses will be cleared of non-essential material and remain for use by Xcel Energy and subcontractors. The plant's operating staff will perform the following activities at no additional cost or credit to the project during the transition period:

- Drain and collect fuel oils, lubricating oils, and transformer oils for recycle and/or sale.
- Drain and collect acids, caustics, and other chemical stores for recycle and/or sale.
- Processes operating waste inventories, i.e., the estimates do not address the disposition of any legacy wastes; the disposal of operating wastes during this initial period is not considered a decommissioning expense.

Scrap and Salvage

The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. Xcel Energy will make economically reasonable efforts to salvage equipment following final plant shutdown. However, dismantling techniques assumed by TLG for equipment in this analysis are not consistent with removal techniques required for salvage (resale) of equipment. Experience has indicated that some buyers wanted equipment stripped down to very specific requirements before they would consider purchase. This required expensive rework after the equipment had been removed from its installed location. Since placing a salvage value on this machinery and equipment would be speculative, and the value would be small in comparison to the overall decommissioning expenses, this analysis does not attempt to quantify the possible salvage value that Xcel Energy may realize based upon those efforts.

It is assumed, for purposes of this analysis, that any value received from the sale of scrap generated in the dismantling process would be offset by the on-site processing costs. The dismantling techniques assumed in the decommissioning estimates do not include the additional cost for size reduction and preparation to meet "furnace ready" conditions. For example, the recovery of copper from electrical cabling may require the removal and disposition of any contaminated insulation, an added

expense. With a volatile market, the potential profit margin in scrap recovery is highly speculative, regardless of the ability to free release this material. This assumption is an implicit recognition of scrap value in the disposal of clean metallic waste at no additional cost to the project.

Furniture, tools, mobile equipment such as forklifts, trucks, bulldozers, and other property will be removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts will also be made available for alternative use.

The concrete debris resulting from building demolition activities is crushed on site to reduce the size of the debris. The resulting crushed concrete is disposed offsite as construction debris. The rebar removed from the concrete crushing process is disposed of as scrap steel in a similar fashion as other scrap metal as discussed previously.

Energy

For estimating purposes, the plant is assumed to be de-energized, except for those facilities associated with spent fuel storage. Replacement power costs are used for the cost of energy consumption during decommissioning for tooling, lighting, ventilation, and essential services.

Emergency Planning

FEMA and state fees associated with emergency planning are assumed to continue for approximately 12 months following the cessation of operations. At this time, the FEMA fees are discontinued. The timing is based upon the anticipated condition of the spent fuel (i.e., the hottest spent fuel assemblies are assumed to be cool enough that no substantial Zircaloy oxidation and off-site event would occur with the loss of spent fuel pool water). State and local fees are continued until all spent fuel is transferred out of the spent fuel pool.

Insurance

Costs for continuing coverage (nuclear liability and property insurance) following cessation of plant operations and during decommissioning are included and based upon current operating premiums. Reductions in premiums, throughout the decommissioning process, are based upon the guidance provided in SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning."[42] The NRC's financial

protection requirements are based on various reactor (and spent fuel) configurations.

Site Non-Labor Overhead

These estimates include costs for site non-labor overhead charges. These costs include telephones, copy machines, computers, IT infrastructure, office supplies, janitorial supplies, training expenses, etc. Xcel Energy provided a two-part cost to address these costs. A variable charge of $7,389 per person per year of the Xcel Energy staff is included throughout the estimate. A fixed annual overhead charge is also included, starting at $2.7 million at the time of unit shut down and decreasing at various intervals to approximately $108 thousand per reactor.

Severance Program

Severance for personnel retained for the decommissioning organization is included in this estimate.

Taxes

Property taxes are included for all decommissioning periods. Xcel Energy provided a schedule of decreasing tax payments against the current tax assessment. These payments are maintained for the balance of the decommissioning program.

NRC Fees

These estimates include charges from the NRC to support the Monticello decommissioning program. Charges are included for the yearly license held by Xcel Energy for the Part 50 license, as well as engineering support charges by the NRC to review activities at the site. The Part 50 license fee for a reactor in a decommissioning or possession-only status and which has spent fuel onsite is $188 thousand per year. Once the reactor has been decommissioned, the site Part 50 license continues at the same fee until final removal of the spent fuel. The hourly rate for NRC review is $279.00. The level of effort of NRC participation is commensurate with the decommissioning alternative and schedule.

Disposal of Processed Water

This estimate assumes that processed water which meets state and federal release limits can be disposed of without additional cost.

Site Modifications

The perimeter fence and in-plant security barriers will be moved, as appropriate, to conform to the Site Security Plan in force during the various stages of the project.

Morris Facility Payments

This estimate includes a yearly cost of $63 thousand to pay for the storage of spent fuel at the Morris facility.

Minnesota state regulations regarding concrete

This estimate complies with the Minnesota state regulations regarding the removal of all subterranean concrete during demolition, plus the survey and confirmation of the suitability of the clean fill used for backfill of the subgrade structures following concrete removal.

3.6 COST ESTIMATE SUMMARY

The estimates presented in this document reflects the total cost to decontaminate the nuclear unit, manage the spent fuel until the DOE is able to complete the transfer to a federal facility, dismantle the plant and restore the site for alternative use.

Schedules of expenditures are provided in Tables 3.1 through 3.8. The tables delineate the cost contributors by year of expenditures as well as cost contributor (e.g., labor, materials, and waste disposal).

Additional tables in Appendices C through J provide detailed costs elements. The cost elements are also assigned to one of three subcategories: “License Termination,” “Spent Fuel Management,” and “Site Restoration.” The subcategory “License Termination” is used to accumulate costs that are consistent with “decommissioning” as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). In situations where the long-term management of spent fuel is not an issue, the cost reported for this subcategory is generally sufficient to terminate the unit’s operating license, recognizing that there may be some additional cost impact from spent fuel management.

The "Spent Fuel Management" subcategory contains costs associated with the containerization and transfer of spent fuel from the pool to the ISFSI for interim storage, and the transfer of the multipurpose canisters from the ISFSI to the DOE. Costs are also included for the operations of the pool and management of the ISFSI until such time that the transfer of all fuel from this facility to an off-site location (e.g., interim storage facility) is complete.

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are completely removed, including foundations and basemats and backfilled to conform to local grade.

As discussed in Section 3.4.1, it is assumed that the DOE will not accept the GTCC waste prior to completing the transfer of spent fuel. Therefore, the cost of GTCC disposal is shown in the final year of ISFSI operation (for the DECON alternative). While designated for disposal at a federal facility along with the spent fuel, GTCC waste is still classified as low-level radioactive waste and, as such, included as a "License Termination" expense.

Decommissioning costs are reported in 2020 dollars. Costs are not inflated, escalated, or discounted over the period of expenditure (or projected lifetime of the plant).

TABLE 3.1
SCENARIO 1: DECON WITH 42 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2030	22,676	1,092	658	20	7,605	32,050
2031	77,447	8,635	2,747	1,362	34,052	124,243
2032	85,158	36,726	2,393	59,659	32,197	216,132
2033	95,842	65,825	1,830	56,740	27,821	248,058
2034	97,504	77,212	1,336	29,642	22,782	228,476
2035	53,100	4,702	601	11,794	5,834	76,030
2036	38,067	12,606	250	9	4,045	54,977
2037	32,985	14,093	193	0	3,929	51,199
2038	6,573	594	0	0	2,511	9,678
2039	7,473	3,294	0	0	2,511	13,278
2040	7,850	4,373	0	0	2,518	14,742
2041	6,375	0	0	0	2,511	8,887
2042	6,375	0	0	0	2,511	8,887
2043	6,375	0	0	0	2,511	8,887
2044	6,393	0	0	0	2,518	8,911
2045	6,375	0	0	0	2,511	8,887
2046	6,375	0	0	0	2,511	8,887
2047	6,375	0	0	0	2,511	8,887
2048	7,112	2,158	0	0	2,518	11,789
2049	6,375	0	0	0	2,511	8,887
2050	6,375	0	0	0	2,511	8,887
2051	6,375	0	0	0	2,511	8,887
2052	6,496	311	0	0	2,518	9,326
2053	6,686	934	0	0	2,511	10,132
2054	6,583	623	0	0	2,511	9,717
2055	6,583	623	0	0	2,511	9,717
2056	7,015	1,868	0	0	2,518	11,402
2057	6,894	1,557	0	0	2,511	10,962
2058	6,894	1,557	0	0	2,511	10,962
2059	6,894	1,557	0	0	2,511	10,962

TABLE 3.1 (continued)
SCENARIO 1: DECON WITH 42 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2060	6,704	934	0	0	2,518	10,156
2061	6,583	623	0	0	2,511	9,717
2062	6,686	934	0	0	2,511	10,132
2063	6,583	623	0	0	2,511	9,717
2064	6,600	623	0	0	2,518	9,741
2065	6,686	934	0	0	2,511	10,132
2066	6,583	623	0	0	2,511	9,717
2067	6,583	623	0	0	2,511	9,717
2068	6,704	934	0	0	2,518	10,156
2069	6,790	1,245	0	0	2,511	10,547
2070	6,583	623	0	0	2,511	9,717
2071	6,790	1,245	0	0	2,511	10,547
2072	6,808	2,599	0	0	7,470	16,877
2073	1,956	1,431	22	7,406	4,691	15,507
Total	738,239	254,331	10,030	166,633	235,871	1,405,104

Note: Columns may not add due to rounding

TABLE 3.2
SCENARIO 2: DECON WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2030	22,676	1,092	658	20	7,605	32,050
2031	77,447	8,635	2,747	1,362	34,052	124,243
2032	85,158	36,726	2,393	59,659	32,197	216,132
2033	95,842	65,825	1,830	56,740	27,821	248,058
2034	97,504	77,212	1,336	29,642	22,782	228,476
2035	52,998	4,394	601	11,794	5,834	75,620
2036	37,293	10,285	250	9	4,045	51,882
2037	32,061	11,322	193	0	3,925	47,501
2038	6,393	54	0	0	2,465	8,912
2039	6,393	54	0	0	2,465	8,912
2040	6,411	54	0	0	2,472	8,936
2041	6,393	54	0	0	2,465	8,912
2042	6,393	54	0	0	2,465	8,912
2043	6,393	54	0	0	2,465	8,912
2044	6,411	54	0	0	2,472	8,936
2045	6,393	54	0	0	2,465	8,912
2046	6,393	54	0	0	2,465	8,912
2047	6,393	54	0	0	2,465	8,912
2048	7,130	2,212	0	0	2,472	11,814
2049	6,393	54	0	0	2,465	8,912
2050	8,012	4,910	0	0	2,465	15,387
2051	8,012	4,910	0	0	2,465	15,387
2052	8,749	7,070	0	0	2,472	18,291
2053	9,272	8,690	0	0	2,465	20,427
2054	8,192	5,450	0	0	2,465	16,107
2055	9,092	8,150	0	0	2,465	19,707
2056	9,469	9,230	0	0	2,472	21,171
2057	6,375	0	0	0	2,465	8,840
2058	6,375	0	0	0	2,465	8,840
2059	6,375	0	0	0	2,465	8,840

TABLE 3.2 (continued)
SCENARIO 2: DECON WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2060	6,393	0	0	0	2,472	8,864
2061	6,375	0	0	0	2,465	8,840
2062	6,375	0	0	0	2,465	8,840
2063	6,375	0	0	0	2,465	8,840
2064	6,393	0	0	0	2,472	8,864
2065	6,375	0	0	0	2,465	8,840
2066	6,375	0	0	0	2,465	8,840
2067	6,375	0	0	0	2,465	8,840
2068	6,393	0	0	0	2,472	8,864
2069	6,375	0	0	0	2,465	8,840
2070	6,375	0	0	0	2,465	8,840
2071	6,375	0	0	0	2,465	8,840
2072	6,393	0	0	0	2,472	8,864
2073	6,375	0	0	0	2,465	8,840
2074	6,375	0	0	0	2,465	8,840
2075	6,375	0	0	0	2,465	8,840
2076	6,393	0	0	0	2,472	8,864
2077	6,375	0	0	0	2,465	8,840
2078	6,894	1,557	0	0	2,465	10,916
2079	6,998	1,868	0	0	2,465	11,331
2080	6,911	1,557	0	0	2,472	10,940
2081	6,894	1,557	0	0	2,465	10,916
2082	6,894	1,557	0	0	2,465	10,916
2083	6,998	1,868	0	0	2,465	11,331
2084	6,911	1,557	0	0	2,472	10,940
2085	6,894	1,557	0	0	2,465	10,916
2086	6,894	1,557	0	0	2,465	10,916
2087	6,998	1,868	0	0	2,465	11,331
2088	7,631	3,715	0	0	2,472	13,818
2089	6,894	1,557	0	0	2,465	10,916

TABLE 3.2 (continued)
SCENARIO 2: DECON WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2090	6,583	1,976	0	0	7,419	15,978
2091	1,956	1,431	22	7,406	4,691	15,507
Total	865,580	291,889	10,030	166,633	278,631	1,612,762

Note: Columns may not add due to rounding

TABLE 3.3
SCENARIO 3: DECON WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2030	22,676	1,092	658	20	7,605	32,050
2031	77,872	9,912	2,747	1,362	34,052	125,946
2032	87,105	42,568	2,393	59,659	32,197	223,922
2033	97,150	69,747	1,830	56,740	27,821	253,288
2034	97,504	77,212	1,336	29,642	22,782	228,476
2035	52,998	4,394	601	11,794	5,834	75,620
2036	37,468	10,398	250	3,307	4,603	56,026
2037	32,364	11,447	193	3,754	4,559	52,317
2038	7,761	54	0	0	2,452	10,267
2039	7,761	54	0	0	2,452	10,267
2040	7,783	54	0	0	2,458	10,295
2041	7,761	54	0	0	2,452	10,267
2042	7,761	54	0	0	2,452	10,267
2043	7,761	54	0	0	2,452	10,267
2044	7,783	54	0	0	2,458	10,295
2045	7,761	54	0	0	2,452	10,267
2046	7,761	54	0	0	2,452	10,267
2047	7,761	54	0	0	2,452	10,267
2048	8,502	2,212	0	0	2,458	13,173
2049	7,761	54	0	0	2,452	10,267
2050	9,380	4,911	0	0	2,452	16,742
2051	9,380	4,911	0	0	2,452	16,742
2052	9,401	4,911	0	0	2,458	16,770
2053	9,380	4,911	0	0	2,452	16,742
2054	9,380	4,911	0	0	2,452	16,742
2055	9,380	4,911	0	0	2,452	16,742
2056	9,401	4,911	0	0	2,458	16,770
2057	9,380	4,911	0	0	2,452	16,742
2058	16,568	26,474	0	0	2,452	45,494
2059	9,380	4,911	0	0	2,452	16,742

TABLE 3.3 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2060	9,401	4,911	0	0	2,458	16,770
2061	9,380	4,911	0	0	2,452	16,742
2062	9,380	4,911	0	0	2,452	16,742
2063	12,974	15,692	0	0	2,452	31,118
2064	9,401	4,911	0	0	2,458	16,770
2065	9,380	4,911	0	0	2,452	16,742
2066	10,099	7,067	0	0	2,452	19,617
2067	9,380	4,911	0	0	2,452	16,742
2068	19,464	35,099	0	0	2,458	57,022
2069	9,380	4,911	0	0	2,452	16,742
2070	9,380	4,911	0	0	2,452	16,742
2071	9,380	4,911	0	0	2,452	16,742
2072	9,401	4,911	0	0	2,458	16,770
2073	9,380	4,911	0	0	2,452	16,742
2074	9,380	4,911	0	0	2,452	16,742
2075	9,380	4,911	0	0	2,452	16,742
2076	9,401	4,911	0	0	2,458	16,770
2077	9,380	4,911	0	0	2,452	16,742
2078	9,380	4,911	0	0	2,452	16,742
2079	9,380	4,911	0	0	2,452	16,742
2080	9,401	4,911	0	0	2,458	16,770
2081	9,380	4,911	0	0	2,452	16,742
2082	9,380	4,911	0	0	2,452	16,742
2083	9,380	4,911	0	0	2,452	16,742
2084	34,559	80,383	0	0	2,458	117,400
2085	9,380	4,911	0	0	2,452	16,742
2086	9,380	4,911	0	0	2,452	16,742
2087	9,380	4,911	0	0	2,452	16,742
2088	10,121	7,069	0	0	2,458	19,648
2089	9,380	4,911	0	0	2,452	16,742

TABLE 3.3 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2090	9,380	4,911	0	0	2,452	16,742
2091	9,380	4,911	0	0	2,452	16,742
2092	10,121	7,070	0	0	2,458	19,650
2093	10,640	8,690	0	0	2,452	21,782
2094	9,560	5,450	0	0	2,452	17,462
2095	10,460	8,150	0	0	2,452	21,062
2096	10,841	9,230	0	0	2,458	22,529
2097	7,743	0	0	0	2,452	10,195
2098	7,743	0	0	0	2,452	10,195
2099	7,743	0	0	0	2,452	10,195
2100	7,743	0	0	0	2,452	10,195
2101	7,743	0	0	0	2,452	10,195
2102	7,743	0	0	0	2,452	10,195
2103	7,743	0	0	0	2,452	10,195
2104	7,765	0	0	0	2,458	10,223
2105	7,743	0	0	0	2,452	10,195
2106	7,743	0	0	0	2,452	10,195
2107	7,743	0	0	0	2,452	10,195
2108	14,952	21,564	0	0	2,458	38,974
2109	7,743	0	0	0	2,452	10,195
2110	7,743	0	0	0	2,452	10,195
2111	7,743	0	0	0	2,452	10,195
2112	7,765	0	0	0	2,458	10,223
2113	11,337	10,782	0	0	2,452	24,571
2114	7,743	0	0	0	2,452	10,195
2115	7,743	0	0	0	2,452	10,195
2116	8,483	2,156	0	0	2,458	13,098
2117	7,743	0	0	0	2,452	10,195
2118	18,325	31,746	0	0	2,452	52,523
2119	8,366	1,868	0	0	2,452	12,686

TABLE 3.3 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2120	8,284	1,557	0	0	2,458	12,299
2121	8,262	1,557	0	0	2,452	12,271
2122	8,262	1,557	0	0	2,452	12,271
2123	8,366	1,868	0	0	2,452	12,686
2124	8,284	1,557	0	0	2,458	12,299
2125	8,262	1,557	0	0	2,452	12,271
2126	8,262	1,557	0	0	2,452	12,271
2127	8,366	1,868	0	0	2,452	12,686
2128	9,003	3,715	0	0	2,458	15,177
2129	8,262	1,557	0	0	2,452	12,271
2130	7,898	1,977	0	0	7,406	17,281
2131	1,935	1,241	22	354	3,617	7,168
Total	1,386,633	706,414	10,030	166,633	376,162	2,645,871

Note: Columns may not add due to rounding

TABLE 3.4
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2030	22,676	1,092	658	20	7,605	32,050
2031	77,872	9,912	2,747	1,362	34,052	125,946
2032	87,239	42,568	2,393	59,659	32,197	224,056
2033	97,170	69,747	1,830	56,740	27,821	253,308
2034	97,350	77,212	1,336	29,642	22,782	228,322
2035	52,998	4,394	601	11,794	5,834	75,620
2036	37,468	10,398	250	3,307	4,603	56,026
2037	32,364	11,447	193	3,754	4,558	52,316
2038	7,761	54	0	0	2,442	10,258
2039	7,761	54	0	0	2,442	10,258
2040	7,783	54	0	0	2,449	10,286
2041	7,761	54	0	0	2,442	10,258
2042	7,761	54	0	0	2,442	10,258
2043	7,761	54	0	0	2,442	10,258
2044	7,783	54	0	0	2,449	10,286
2045	7,761	54	0	0	2,442	10,258
2046	7,761	54	0	0	2,442	10,258
2047	7,761	54	0	0	2,442	10,258
2048	8,502	2,212	0	0	2,449	13,163
2049	7,761	54	0	0	2,442	10,258
2050	9,380	4,911	0	0	2,442	16,733
2051	9,380	4,911	0	0	2,442	16,733
2052	9,401	4,911	0	0	2,449	16,761
2053	9,380	4,911	0	0	2,442	16,733
2054	9,380	4,911	0	0	2,442	16,733
2055	9,380	4,911	0	0	2,442	16,733
2056	9,401	4,911	0	0	2,449	16,761
2057	9,380	4,911	0	0	2,442	16,733
2058	16,568	26,474	0	0	2,442	45,484
2059	9,380	4,911	0	0	2,442	16,733

TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2060	9,401	4,911	0	0	2,449	16,761
2061	9,380	4,911	0	0	2,442	16,733
2062	9,380	4,911	0	0	2,442	16,733
2063	12,974	15,692	0	0	2,442	31,109
2064	9,401	4,911	0	0	2,449	16,761
2065	9,380	4,911	0	0	2,442	16,733
2066	10,099	7,067	0	0	2,442	19,608
2067	9,380	4,911	0	0	2,442	16,733
2068	19,464	35,099	0	0	2,449	57,013
2069	9,380	4,911	0	0	2,442	16,733
2070	9,380	4,911	0	0	2,442	16,733
2071	9,380	4,911	0	0	2,442	16,733
2072	9,401	4,911	0	0	2,449	16,761
2073	9,380	4,911	0	0	2,442	16,733
2074	9,380	4,911	0	0	2,442	16,733
2075	9,380	4,911	0	0	2,442	16,733
2076	9,401	4,911	0	0	2,449	16,761
2077	9,380	4,911	0	0	2,442	16,733
2078	9,380	4,911	0	0	2,442	16,733
2079	9,380	4,911	0	0	2,442	16,733
2080	9,401	4,911	0	0	2,449	16,761
2081	9,380	4,911	0	0	2,442	16,733
2082	9,380	4,911	0	0	2,442	16,733
2083	9,380	4,911	0	0	2,442	16,733
2084	34,559	80,383	0	0	2,449	117,391
2085	9,380	4,911	0	0	2,442	16,733
2086	9,380	4,911	0	0	2,442	16,733
2087	9,380	4,911	0	0	2,442	16,733
2088	10,121	7,069	0	0	2,449	19,639
2089	9,380	4,911	0	0	2,442	16,733

TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2090	9,380	4,911	0	0	2,442	16,733
2091	9,380	4,911	0	0	2,442	16,733
2092	9,401	4,911	0	0	2,449	16,761
2093	9,380	4,911	0	0	2,442	16,733
2094	9,380	4,911	0	0	2,442	16,733
2095	9,380	4,911	0	0	2,442	16,733
2096	9,401	4,911	0	0	2,449	16,761
2097	9,380	4,911	0	0	2,442	16,733
2098	9,380	4,911	0	0	2,442	16,733
2099	9,380	4,911	0	0	2,442	16,733
2100	9,380	4,911	0	0	2,442	16,733
2101	9,380	4,911	0	0	2,442	16,733
2102	9,380	4,911	0	0	2,442	16,733
2103	9,380	4,911	0	0	2,442	16,733
2104	9,401	4,911	0	0	2,449	16,761
2105	9,380	4,911	0	0	2,442	16,733
2106	9,380	4,911	0	0	2,442	16,733
2107	9,380	4,911	0	0	2,442	16,733
2108	16,589	26,474	0	0	2,449	45,512
2109	9,380	4,911	0	0	2,442	16,733
2110	9,380	4,911	0	0	2,442	16,733
2111	9,380	4,911	0	0	2,442	16,733
2112	9,401	4,911	0	0	2,449	16,761
2113	12,974	15,692	0	0	2,442	31,109
2114	9,380	4,911	0	0	2,442	16,733
2115	9,380	4,911	0	0	2,442	16,733
2116	10,120	7,067	0	0	2,449	19,636
2117	9,380	4,911	0	0	2,442	16,733
2118	19,443	35,099	0	0	2,442	56,985
2119	9,380	4,911	0	0	2,442	16,733

TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2120	9,401	4,911	0	0	2,449	16,761
2121	9,380	4,911	0	0	2,442	16,733
2122	9,380	4,911	0	0	2,442	16,733
2123	9,380	4,911	0	0	2,442	16,733
2124	9,401	4,911	0	0	2,449	16,761
2125	9,380	4,911	0	0	2,442	16,733
2126	9,380	4,911	0	0	2,442	16,733
2127	9,380	4,911	0	0	2,442	16,733
2128	10,121	7,069	0	0	2,449	19,639
2129	9,380	4,911	0	0	2,442	16,733
2130	9,380	4,911	0	0	2,442	16,733
2131	9,380	4,911	0	0	2,442	16,733
2132	9,401	4,911	0	0	2,449	16,761
2133	9,380	4,911	0	0	2,442	16,733
2134	34,538	80,383	0	0	2,442	117,363
2135	9,380	4,911	0	0	2,442	16,733
2136	9,401	4,911	0	0	2,449	16,761
2137	9,380	4,911	0	0	2,442	16,733
2138	9,380	4,911	0	0	2,442	16,733
2139	9,380	4,911	0	0	2,442	16,733
2140	9,401	4,911	0	0	2,449	16,761
2141	9,380	4,911	0	0	2,442	16,733
2142	9,380	4,911	0	0	2,442	16,733
2143	9,380	4,911	0	0	2,442	16,733
2144	9,401	4,911	0	0	2,449	16,761
2145	9,380	4,911	0	0	2,442	16,733
2146	9,380	4,911	0	0	2,442	16,733
2147	9,380	4,911	0	0	2,442	16,733
2148	9,401	4,911	0	0	2,449	16,761
2149	9,380	4,911	0	0	2,442	16,733

TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2150	9,380	4,911	0	0	2,442	16,733
2151	9,380	4,911	0	0	2,442	16,733
2152	9,401	4,911	0	0	2,449	16,761
2153	9,380	4,911	0	0	2,442	16,733
2154	9,380	4,911	0	0	2,442	16,733
2155	9,380	4,911	0	0	2,442	16,733
2156	9,401	4,911	0	0	2,449	16,761
2157	9,380	4,911	0	0	2,442	16,733
2158	16,568	26,474	0	0	2,442	45,484
2159	9,380	4,911	0	0	2,442	16,733
2160	9,401	4,911	0	0	2,449	16,761
2161	9,380	4,911	0	0	2,442	16,733
2162	9,380	4,911	0	0	2,442	16,733
2163	12,974	15,692	0	0	2,442	31,109
2164	9,401	4,911	0	0	2,449	16,761
2165	9,380	4,911	0	0	2,442	16,733
2166	10,099	7,067	0	0	2,442	19,608
2167	9,380	4,911	0	0	2,442	16,733
2168	20,184	37,258	0	0	2,449	59,891
2169	9,380	4,911	0	0	2,442	16,733
2170	9,380	4,911	0	0	2,442	16,733
2171	9,380	4,911	0	0	2,442	16,733
2172	9,401	4,911	0	0	2,449	16,761
2173	9,380	4,911	0	0	2,442	16,733
2174	9,380	4,911	0	0	2,442	16,733
2175	9,380	4,911	0	0	2,442	16,733
2176	9,401	4,911	0	0	2,449	16,761
2177	9,380	4,911	0	0	2,442	16,733
2178	9,380	4,911	0	0	2,442	16,733
2179	9,380	4,911	0	0	2,442	16,733

TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2180	9,401	4,911	0	0	2,449	16,761
2181	9,380	4,911	0	0	2,442	16,733
2182	9,380	4,911	0	0	2,442	16,733
2183	9,380	4,911	0	0	2,442	16,733
2184	34,559	80,383	0	0	2,449	117,391
2185	9,380	4,911	0	0	2,442	16,733
2186	9,380	4,911	0	0	2,442	16,733
2187	9,380	4,911	0	0	2,442	16,733
2188	9,401	4,911	0	0	2,449	16,761
2189	9,380	4,911	0	0	2,442	16,733
2190	9,380	4,911	0	0	2,442	16,733
2191	9,380	4,911	0	0	2,442	16,733
2192	10,121	7,070	0	0	2,449	19,641
2193	10,640	8,690	0	0	2,442	21,772
2194	9,560	5,450	0	0	2,442	17,453
2195	10,460	8,150	0	0	2,442	21,052
2196	10,841	9,230	0	0	2,449	22,520
2197	7,743	0	0	0	2,442	10,186
2198	7,743	0	0	0	2,442	10,186
2199	7,743	0	0	0	2,442	10,186
2200	7,743	0	0	0	2,442	10,186
2201	7,743	0	0	0	2,442	10,186
2202	7,743	0	0	0	2,442	10,186
2203	7,743	0	0	0	2,442	10,186
2204	7,765	0	0	0	2,449	10,214
2205	7,743	0	0	0	2,442	10,186
2206	7,743	0	0	0	2,442	10,186
2207	7,743	0	0	0	2,442	10,186
2208	15,672	23,722	0	0	2,449	41,843
2209	7,743	0	0	0	2,442	10,186

TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2210	7,743	0	0	0	2,442	10,186
2211	7,743	0	0	0	2,442	10,186
2212	7,765	0	0	0	2,449	10,214
2213	11,337	10,782	0	0	2,442	24,561
2214	7,743	0	0	0	2,442	10,186
2215	7,743	0	0	0	2,442	10,186
2216	8,483	2,156	0	0	2,449	13,089
2217	7,743	0	0	0	2,442	10,186
2218	18,325	31,746	0	0	2,442	52,513
2219	8,366	1,868	0	0	2,442	12,677
2220	8,283	1,557	0	0	2,449	12,289
2221	8,262	1,557	0	0	2,442	12,261
2222	8,262	1,557	0	0	2,442	12,261
2223	8,366	1,868	0	0	2,442	12,677
2224	8,283	1,557	0	0	2,449	12,289
2225	8,262	1,557	0	0	2,442	12,261
2226	8,262	1,557	0	0	2,442	12,261
2227	8,366	1,868	0	0	2,442	12,677
2228	8,283	1,557	0	0	2,449	12,289
2229	8,262	1,557	0	0	2,442	12,261
2230	7,898	1,976	0	0	7,397	17,272
2231	1,935	1,241	22	354	3,617	7,168
Total	2,420,040	1,482,106	10,030	166,633	619,701	4,698,508

Note: Columns may not add due to rounding

TABLE 3.5
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2030	18,693	912	658	20	7,520	27,803
2031	68,993	7,737	2,089	987	39,899	119,705
2032	44,420	38,443	726	430	22,956	106,975
2033	41,096	45,594	418	24	22,409	109,540
2034	31,070	31,336	352	20	17,048	79,827
2035	9,293	395	209	11	5,394	15,303
2036	10,038	2,556	209	11	5,409	18,224
2037	10,373	3,635	209	11	5,394	19,623
2038	9,473	935	209	11	5,394	16,023
2039	10,373	3,635	209	11	5,394	19,623
2040	10,758	4,716	209	11	5,409	21,104
2041	9,275	341	209	11	5,394	15,231
2042	9,275	341	209	11	5,394	15,231
2043	9,275	341	209	11	5,394	15,231
2044	9,301	342	209	11	5,409	15,273
2045	9,275	341	209	11	5,394	15,231
2046	9,275	341	209	11	5,394	15,231
2047	9,275	341	209	11	5,394	15,231
2048	10,020	2,501	209	11	5,409	18,151
2049	9,275	341	209	11	5,394	15,231
2050	9,275	341	209	11	5,394	15,231
2051	9,275	341	209	11	5,394	15,231
2052	9,404	654	209	11	5,409	15,688
2053	9,586	1,275	209	11	5,394	16,477
2054	9,483	964	209	11	5,394	16,062
2055	9,483	964	209	11	5,394	16,062
2056	9,923	2,210	209	11	5,409	17,764
2057	9,794	1,898	209	11	5,394	17,307
2058	9,794	1,898	209	11	5,394	17,307
2059	9,794	1,898	209	11	5,394	17,307

TABLE 3.5 (continued)
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2060	9,612	1,276	209	11	5,409	16,518
2061	9,483	964	209	11	5,394	16,062
2062	9,586	1,275	209	11	5,394	16,477
2063	9,483	964	209	11	5,394	16,062
2064	9,508	965	209	11	5,409	16,103
2065	9,586	1,275	209	11	5,394	16,477
2066	9,483	964	209	11	5,394	16,062
2067	9,483	964	209	11	5,394	16,062
2068	9,612	1,276	209	11	5,409	16,518
2069	9,690	1,587	209	11	5,394	16,892
2070	9,483	964	209	11	5,394	16,062
2071	9,690	1,587	209	11	5,394	16,892
2072	9,716	1,588	209	11	5,409	16,934
2073	4,425	332	209	10	4,159	9,136
2074	4,425	332	209	10	4,159	9,136
2075	4,425	332	209	10	4,159	9,136
2076	4,437	333	209	11	4,171	9,161
2077	4,425	332	209	10	4,159	9,136
2078	4,425	332	209	10	4,159	9,136
2079	4,425	332	209	10	4,159	9,136
2080	4,437	333	209	11	4,171	9,161
2081	4,425	332	209	10	4,159	9,136
2082	4,425	332	209	10	4,159	9,136
2083	4,425	332	209	10	4,159	9,136
2084	4,437	333	209	11	4,171	9,161
2085	37,435	4,080	1,574	53	4,212	47,355
2086	54,409	12,607	2,065	18,514	6,705	94,300
2087	63,936	31,146	1,941	75,384	14,548	186,956
2088	56,511	9,540	1,571	25,387	10,427	103,436
2089	54,852	8,981	1,488	23,587	9,919	98,827

TABLE 3.5 (continued)
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2090	29,405	5,226	352	33	3,584	38,600
2091	18,561	12,810	209	0	4,002	35,582
2092	7,781	5,370	88	0	1,678	14,915
Total	945,084	266,972	23,983	144,997	419,993	1,801,028

Note: Columns may not add due to rounding

TABLE 3.6
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2030	18,693	912	658	20	7,520	27,803
2031	68,993	7,737	2,089	987	39,899	119,705
2032	44,420	38,443	726	430	22,956	106,975
2033	41,096	45,594	418	24	22,409	109,540
2034	31,070	31,336	352	20	17,048	79,827
2035	9,293	395	209	11	5,394	15,303
2036	9,319	396	209	11	5,409	15,345
2037	9,293	395	209	11	5,394	15,303
2038	9,293	395	209	11	5,394	15,303
2039	9,293	395	209	11	5,394	15,303
2040	9,319	396	209	11	5,409	15,345
2041	9,293	395	209	11	5,394	15,303
2042	9,293	395	209	11	5,394	15,303
2043	9,293	395	209	11	5,394	15,303
2044	9,319	396	209	11	5,409	15,345
2045	9,293	395	209	11	5,394	15,303
2046	9,293	395	209	11	5,394	15,303
2047	9,293	395	209	11	5,394	15,303
2048	10,038	2,555	209	11	5,409	18,223
2049	9,293	395	209	11	5,394	15,303
2050	10,912	5,252	209	11	5,394	21,779
2051	10,912	5,252	209	11	5,394	21,779
2052	11,657	7,412	209	11	5,409	24,700
2053	12,172	9,031	209	11	5,394	26,818
2054	11,092	5,792	209	11	5,394	22,498
2055	11,992	8,491	209	11	5,394	26,098
2056	12,377	9,572	209	11	5,409	27,580
2057	9,275	341	209	11	5,394	15,231
2058	9,275	341	209	11	5,394	15,231
2059	9,275	341	209	11	5,394	15,231

TABLE 3.6 (continued)
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2060	9,301	342	209	11	5,409	15,273
2061	9,275	341	209	11	5,394	15,231
2062	9,275	341	209	11	5,394	15,231
2063	9,275	341	209	11	5,394	15,231
2064	9,301	342	209	11	5,409	15,273
2065	9,275	341	209	11	5,394	15,231
2066	9,275	341	209	11	5,394	15,231
2067	9,275	341	209	11	5,394	15,231
2068	9,301	342	209	11	5,409	15,273
2069	9,275	341	209	11	5,394	15,231
2070	9,275	341	209	11	5,394	15,231
2071	9,275	341	209	11	5,394	15,231
2072	9,301	342	209	11	5,409	15,273
2073	9,275	341	209	11	5,394	15,231
2074	9,275	341	209	11	5,394	15,231
2075	9,275	341	209	11	5,394	15,231
2076	9,301	342	209	11	5,409	15,273
2077	9,275	341	209	11	5,394	15,231
2078	9,794	1,898	209	11	5,394	17,307
2079	9,898	2,210	209	11	5,394	17,722
2080	9,819	1,899	209	11	5,409	17,349
2081	9,794	1,898	209	11	5,394	17,307
2082	9,794	1,898	209	11	5,394	17,307
2083	9,898	2,210	209	11	5,394	17,722
2084	9,819	1,899	209	11	5,409	17,349
2085	39,677	5,640	1,574	54	5,430	52,374
2086	55,815	14,221	2,065	18,514	7,675	98,290
2087	66,537	33,022	1,941	75,006	15,165	191,672
2088	59,340	12,021	1,571	21,744	8,784	103,459
2089	57,778	11,382	1,488	20,876	8,972	100,495

TABLE 3.6 (continued)
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2090	32,388	6,183	352	6,766	9,424	55,113
2091	18,561	12,810	209	0	4,138	35,719
2092	7,781	5,370	88	0	1,735	14,972
Total	1,027,203	304,650	23,983	145,009	441,071	1,941,915

Note: Columns may not add due to rounding

TABLE 3.7
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2030	19,195	1,230	658	20	7,520	28,622
2031	69,384	7,388	2,089	982	39,899	119,742
2032	35,973	13,099	726	430	22,956	73,184
2033	32,005	18,323	418	24	22,409	73,179
2034	52,289	94,992	352	20	17,048	164,701
2035	9,293	395	209	11	5,394	15,303
2036	9,319	396	209	11	5,409	15,345
2037	9,293	395	209	11	5,394	15,303
2038	9,293	395	209	11	5,394	15,303
2039	9,293	395	209	11	5,394	15,303
2040	9,319	396	209	11	5,409	15,345
2041	9,293	395	209	11	5,394	15,303
2042	9,293	395	209	11	5,394	15,303
2043	9,293	395	209	11	5,394	15,303
2044	9,319	396	209	11	5,409	15,345
2045	9,293	395	209	11	5,394	15,303
2046	9,293	395	209	11	5,394	15,303
2047	9,293	395	209	11	5,394	15,303
2048	10,038	2,555	209	11	5,409	18,223
2049	9,293	395	209	11	5,394	15,303
2050	10,912	5,252	209	11	5,394	21,779
2051	10,912	5,252	209	11	5,394	21,779
2052	10,937	5,253	209	11	5,409	21,820
2053	10,912	5,252	209	11	5,394	21,779
2054	10,912	5,252	209	11	5,394	21,779
2055	10,912	5,252	209	11	5,394	21,779
2056	10,937	5,253	209	11	5,409	21,820
2057	10,912	5,252	209	11	5,394	21,779
2058	18,100	26,815	209	11	5,394	50,530
2059	10,912	5,252	209	11	5,394	21,779

TABLE 3.7 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2060	10,937	5,253	209	11	5,409	21,820
2061	10,912	5,252	209	11	5,394	21,779
2062	10,912	5,252	209	11	5,394	21,779
2063	14,506	16,034	209	11	5,394	36,154
2064	10,937	5,253	209	11	5,409	21,820
2065	10,912	5,252	209	11	5,394	21,779
2066	11,631	7,408	209	11	5,394	24,654
2067	10,912	5,252	209	11	5,394	21,779
2068	21,000	35,442	209	11	5,409	62,072
2069	10,912	5,252	209	11	5,394	21,779
2070	10,912	5,252	209	11	5,394	21,779
2071	10,912	5,252	209	11	5,394	21,779
2072	10,937	5,253	209	11	5,409	21,820
2073	10,912	5,252	209	11	5,394	21,779
2074	10,912	5,252	209	11	5,394	21,779
2075	10,912	5,252	209	11	5,394	21,779
2076	10,937	5,253	209	11	5,409	21,820
2077	10,912	5,252	209	11	5,394	21,779
2078	10,912	5,252	209	11	5,394	21,779
2079	10,912	5,252	209	11	5,394	21,779
2080	10,937	5,253	209	11	5,409	21,820
2081	10,912	5,252	209	11	5,394	21,779
2082	10,912	5,252	209	11	5,394	21,779
2083	10,912	5,252	209	11	5,394	21,779
2084	36,095	80,725	209	11	5,409	122,450
2085	39,882	8,994	1,574	54	5,471	55,974
2086	56,570	18,301	2,065	18,514	6,727	102,177
2087	67,544	39,125	1,941	75,006	11,266	194,882
2088	60,817	16,453	1,571	21,744	8,840	109,425
2089	58,571	13,747	1,488	20,202	8,561	102,570

TABLE 3.7 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2090	35,101	9,949	352	33	5,111	50,547
2091	24,492	17,115	209	0	5,133	46,948
2092	16,194	12,186	88	0	3,606	32,074
2093	10,192	8,690	0	0	2,493	21,375
2094	9,112	5,450	0	0	2,493	17,056
2095	10,070	8,392	0	7,052	3,686	29,199
2096	10,392	9,230	0	0	2,500	22,122
2097	7,296	0	0	0	2,493	9,789
2098	7,296	0	0	0	2,493	9,789
2099	7,296	0	0	0	2,493	9,789
2100	7,296	0	0	0	2,493	9,789
2010	7,296	0	0	0	2,493	9,789
2102	7,296	0	0	0	2,493	9,789
2103	7,296	0	0	0	2,493	9,789
2104	7,316	0	0	0	2,500	9,816
2105	7,296	0	0	0	2,493	9,789
2106	7,296	0	0	0	2,493	9,789
2107	7,296	0	0	0	2,493	9,789
2108	14,503	21,564	0	0	2,500	38,567
2109	7,296	0	0	0	2,493	9,789
2110	7,296	0	0	0	2,493	9,789
2111	7,296	0	0	0	2,493	9,789
2112	7,316	0	0	0	2,500	9,816
1213	10,890	10,782	0	0	2,493	24,164
2114	7,296	0	0	0	2,493	9,789
2115	7,296	0	0	0	2,493	9,789
2116	8,034	2,156	0	0	2,500	12,691
2117	7,296	0	0	0	2,493	9,789
2118	17,878	31,746	0	0	2,493	52,116
2119	7,918	1,868	0	0	2,493	12,280

TABLE 3.7 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2120	7,835	1,557	0	0	2,500	11,891
2121	7,815	1,557	0	0	2,493	11,864
2122	7,815	1,557	0	0	2,493	11,864
2123	7,918	1,868	0	0	2,493	12,280
2124	7,835	1,557	0	0	2,500	11,891
2125	7,815	1,557	0	0	2,493	11,864
2126	7,815	1,557	0	0	2,493	11,864
2127	7,918	1,868	0	0	2,493	12,280
2128	8,554	3,715	0	0	2,500	14,769
2129	7,815	1,557	0	0	2,493	11,864
2130	7,451	1,976	0	0	7,446	16,873
2131	1,941	1,243	22	354	3,617	7,177
Total	1,455,980	724,426	24,005	145,004	539,017	2,888,431

Note: Columns may not add due to rounding

TABLE 3.8
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2030	19,195	1,230	658	20	7,520	28,622
2031	69,384	7,388	2,089	982	39,899	119,742
2032	35,973	13,099	726	430	22,956	73,184
2033	32,005	18,323	418	24	22,409	73,179
2034	52,289	94,992	352	20	17,048	164,701
2035	9,293	395	209	11	5,394	15,303
2036	9,319	396	209	11	5,409	15,345
2037	9,293	395	209	11	5,394	15,303
2038	9,293	395	209	11	5,394	15,303
2039	9,293	395	209	11	5,394	15,303
2040	9,319	396	209	11	5,409	15,345
2041	9,293	395	209	11	5,394	15,303
2042	9,293	395	209	11	5,394	15,303
2043	9,293	395	209	11	5,394	15,303
2044	9,319	396	209	11	5,409	15,345
2045	9,293	395	209	11	5,394	15,303
2046	9,293	395	209	11	5,394	15,303
2047	9,293	395	209	11	5,394	15,303
2048	10,038	2,555	209	11	5,409	18,223
2049	9,293	395	209	11	5,394	15,303
2050	10,912	5,252	209	11	5,394	21,779
2051	10,912	5,252	209	11	5,394	21,779
2052	10,937	5,253	209	11	5,409	21,820
2053	10,912	5,252	209	11	5,394	21,779
2054	10,912	5,252	209	11	5,394	21,779
2055	10,912	5,252	209	11	5,394	21,779
2056	10,937	5,253	209	11	5,409	21,820
2057	10,912	5,252	209	11	5,394	21,779
2058	18,100	26,815	209	11	5,394	50,530
2059	10,912	5,252	209	11	5,394	21,779

TABLE 3.8 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2060	10,937	5,253	209	11	5,409	21,820
2061	10,912	5,252	209	11	5,394	21,779
2062	10,912	5,252	209	11	5,394	21,779
2063	14,506	16,034	209	11	5,394	36,154
2064	10,937	5,253	209	11	5,409	21,820
2065	10,912	5,252	209	11	5,394	21,779
2066	11,631	7,408	209	11	5,394	24,654
2067	10,912	5,252	209	11	5,394	21,779
2068	21,000	35,442	209	11	5,409	62,072
2069	10,912	5,252	209	11	5,394	21,779
2070	10,912	5,252	209	11	5,394	21,779
2071	10,912	5,252	209	11	5,394	21,779
2072	10,937	5,253	209	11	5,409	21,820
2073	10,912	5,252	209	11	5,394	21,779
2074	10,912	5,252	209	11	5,394	21,779
2075	10,912	5,252	209	11	5,394	21,779
2076	10,937	5,253	209	11	5,409	21,820
2077	10,912	5,252	209	11	5,394	21,779
2078	10,912	5,252	209	11	5,394	21,779
2079	10,912	5,252	209	11	5,394	21,779
2080	10,937	5,253	209	11	5,409	21,820
2081	10,912	5,252	209	11	5,394	21,779
2082	10,912	5,252	209	11	5,394	21,779
2083	10,912	5,252	209	11	5,394	21,779
2084	36,095	80,725	209	11	5,409	122,450
2085	39,882	8,994	1,574	54	5,452	55,956
2086	56,570	18,301	2,065	18,514	6,701	102,152
2087	67,544	39,125	1,941	75,006	11,240	194,856
2088	60,817	16,453	1,571	21,744	8,815	109,399
2089	58,571	13,747	1,488	20,202	8,536	102,545

TABLE 3.8 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2090	35,101	9,949	352	33	5,086	50,521
2091	24,492	17,115	209	0	5,107	46,923
2092	15,474	10,026	88	0	3,572	29,160
2093	8,932	4,910	0	0	2,452	16,295
2094	8,932	4,910	0	0	2,452	16,295
2095	8,991	5,152	0	7,052	3,644	24,839
2096	8,952	4,910	0	0	2,459	16,321
2097	8,932	4,910	0	0	2,452	16,295
2098	8,932	4,910	0	0	2,452	16,295
2099	8,932	4,910	0	0	2,452	16,295
2100	8,932	4,910	0	0	2,452	16,295
2010	8,932	4,910	0	0	2,452	16,295
2102	8,932	4,910	0	0	2,452	16,295
2103	8,932	4,910	0	0	2,452	16,295
2104	8,952	4,910	0	0	2,459	16,321
2105	8,932	4,910	0	0	2,452	16,295
2106	8,932	4,910	0	0	2,452	16,295
2107	8,932	4,910	0	0	2,452	16,295
2108	16,140	26,474	0	0	2,459	45,073
2109	8,932	4,910	0	0	2,452	16,295
2110	8,932	4,910	0	0	2,452	16,295
2111	8,932	4,910	0	0	2,452	16,295
2112	8,952	4,910	0	0	2,459	16,321
1213	12,526	15,692	0	0	2,452	30,670
2114	8,932	4,910	0	0	2,452	16,295
2115	8,932	4,910	0	0	2,452	16,295
2116	9,671	7,067	0	0	2,459	19,197
2117	8,932	4,910	0	0	2,452	16,295
2118	18,995	35,099	0	0	2,452	56,547
2119	8,932	4,910	0	0	2,452	16,295

TABLE 3.8 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2120	8,952	4,910	0	0	2,459	16,321
2121	8,932	4,910	0	0	2,452	16,295
2122	8,932	4,910	0	0	2,452	16,295
2123	8,932	4,910	0	0	2,452	16,295
2124	8,952	4,910	0	0	2,459	16,321
2125	8,932	4,910	0	0	2,452	16,295
2126	8,932	4,910	0	0	2,452	16,295
2127	8,932	4,910	0	0	2,452	16,295
2128	9,672	7,069	0	0	2,459	19,199
2129	8,932	4,910	0	0	2,452	16,295
2130	8,932	4,910	0	0	2,452	16,295
2131	8,932	4,910	0	0	2,452	16,295
2132	8,952	4,910	0	0	2,459	16,321
2133	8,932	4,910	0	0	2,452	16,295
2134	34,090	80,383	0	0	2,452	116,925
2135	8,932	4,910	0	0	2,452	16,295
2136	8,952	4,910	0	0	2,459	16,321
2137	8,932	4,910	0	0	2,452	16,295
2138	8,932	4,910	0	0	2,452	16,295
2139	8,932	4,910	0	0	2,452	16,295
2140	8,952	4,910	0	0	2,459	16,321
2141	8,932	4,910	0	0	2,452	16,295
2142	8,932	4,910	0	0	2,452	16,295
2143	8,932	4,910	0	0	2,452	16,295
2144	8,952	4,910	0	0	2,459	16,321
2145	8,932	4,910	0	0	2,452	16,295
2146	8,932	4,910	0	0	2,452	16,295
2147	8,932	4,910	0	0	2,452	16,295
2148	8,952	4,910	0	0	2,459	16,321
2149	8,932	4,910	0	0	2,452	16,295

TABLE 3.8 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2150	8,932	4,910	0	0	2,452	16,295
2151	8,932	4,910	0	0	2,452	16,295
2152	8,952	4,910	0	0	2,459	16,321
2153	8,932	4,910	0	0	2,452	16,295
2154	8,932	4,910	0	0	2,452	16,295
2155	8,932	4,910	0	0	2,452	16,295
2156	8,952	4,910	0	0	2,459	16,321
2157	8,932	4,910	0	0	2,452	16,295
2158	16,120	26,474	0	0	2,452	45,046
2159	8,932	4,910	0	0	2,452	16,295
2160	8,952	4,910	0	0	2,459	16,321
2161	8,932	4,910	0	0	2,452	16,295
2162	8,932	4,910	0	0	2,452	16,295
2163	12,526	15,692	0	0	2,452	30,670
2164	8,952	4,910	0	0	2,459	16,321
2165	8,932	4,910	0	0	2,452	16,295
2166	9,651	7,067	0	0	2,452	19,170
2167	8,932	4,910	0	0	2,452	16,295
2168	19,735	37,258	0	0	2,459	59,451
2169	8,932	4,910	0	0	2,452	16,295
2170	8,932	4,910	0	0	2,452	16,295
2171	8,932	4,910	0	0	2,452	16,295
2172	8,952	4,910	0	0	2,459	16,321
2173	8,932	4,910	0	0	2,452	16,295
2174	8,932	4,910	0	0	2,452	16,295
2175	8,932	4,910	0	0	2,452	16,295
2176	8,952	4,910	0	0	2,459	16,321
2177	8,932	4,910	0	0	2,452	16,295
2178	8,932	4,910	0	0	2,452	16,295
2179	8,932	4,910	0	0	2,452	16,295

TABLE 3.8 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

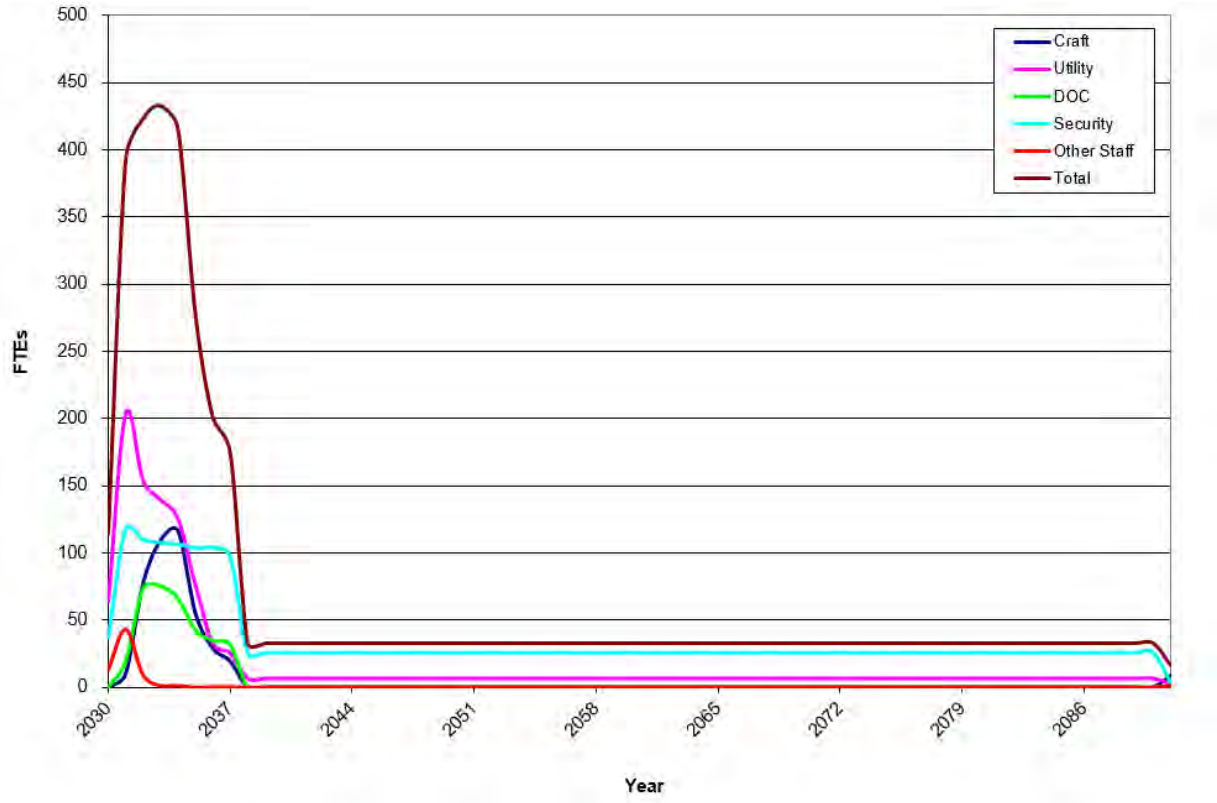
Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2180	8,952	4,910	0	0	2,459	16,321
2181	8,932	4,910	0	0	2,452	16,295
2182	8,932	4,910	0	0	2,452	16,295
2183	8,932	4,910	0	0	2,452	16,295
2184	34,110	80,383	0	0	2,459	116,951
2185	8,932	4,910	0	0	2,452	16,295
2186	8,932	4,910	0	0	2,452	16,295
2187	8,932	4,910	0	0	2,452	16,295
2188	8,952	4,910	0	0	2,459	16,321
2189	8,932	4,910	0	0	2,452	16,295
2190	8,932	4,910	0	0	2,452	16,295
2191	8,932	4,910	0	0	2,452	16,295
2192	9,672	7,070	0	0	2,459	19,201
2193	10,192	8,690	0	0	2,452	21,334
2194	9,112	5,450	0	0	2,452	17,015
2195	10,012	8,150	0	0	2,452	20,614
2196	10,392	9,230	0	0	2,459	22,081
2197	7,296	0	0	0	2,452	9,747
2198	7,296	0	0	0	2,452	9,747
2199	7,296	0	0	0	2,452	9,747
2200	7,296	0	0	0	2,452	9,747
2201	7,296	0	0	0	2,452	9,747
2202	7,296	0	0	0	2,452	9,747
2203	7,296	0	0	0	2,452	9,747
2204	7,316	0	0	0	2,459	9,774
2205	7,296	0	0	0	2,452	9,747
2206	7,296	0	0	0	2,452	9,747
2207	7,296	0	0	0	2,452	9,747
2208	15,223	23,722	0	0	2,459	41,403
2209	7,296	0	0	0	2,452	9,747

TABLE 3.8 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2210	7,296	0	0	0	2,452	9,747
2211	7,296	0	0	0	2,452	9,747
2212	7,316	0	0	0	2,459	9,774
2213	10,890	10,782	0	0	2,452	24,123
2214	7,296	0	0	0	2,452	9,747
2215	7,296	0	0	0	2,452	9,747
2216	8,034	2,156	0	0	2,459	12,649
2217	7,296	0	0	0	2,452	9,747
2218	17,878	31,746	0	0	2,452	52,075
2219	7,918	1,868	0	0	2,452	12,238
2220	7,835	1,557	0	0	2,459	11,850
2221	7,815	1,557	0	0	2,452	11,823
2222	7,815	1,557	0	0	2,452	11,823
2223	7,918	1,868	0	0	2,452	12,238
2224	7,835	1,557	0	0	2,459	11,850
2225	7,815	1,557	0	0	2,452	11,823
2226	7,815	1,557	0	0	2,452	11,823
2227	7,918	1,868	0	0	2,452	12,238
2228	7,835	1,557	0	0	2,459	11,850
2229	7,815	1,557	0	0	2,452	11,823
2230	7,451	1,976	0	0	7,406	16,833
2231	1,941	1,243	22	354	3,617	7,177
Total	2,444,586	1,500,117	24,005	145,004	782,589	4,896,302

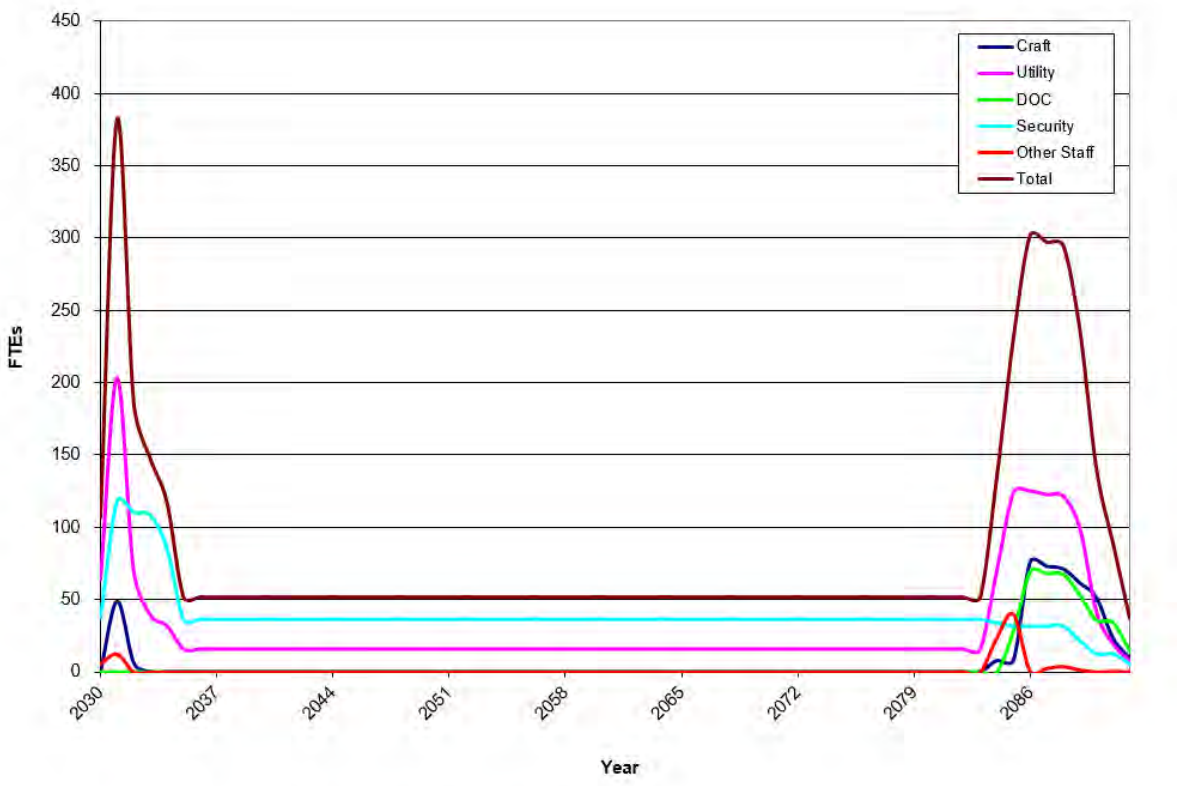
Note: Columns may not add due to rounding

FIGURE 3.1
SCENARIO 2: DECON WITH 60 YEAR DFS
MONTICELLO NUCLEAR GENERATING PLANT
MANPOWER LEVELS



Note that the labor hour basis of this chart was taken from Appendix D; however not all line items in Appendix D have labor hour values available (e.g. spent fuel canister loading estimates from Xcel Energy)

FIGURE 3.2
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
MONTICELLO NUCLEAR GENERATING PLANT
MANPOWER LEVELS



Note that the labor hour basis of this chart was taken from Appendix H; however not all line items in Appendix H have labor hour values available (e.g. spent fuel canister loading estimates from Xcel Energy)

4. SCHEDULE ESTIMATE

The schedules for the decommissioning scenarios considered in this study follow the sequence presented in the AIF/NESP-036 study, with minor changes to reflect recent experience and site-specific constraints. In addition, the scheduling has been revised to reflect the spent fuel management plans described in Section 3.4.1.

A schedule or sequence of activities for the DECON alternative is presented in Figure 4.1. The schedule is also representative of the work activities identified in the delayed dismantling scenarios, absent any spent fuel constraints. The scheduling sequence is based on the fuel being removed from the spent fuel pool within the first four years after operations cease. The key activities listed in the schedule do not reflect a one-to-one correspondence with those activities in the cost tables, but reflect dividing some activities for clarity and combining others for convenience. The schedule was prepared using the "Microsoft Project Professional" computer software. [43]

4.1 SCHEDULE ESTIMATE ASSUMPTIONS

The schedule reflects the results of a precedence network developed for the site decommissioning activities, i.e., a PERT (Program Evaluation and Review Technique) Software Package. The work activity durations used in the precedence network reflect the actual man-hour estimates from the cost table, adjusted by stretching certain activities over their slack range and shifting the start and end dates of others. The following assumptions were made in the development of the decommissioning schedule:

- The reactor building is isolated until such time that all spent fuel has been discharged from the storage pool to the ISFSI. Decontamination and dismantling of the spent fuel storage pool is initiated once the transfer of spent fuel is complete (DECON option).
- All work (except vessel and internals removal) is performed during an 8-hour workday, 5 days per week, with no overtime. There are eleven paid holidays per year.
- Reactor and internals removal activities are performed by using separate crews for different activities working on different shifts, with a corresponding backshift charge for the second shift.
- Multiple crews work parallel activities to the maximum extent possible, consistent with optimum efficiency, adequate access for cutting, removal and laydown space, and with the stringent safety measures necessary during demolition of heavy components and structures.

- For plant systems removal, the systems with the longest removal durations in areas on the critical path are considered to determine the duration of the activity.

4.2 PROJECT SCHEDULE

The period-dependent costs presented in the detailed cost tables are based upon the durations developed in the schedules for decommissioning Monticello. Durations are established between several milestones in each project period; these durations are used to establish a critical path for the entire project. In turn, the critical path duration for each period is used as the basis for determining the period-dependent costs. A second parallel path is also shown for the spent fuel cooling period, which determines the release of the reactor building for final decontamination.

Project timelines are provided in Figures 4.2 through 4.9, with milestone dates based on a 2030 shutdown date. The spent fuel pool is emptied approximately four years after shutdown, while ISFSI operations continue until the DOE completes the transfer of assemblies. Deferred decommissioning operations in the all scenarios are assumed to commence so that the operating license is terminated within a 60-year period from the cessation of operations.

FIGURE 4.1
DECON ACTIVITY SCHEDULE

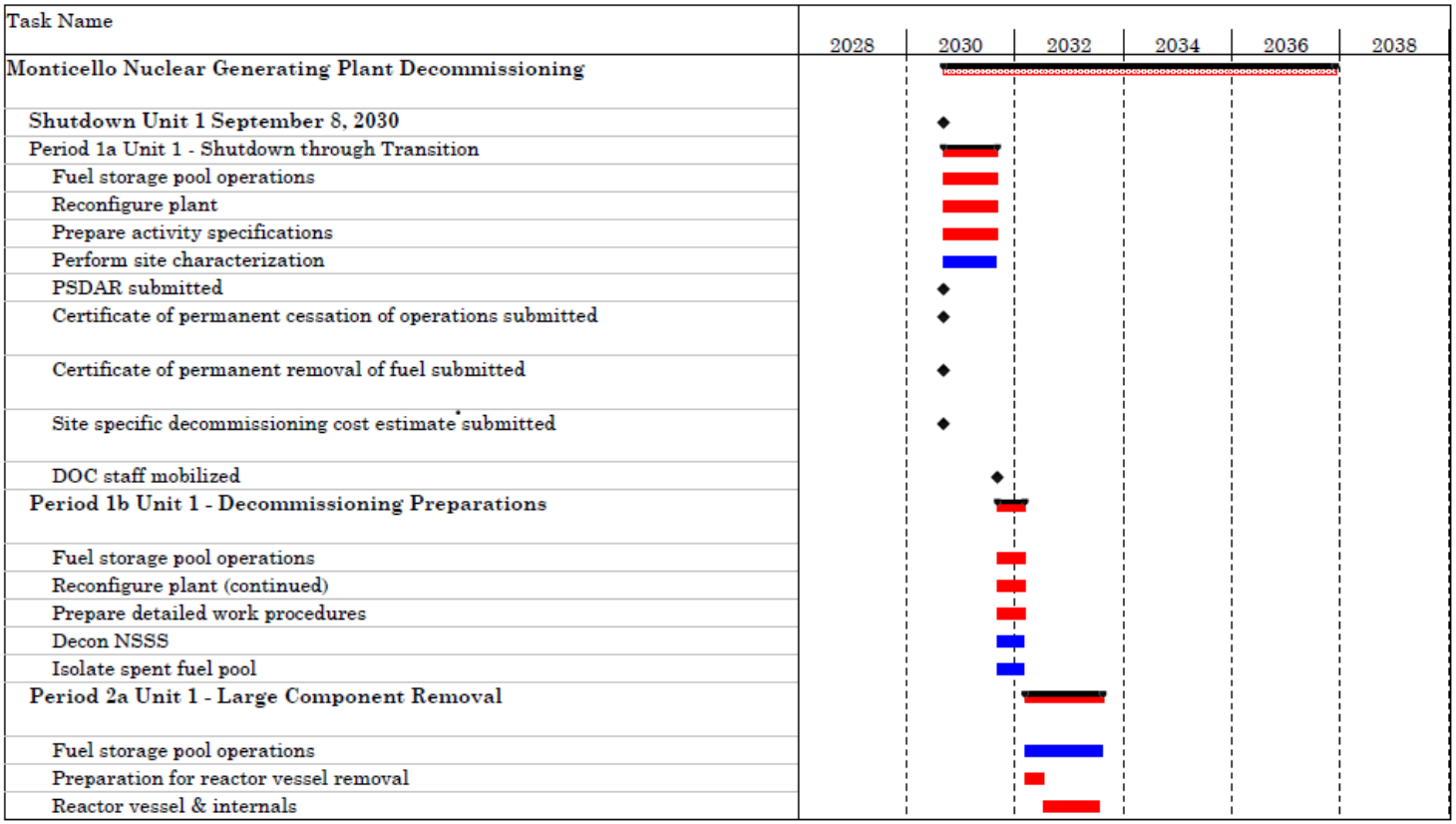
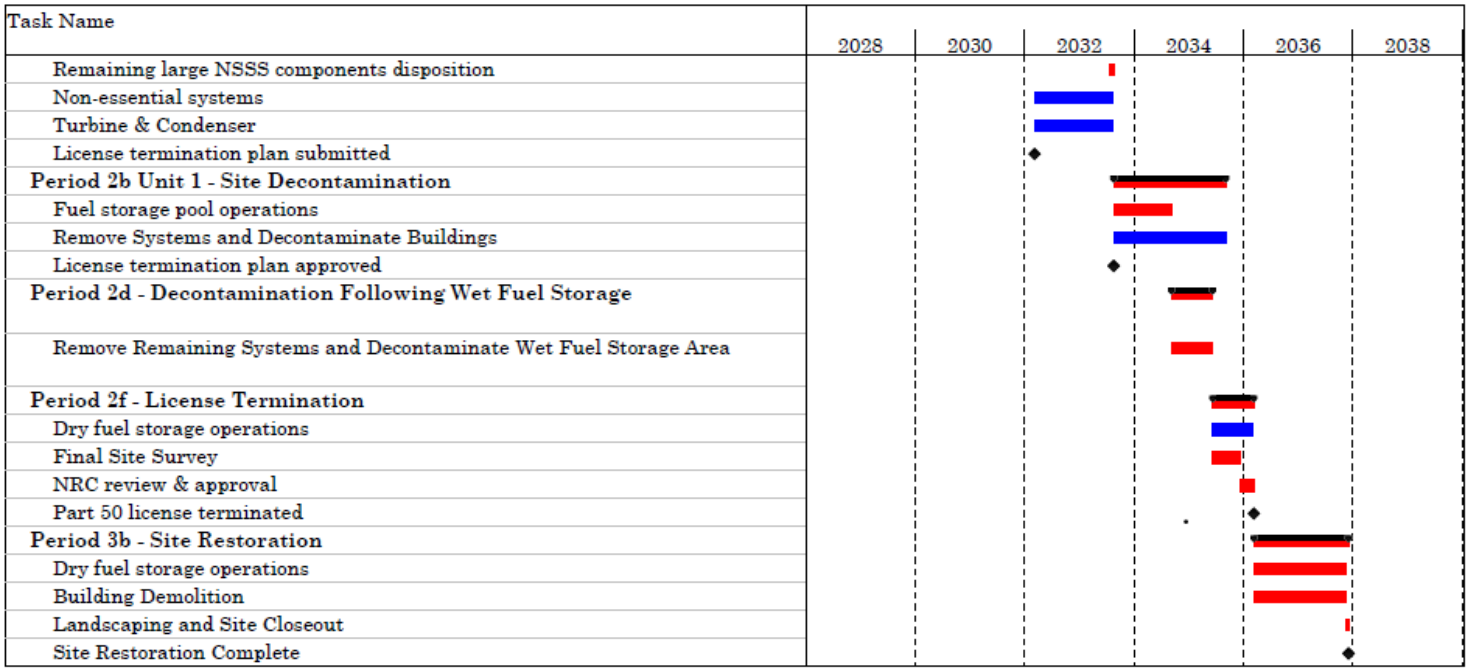


FIGURE 4.1 (continued)
DECON ACTIVITY SCHEDULE



1. Red scheduling bars indicate critical path activities
2. Blue scheduling bars associated with non-critical path activities
3. Diamond symbols indicate major milestones

FIGURE 4.2
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING TIMELINE

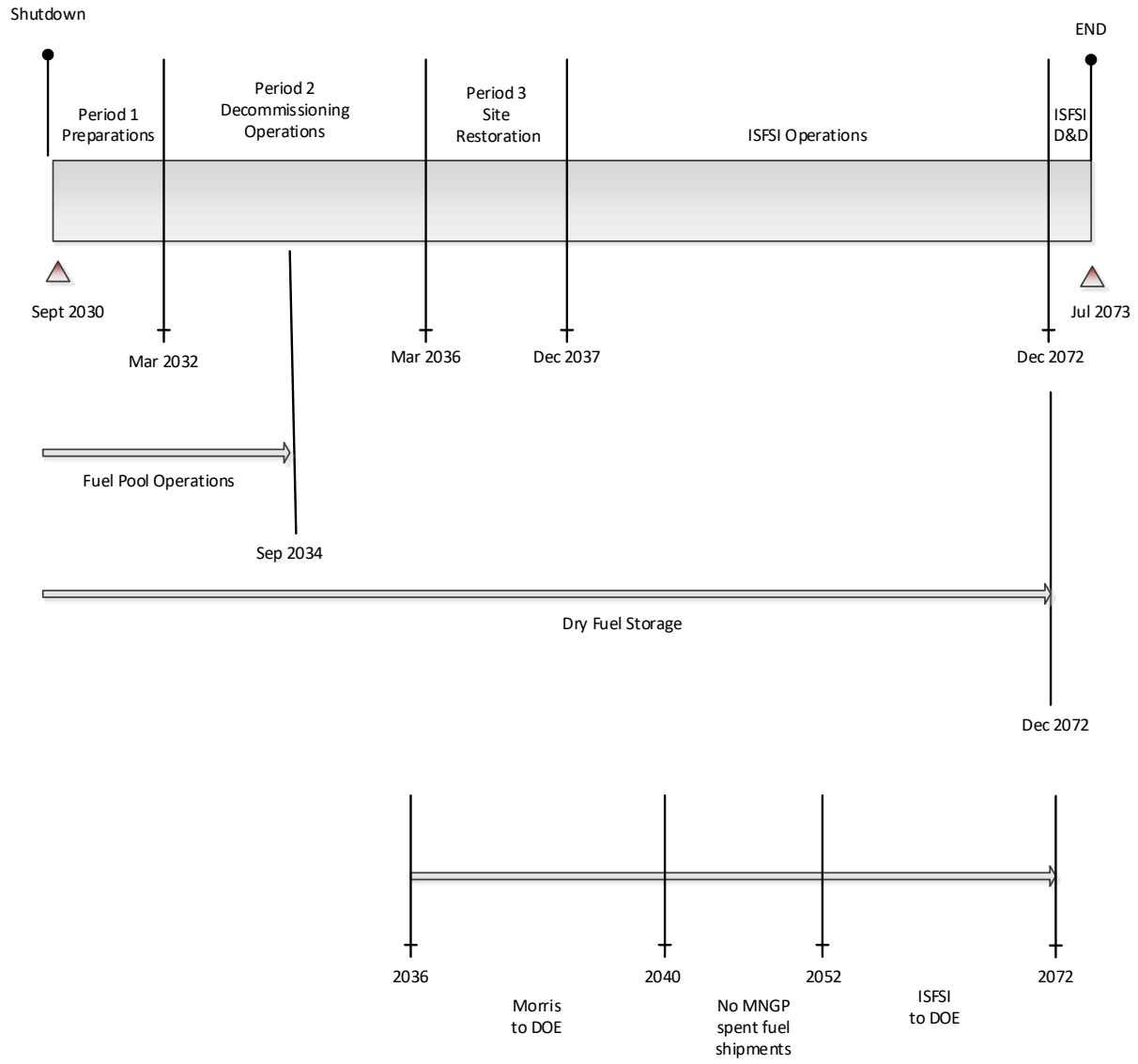


FIGURE 4.3
SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

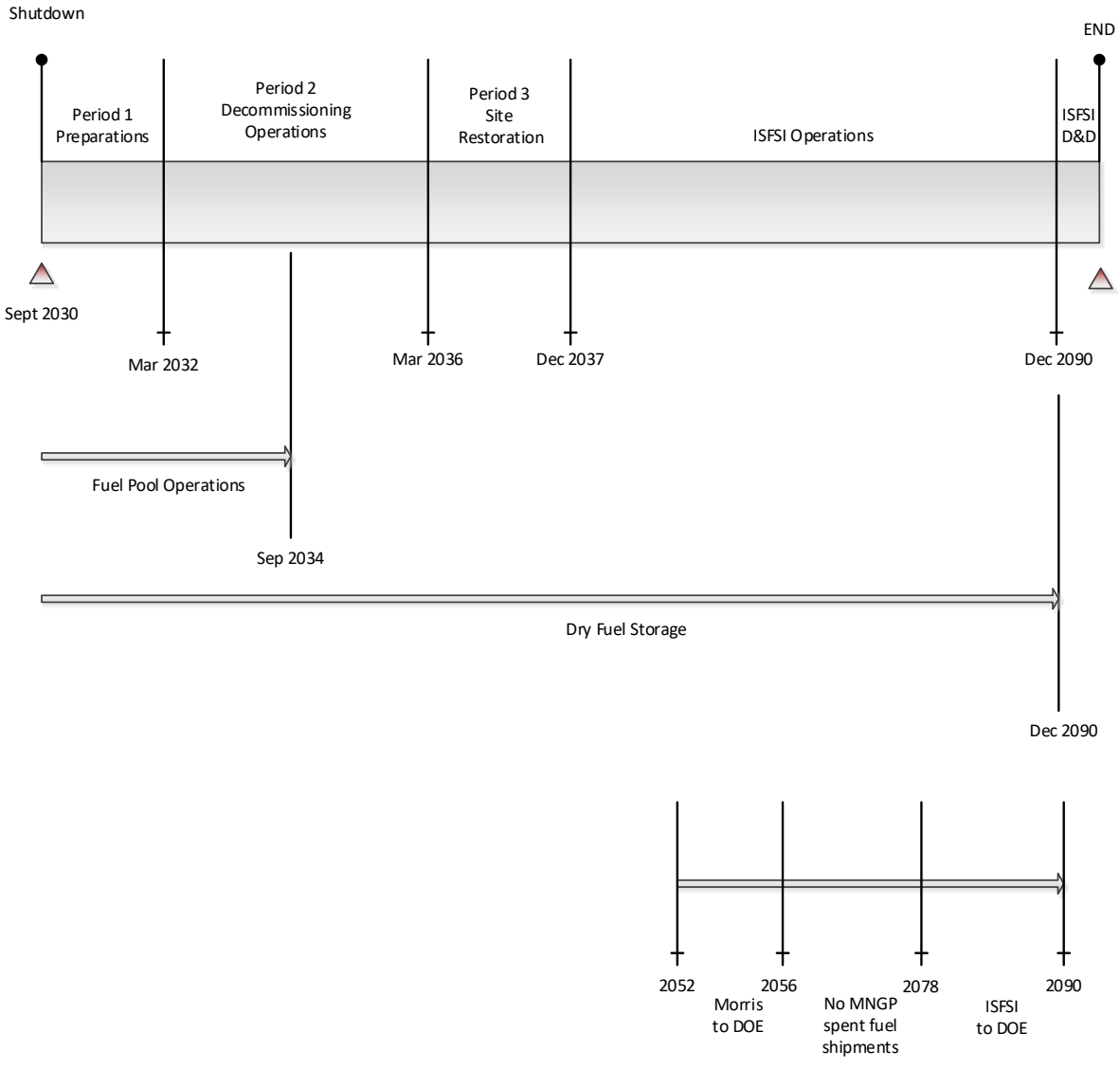


FIGURE 4.4
SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING TIMELINE

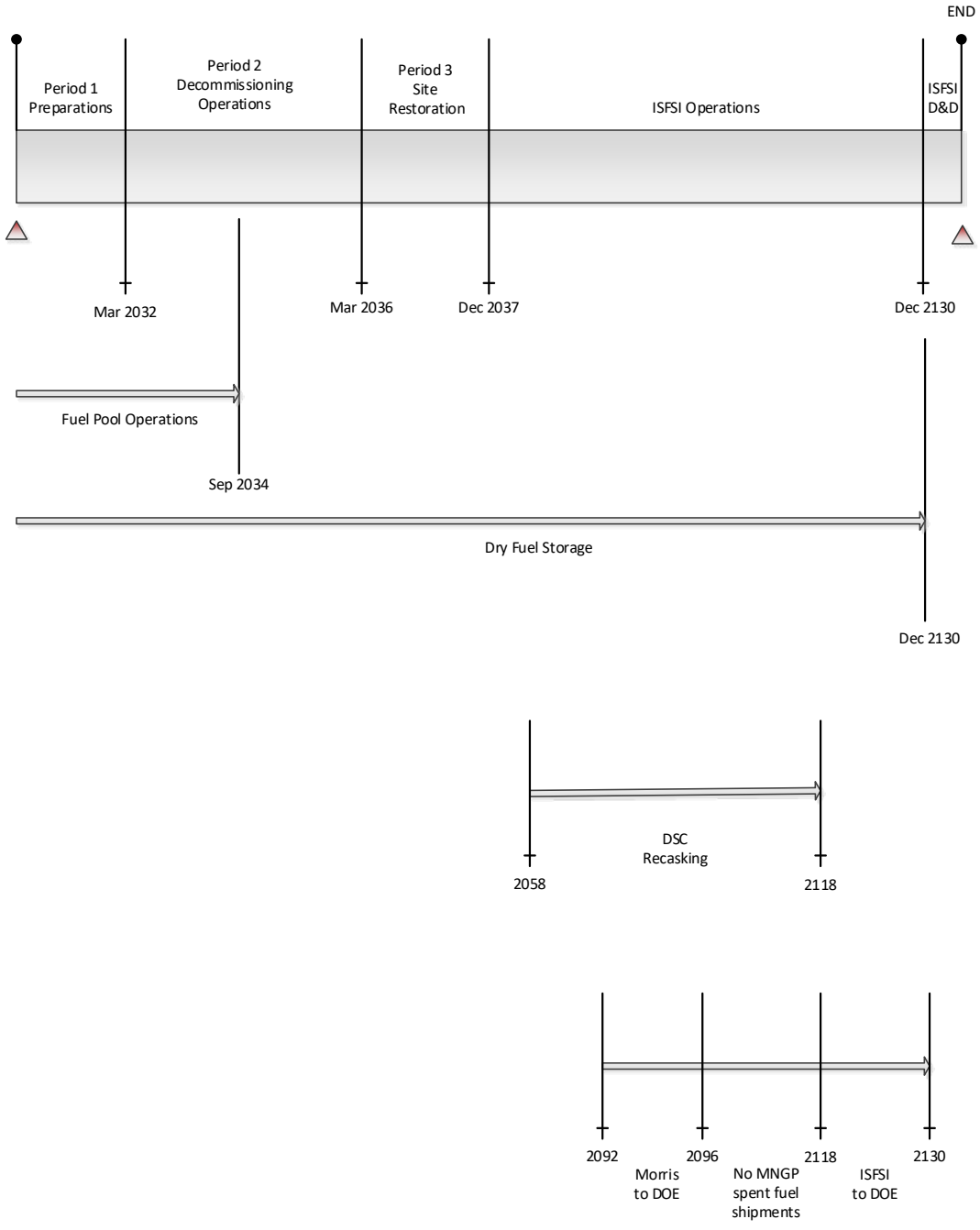


FIGURE 4.5
SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

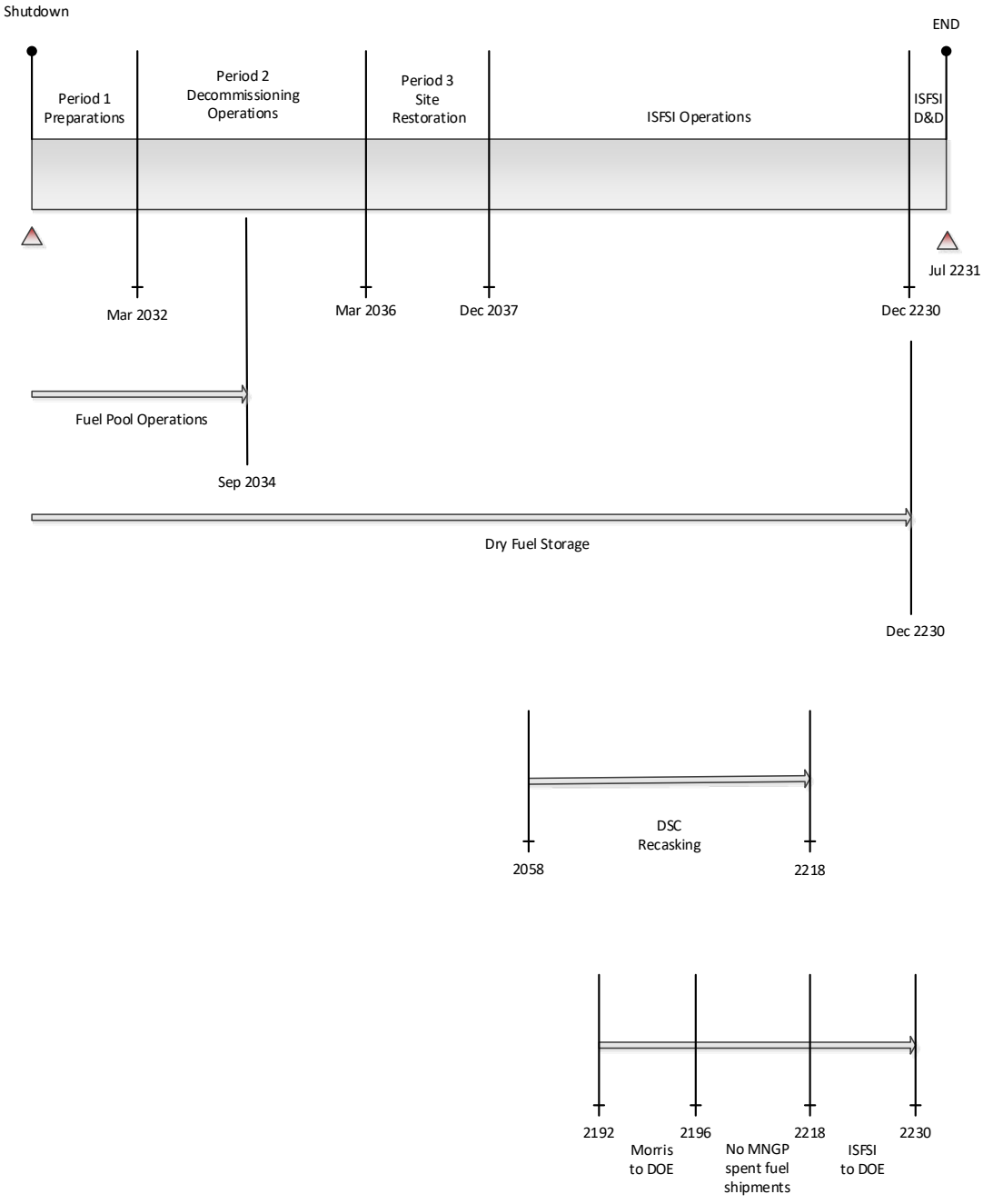


FIGURE 4.6
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
DECOMMISSIONING TIMELINE

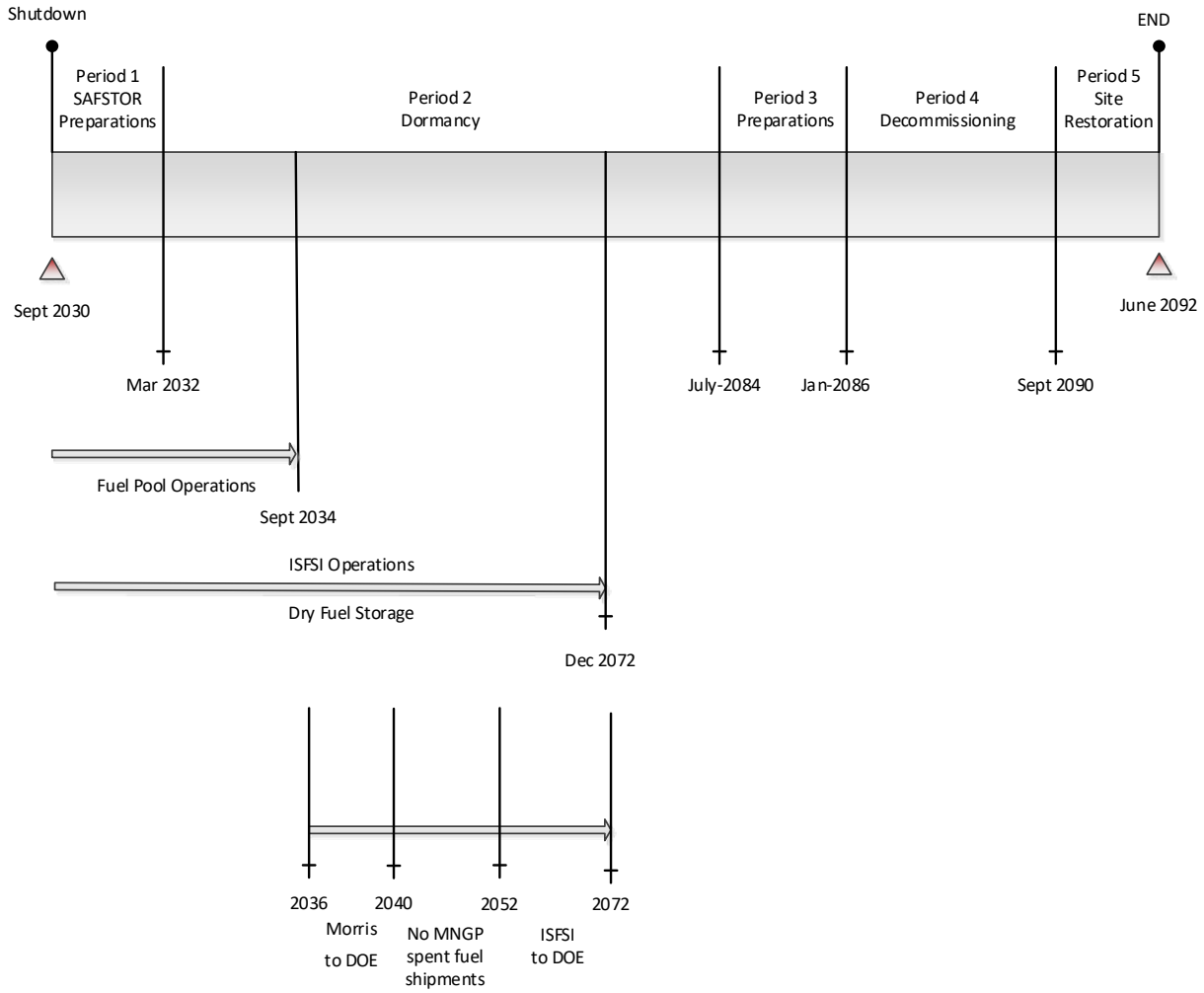


FIGURE 4.7
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

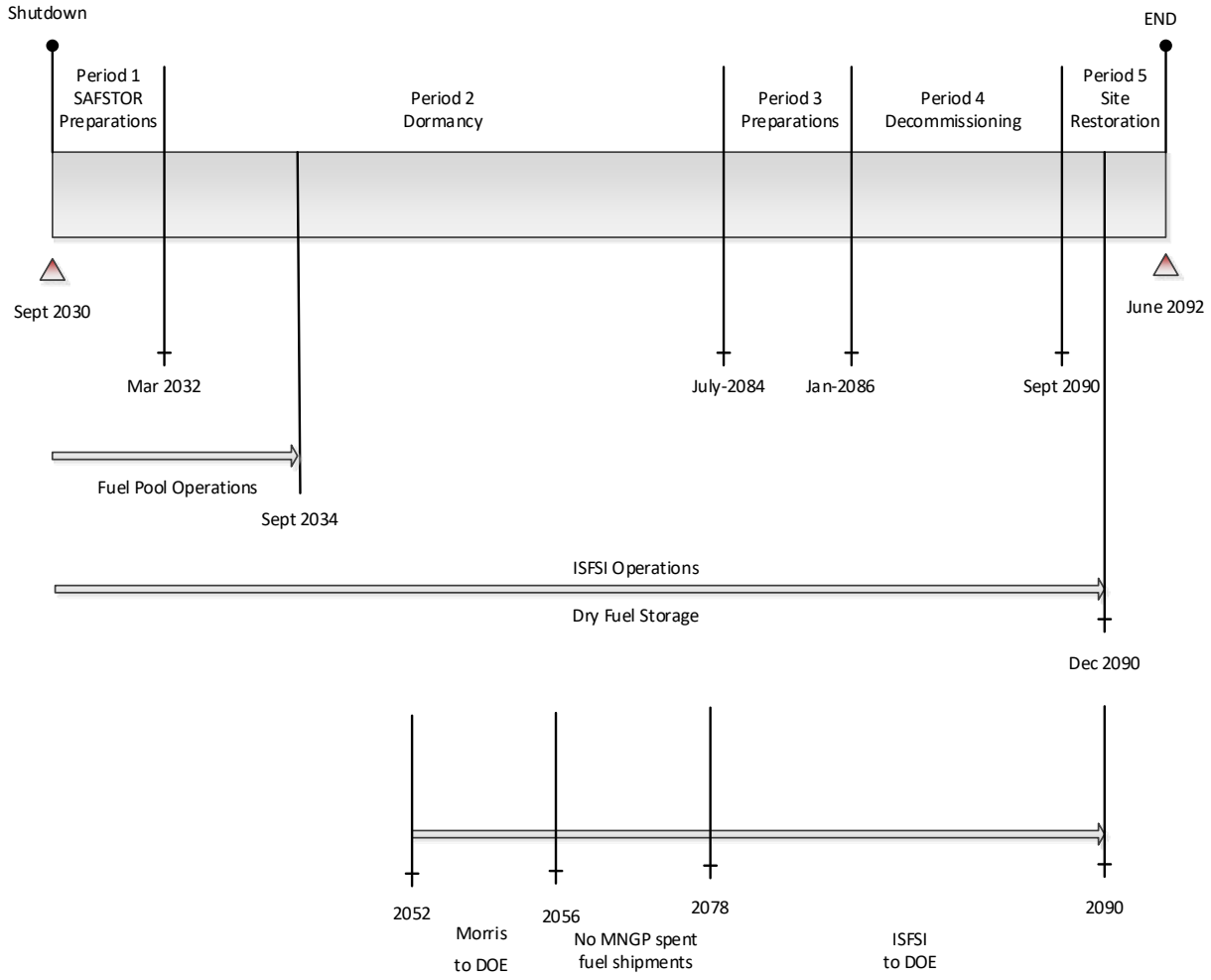
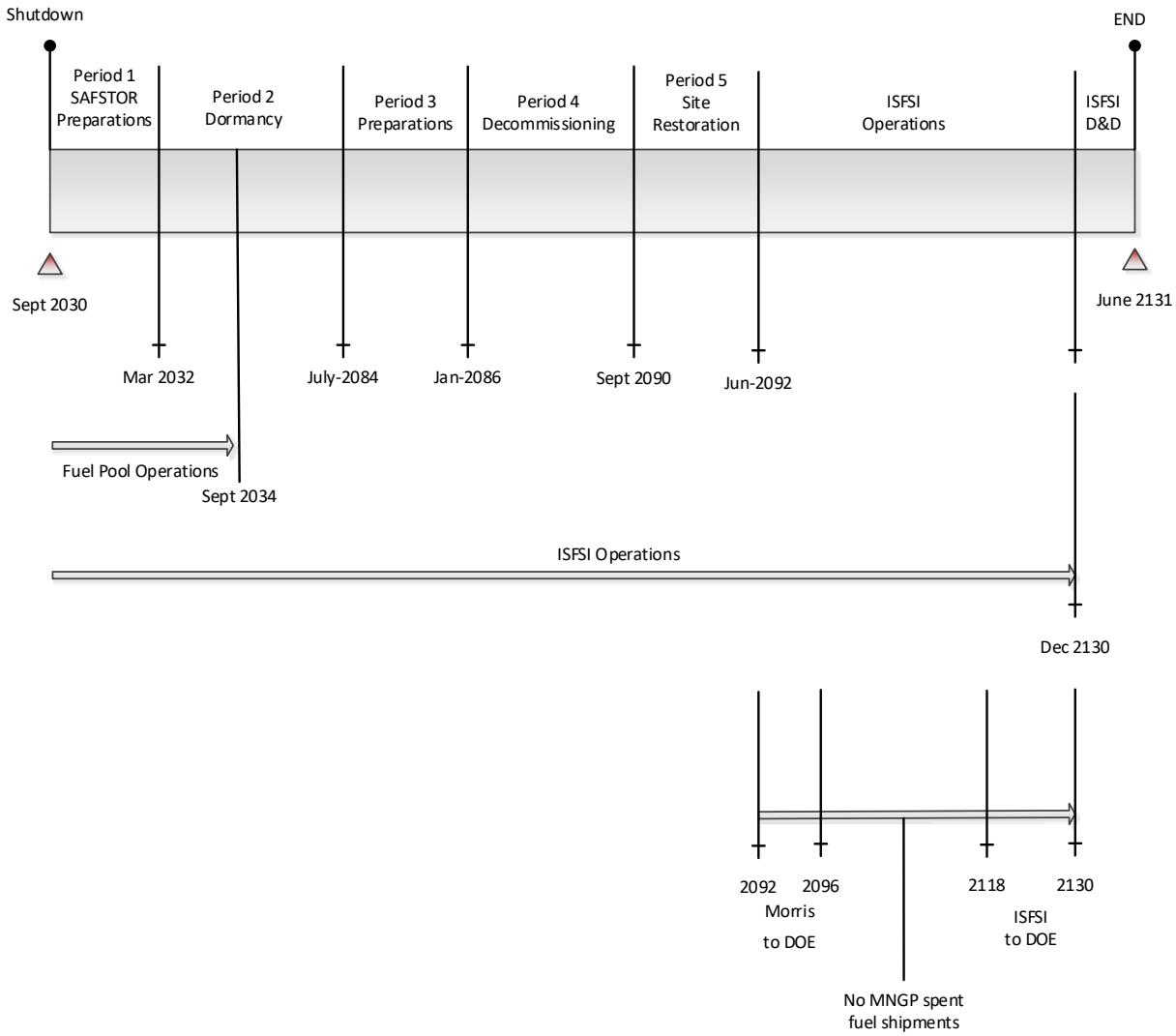


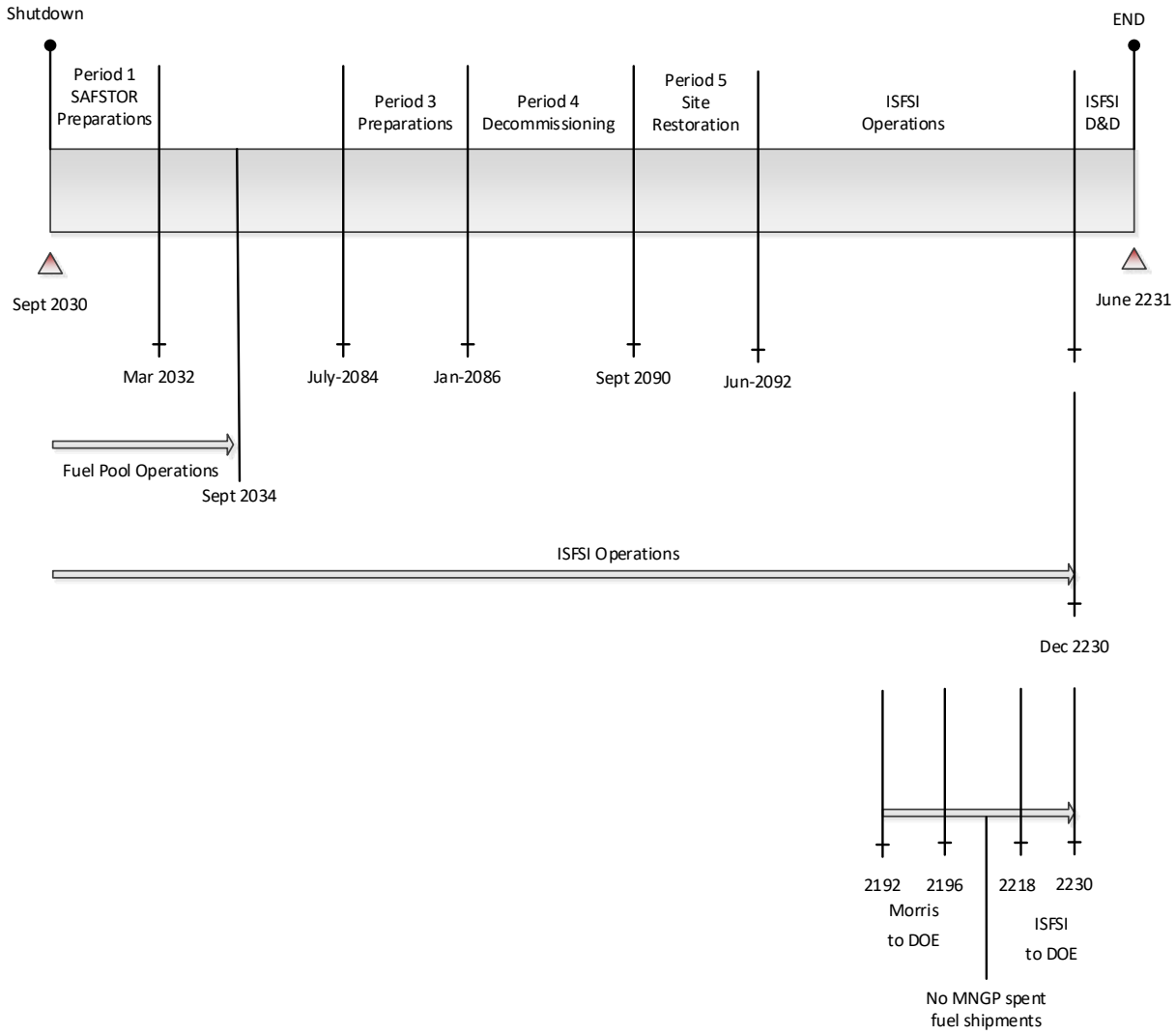
FIGURE 4.8
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)



Recasking campaigns occur 2058 through 2084, and 2108 through 2118.

DOE pickup of fuel occurs from 2118 to 2130.

FIGURE 4.9
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)



Recasking campaigns occur 2058 through 2084, 2108 through 2134, 2158 through 2184, and 2208 through 2218.

DOE pickup of fuel occurs from 2218 to 2130.

5. RADIOACTIVE WASTES

The objectives of the decommissioning process are the removal of all radioactive material from the site that would restrict its future use and the termination of the NRC license. This currently requires the remediation of all radioactive material at the site in excess of applicable legal limits. Under the Atomic Energy Act, [44] the NRC is responsible for protecting the public from sources of ionizing radiation. Title 10 of the Code of Federal Regulations delineates the production, utilization, and disposal of radioactive materials and processes. In particular, Part 71 defines radioactive material as it pertains to transportation and Part 61 specifies its disposition.

Most of the materials being transported for controlled burial are categorized as Low Specific Activity (LSA) or Surface Contaminated Object (SCO) materials containing Type A quantities, as defined in 49 CFR Parts 173-178. Shipping containers are required to be Industrial Packages (IP-1, IP-2 or IP-3, as defined in 10 CFR §173.411). For this study, commercially available steel containers are presumed to be used for the disposal of piping, small components, and concrete. Larger components can serve as their own containers, with proper closure of all openings, access ways, and penetrations.

The destinations for the various waste streams from decommissioning are identified in Figures 5.1 and 5.2. The volumes of radioactive waste generated during the various decommissioning activities at the site are shown on a line-item basis in Appendices C through J and summarized in Tables 5.1 through 5.8. The quantified waste volume summaries shown in these tables are consistent with §61 classifications. The volumes are calculated based on the exterior dimensions for containerized material and on the displaced volume of components serving as their own waste containers.

The reactor vessel and internals are categorized as large quantity shipments and, accordingly, will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume, as well as the special handling requirements of the payload. Packaging efficiencies are lower for the highly activated materials (greater than Type A quantity waste), where high concentrations of gamma-emitting radionuclides limit the capacity of the shipping canisters.

No process system containing/handling radioactive substances at shutdown is presumed to meet material release criteria by decay alone, i.e., systems radioactive at shutdown will still be radioactive over the time period during which the decommissioning is accomplished, due to the presence of long-lived radionuclides.

While the dose rates decrease with time, radionuclides such as ^{137}Cs will still control the disposition requirements.

The waste material generated in the decontamination and dismantling of Monticello is primarily generated during Period 2 of the DECON alternatives and Period 4 of the SAFSTOR alternatives. Material that is considered potentially contaminated when removed from the radiologically controlled area is sent to processing facilities in Tennessee for conditioning and disposal. Heavily contaminated components and activated materials are routed for controlled disposal. The disposal volumes reported in the tables reflect the savings resulting from reprocessing and recycling.

Disposal fees are calculated using representative costs, with surcharges added for the highly activated components, for example, generated in the segmentation of the reactor vessel. The cost to dispose of the majority of the material generated from the decontamination and dismantling activities is based upon representative rates.

Energy*Solutions* is not able to accept the higher activity waste (Class B and C) generated in the decontamination of the NSSS and segmentation of the components closest to the core. Waste disposal costs for the higher activity waste (Class B and C) are based upon preliminary and indicative information on the cost for such from WCS.

A small quantity of material generated during the Monticello decommissioning will not be considered suitable for near-surface disposal, and is assumed to be disposed of in a geologic repository, in a manner similar to that envisioned for spent fuel disposal. Such material, known as Greater-Than-Class-C or GTCC material, is estimated to require four spent fuel storage canisters (or the equivalent) to dispose of the most radioactive portions of the reactor vessel internals. The volume and weight reported in Tables 5.1 through 5.8 represent the packaged weight and volume of the spent fuel storage canisters.

FIGURE 5.1
RADIOACTIVE WASTE DISPOSITION

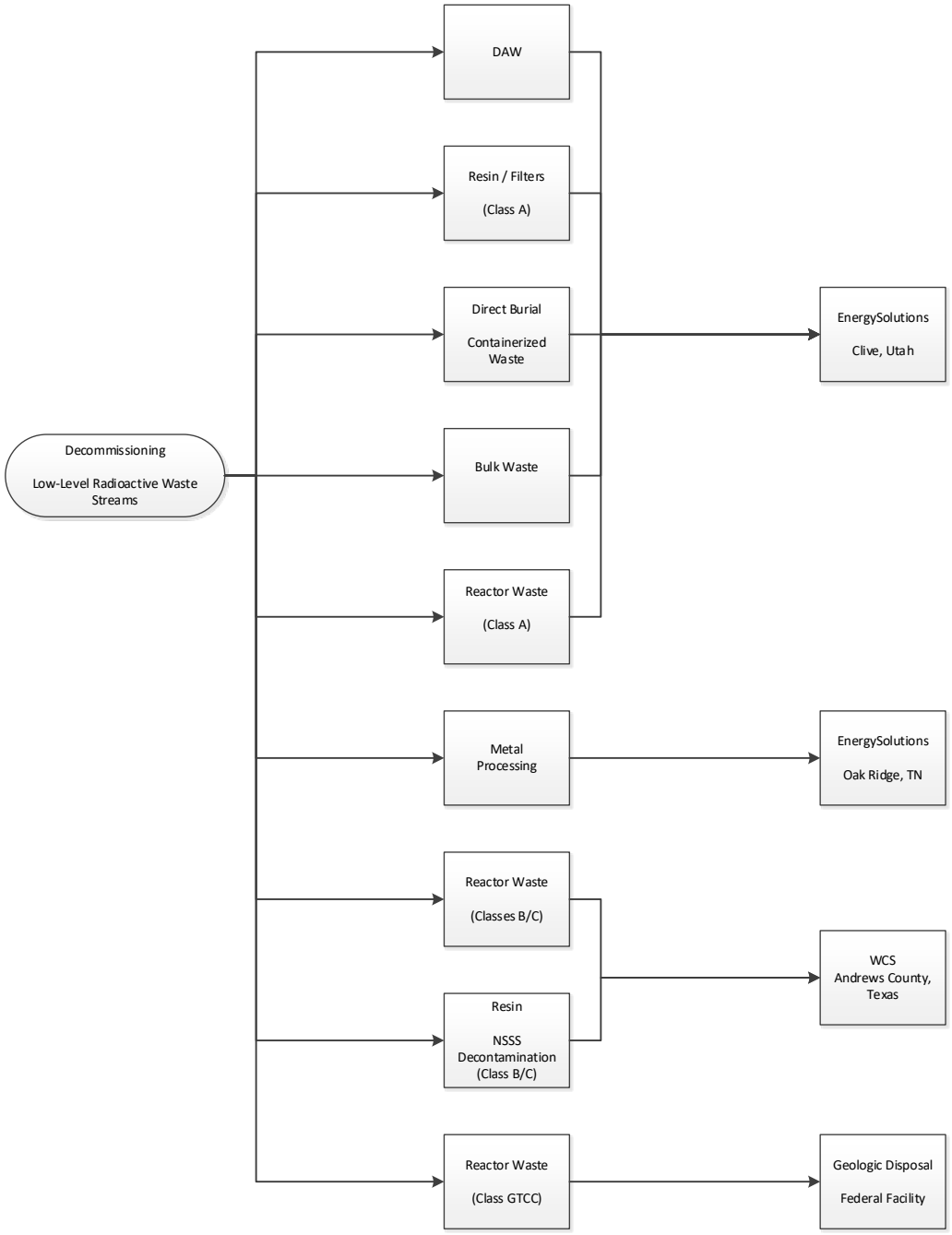
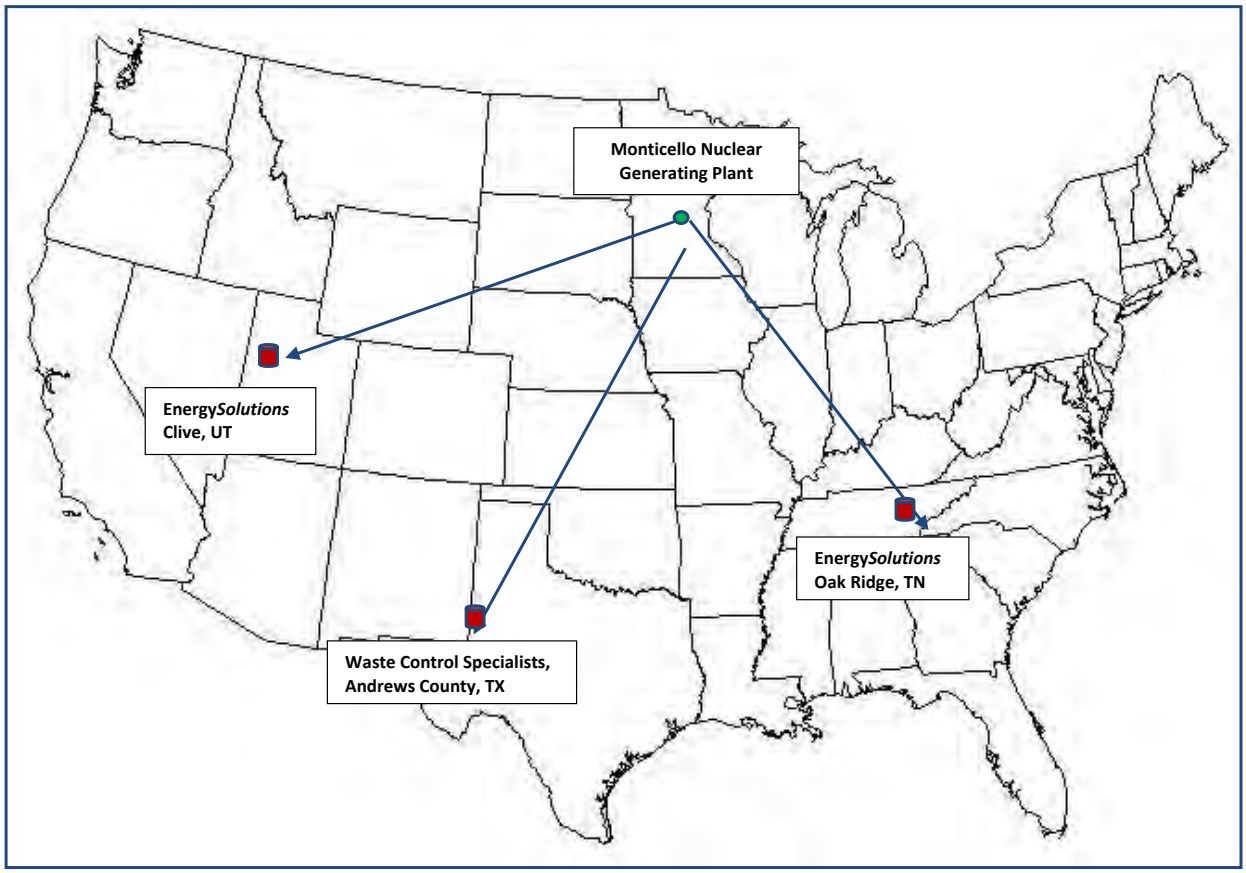


FIGURE 5.2
DECOMMISSIONING WASTE DESTINATIONS
RADIOLOGICAL



The figure indicates the destinations for the low-level radioactive waste designated for direct disposal (Clive, Utah) and processing/recovery (Oak Ridge, Tennessee).

Disposition of the Class B and C low-level radioactive waste will be at the Waste Control Specialists site in Andrews County, Texas.

Disposal options (and destinations) for GTCC are still being evaluated.

TABLE 5.1
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	122,218	7,165,609
	Energy*Solutions* Bulk	A	75,053	4,661,497
	Future LLRW Disposal Facility (Proxy)	B	1,992	228,038
	Future LLRW Disposal Facility (Proxy)	C	898	67,710
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,160	225,765
Total [2]			201,320	12,348,619
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	288,203	12,125,960
Scrap Metal				46,246,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.2
SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	122,218	7,165,609
	Energy*Solutions* Bulk	A	75,053	4,661,497
	Future LLRW Disposal Facility (Proxy)	B	1,992	228,038
	Future LLRW Disposal Facility (Proxy)	C	898	67,710
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,160	225,765
Total [2]			201,320	12,348,619
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	288,203	12,125,960
Scrap Metal				46,246,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.3
SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	122,218	7,169,509
	Energy*Solutions* Bulk	A	75,048	4,661,403
	Future LLRW Disposal Facility (Proxy)	B	1,992	228,038
	Future LLRW Disposal Facility (Proxy)	C	898	67,710
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,160	225,765
Total [2]			201,315	12,352,425
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	288,203	12,125,960
Scrap Metal				46,246,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.4
SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	122,218	7,169,509
	Energy*Solutions* Bulk	A	75,048	4,661,403
	Future LLRW Disposal Facility (Proxy)	B	1,992	228,038
	Future LLRW Disposal Facility (Proxy)	C	898	67,710
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,160	225,765
Total [2]			201,315	12,352,425
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	288,203	12,125,960
Scrap Metal				46,246,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.5
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	48,786	3,102,783
	Energy*Solutions* Bulk	A	104,319	5,908,877
	Future LLRW Disposal Facility (Proxy)	B	1,628	142,266
	Future LLRW Disposal Facility (Proxy)	C	600	60,128
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,160	225,765
Total [2]			156,493	9,439,818
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	340,180	14,286,120
Scrap Metal				46,246,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.6
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	48,786	3,102,783
	Energy*Solutions* Bulk	A	104,436	5,911,207
	Future LLRW Disposal Facility (Proxy)	B	1,628	142,266
	Future LLRW Disposal Facility (Proxy)	C	600	60,128
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,160	225,765
Total [2]			156,609	9,442,148
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	340,180	14,286,120
Scrap Metal				46,246,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.7
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	48,784	3,106,599
	Energy*Solutions* Bulk	A	104,397	5,910,437
	Future LLRW Disposal Facility (Proxy)	B	1,628	142,266
	Future LLRW Disposal Facility (Proxy)	C	600	60,128
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,160	225,765
Total [2]			156,569	9,445,194
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	340,180	14,286,120
Scrap Metal				46,246,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.8
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	48,784	3,106,599
	Energy*Solutions* Bulk	A	104,397	5,910,437
	Future LLRW Disposal Facility (Proxy)	B	1,628	142,266
	Future LLRW Disposal Facility (Proxy)	C	600	60,128
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,160	225,765
Total [2]			156,569	9,445,194
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	340,180	14,286,120
Scrap Metal				46,246,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

6. RESULTS

This report presents estimates of the cost to decommission Monticello for the selected decommissioning scenarios following the cessation of plant operations. The estimates are based on numerous fundamental assumptions, including regulatory requirements, project contingencies, low-level radioactive waste disposal practices, high-level radioactive waste management options, and site restoration requirements. While not an engineering study, the estimates provide Xcel Energy with sufficient information to assess their financial obligations, as they pertain to the eventual decommissioning of the nuclear station.

The decommissioning scenarios assume continued operation of the station's spent fuel pool for a minimum of four years following the cessation of operations for continued cooling of the assemblies. The existing ISFSI is expanded to accommodate the spent fuel, once sufficiently cooled, until such time that the DOE can complete the transfer of the assemblies to its repository.

Using Scenario 2 as the base case, the cost projected to promptly decommission the station, restore the site, and manage the spent fuel is estimated to be $1.613 billion (2020 dollars). The majority of this cost (approximately 48.1%) is associated with the physical decontamination and dismantling of the nuclear plant so that the operating license can be terminated. Another 47.3% is associated with the management, interim storage, and eventual transfer of the spent fuel. The remaining 4.6% is for the demolition of the designated structures and limited restoration of the site.

The primary cost contributors, identified in Tables 6.1 through 6.8, are either labor-related or associated with the management and disposition of the spent fuel or radioactive waste. Program management (including security) is the largest single contributor to the overall cost. The magnitude of the expense is a function of both the size of the organization required to manage the decommissioning, as well as the duration of the program. It is assumed, for purposes of this analysis, that Xcel Energy will hire a contractor to manage the decommissioning labor force. The size and composition of the management organizations varies with the decommissioning phase and associated site activities. However, once the operating license is amended or terminated, the staff is substantially reduced for the conventional demolition and restoration of the site, and the long-term care of the spent fuel (for the DECON alternative).

As described in this report, the spent fuel pool will remain operational for a minimum of four years following the cessation of operations. The pool will be isolated and an independent spent fuel island created. This will allow

decommissioning operations to proceed in and around the pool areas. Over the four year period, the spent fuel will be packaged into transportable canisters for future loading into a DOE-provided transport cask or relocation to the ISFSI. The canisters will be stored in horizontal storage casks at the ISFSI until the DOE is able to receive them. Dry storage of the fuel provides additional flexibility in the event the DOE is not able to meet the current timetable for completing the transfer of assemblies to an off-site facility and minimizes the associated caretaking expenses.

The cost for waste disposal includes only those costs associated with the controlled disposition of the low-level radioactive waste generated from decontamination and dismantling activities, including plant equipment and components, structural material, filters, resins and dry-active waste. As described in Section 5, disposition of the majority of the low-level radioactive material requiring controlled disposal is at the Energy*Solutions* facility, with higher-activity waste sent to the WCS facility. Highly activated components, requiring additional isolation from the environment (GTCC), are packaged for geologic disposal. The cost of geologic disposal is based upon a cost equivalent for spent fuel.

A significant portion of the metallic waste is designated for additional processing and treatment at an off-site facility. Processing reduces the volume of material requiring controlled disposal through such techniques and processes as survey and sorting, decontamination, and volume reduction. The material that cannot be unconditionally released is packaged for controlled disposal at one of the currently operating facilities. The cost identified in the summary tables for processing is all-inclusive, incorporating the ultimate disposition of the material.

Removal costs reflect the labor-intensive nature of the decommissioning process, as well as the management controls required to ensure a safe and successful program. Decontamination and packaging costs also have a large labor component that is based upon prevailing wages. Non-radiological demolition is a natural extension of the decommissioning process. The methods employed in decontamination and dismantling are generally destructive and indiscriminate in inflicting collateral damage. With a work force mobilized to support decommissioning operations, non-radiological demolition can be an integrated activity and a logical expansion of the work being performed in the process of terminating the operating license.

The reported cost for transport includes the tariffs and surcharges associated with moving large components and/or overweight shielded casks overland, as well as the general expense, e.g., labor and fuel, of transporting material to the destinations identified in this report. For purposes of this analysis, material is moved overland by truck.

Decontamination is used to reduce the plant's radiation fields and minimize worker exposure. Slightly contaminated material or material located within a contaminated area is sent to an off-site processing center, i.e., this analysis does not assume that contaminated plant components and equipment can be decontaminated for uncontrolled release in-situ. Centralized processing centers have proven to be a more economical means of handling the large volumes of material produced in the dismantling of a nuclear plant.

License termination survey costs are associated with the labor intensive and complex activity of verifying that contamination has been removed from the site to the levels specified by the regulating agency. This process involves a systematic survey of all remaining plant surface areas and surrounding environs, sampling, isotopic analysis, and documentation of the findings. The status of any plant components and materials not removed in the decommissioning process will also require confirmation and will add to the expense of surveying the facilities alone.

The remaining costs include allocations for heavy equipment and temporary services, as well as for other expenses such as regulatory fees and the premiums for nuclear insurance. While site operating costs are greatly reduced following the final cessation of plant operations, certain administrative functions do need to be maintained either at a basic functional or regulatory level.

TABLE 6.1
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total	Percentage
Decontamination	24,330	1.7%
Removal	124,923	8.9%
Packaging	26,543	1.9%
Transportation	14,145	1.0%
Waste Disposal	114,148	8.1%
Off-site Waste Processing	57,444	4.1%
Program Management [1]	291,793	20.8%
Security	300,359	21.4%
Spent Fuel Pool Isolation	14,576	1.0%
Spent Fuel Storage (Direct Costs) [2]	243,342	17.3%
Insurance and Regulatory Fees	39,755	2.8%
Energy	10,030	0.7%
Characterization and Licensing Surveys	23,012	1.6%
Property Taxes	55,377	3.9%
Miscellaneous Equipment	7,411	0.5%
Railroad Track Maintenance	6,915	0.5%
Retention and Severance	41,002	2.9%
Security Modifications	10,000	0.7%
Total [3]	1,405,104	100.0%

Cost Element	Total	Percentage
NRC License Termination	776,139	55.2%
Spent Fuel Management	555,579	39.5%
Site Restoration	73,386	5.2%
Total [3]	1,405,104	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.2
SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total	Percentage
Decontamination	24,330	1.5%
Removal	124,923	7.7%
Packaging	26,543	1.6%
Transportation	14,145	0.9%
Waste Disposal	114,148	7.1%
Off-site Waste Processing	57,444	3.6%
Program Management [1]	317,534	19.7%
Security	389,439	24.1%
Spent Fuel Pool Isolation	14,576	0.9%
Spent Fuel Storage (Direct Costs) [2]	301,663	18.7%
Insurance and Regulatory Fees	53,689	3.3%
Energy	10,030	0.6%
Characterization and Licensing Surveys	23,012	1.4%
Property Taxes	73,368	4.5%
Miscellaneous Equipment	7,411	0.5%
Railroad Track Maintenance	9,505	0.6%
Retention and Severance	41,002	2.5%
Security Modifications	10,000	0.6%
Total [3]	1,612,762	100.0%

Cost Element	Total	Percentage
NRC License Termination	776,139	48.1%
Spent Fuel Management	763,237	47.3%
Site Restoration	73,386	4.6%
Total [3]	1,612,762	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.3
SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total	Percentage
Decontamination	24,330	0.9%
Removal	125,011	4.7%
Packaging	26,543	1.0%
Transportation	14,145	0.5%
Waste Disposal	114,148	4.3%
Off-site Waste Processing	57,444	2.2%
Program Management [1]	502,435	19.0%
Security	587,397	22.2%
Spent Fuel Pool Isolation	14,576	0.6%
Spent Fuel Storage (Direct Costs) [2]	875,124	33.1%
Insurance and Regulatory Fees	84,655	3.2%
Energy	10,030	0.4%
Characterization and Licensing Surveys	23,012	0.9%
Property Taxes	113,348	4.3%
Miscellaneous Equipment	7,411	0.3%
Railroad Track Maintenance	15,260	0.6%
Retention and Severance	41,002	1.5%
Security Modifications	10,000	0.4%
Total [3]	2,645,871	100.0%

Cost Element	Total	Percentage
NRC License Termination	776,228	29.3%
Spent Fuel Management	1,795,906	67.9%
Site Restoration	73,737	2.8%
Total [3]	2,645,871	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.4
SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total	Percentage
Decontamination	24,330	0.5%
Removal	125,011	2.7%
Packaging	26,543	0.6%
Transportation	14,145	0.3%
Waste Disposal	114,148	2.4%
Off-site Waste Processing	57,444	1.2%
Program Management [1]	782,364	16.7%
Security	1,082,311	23.0%
Spent Fuel Pool Isolation	14,576	0.3%
Spent Fuel Storage (Direct Costs) [2]	1,961,162	41.7%
Insurance and Regulatory Fees	162,073	3.4%
Energy	10,030	0.2%
Characterization and Licensing Surveys	23,012	0.5%
Property Taxes	213,298	4.5%
Miscellaneous Equipment	7,411	0.2%
Railroad Track Maintenance	29,650	0.6%
Retention and Severance	41,002	0.9%
Security Modifications	10,000	0.2%
Total [3]	4,698,509	100.0%

Cost Element	Total	Percentage
NRC License Termination	776,228	16.5%
Spent Fuel Management	3,848,543	81.9%
Site Restoration	73,737	1.6%
Total [3]	4,698,509	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.5
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total	Percentage
Decontamination	30,303	1.7%
Removal	130,385	7.2%
Packaging	17,375	1.0%
Transportation	10,222	0.6%
Waste Disposal	82,277	4.6%
Off-site Waste Processing	67,679	3.8%
Program Management [1]	415,951	23.1%
Security	379,377	21.1%
Spent Fuel Pool Isolation	14,576	0.8%
Spent Fuel Storage (Direct Costs) [2]	233,722	13.0%
Insurance and Regulatory Fees	61,212	3.4%
Energy	23,983	1.3%
Characterization and Licensing Surveys	24,381	1.4%
Property Taxes	227,954	12.7%
Miscellaneous Equipment	21,371	1.2%
Railroad Track Maintenance	9,258	0.5%
Retention and Severance	41,002	2.3%
Security Modifications	10,000	0.6%
Total [3]	1,801,028	100.0%

Cost Element	Total	Percentage
NRC License Termination	1,258,686	69.9%
Spent Fuel Management	479,749	26.6%
Site Restoration	62,593	3.5%
Total [3]	1,801,028	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.6
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total	Percentage
Decontamination	30,303	1.6%
Removal	130,503	6.7%
Packaging	17,378	0.9%
Transportation	10,223	0.5%
Waste Disposal	82,289	4.2%
Off-site Waste Processing	67,679	3.5%
Program Management [1]	433,069	22.3%
Security	431,859	22.2%
Spent Fuel Pool Isolation	14,576	0.8%
Spent Fuel Storage (Direct Costs) [2]	289,013	14.9%
Insurance and Regulatory Fees	66,507	3.4%
Energy	23,983	1.2%
Characterization and Licensing Surveys	24,381	1.3%
Property Taxes	238,521	12.3%
Miscellaneous Equipment	21,371	1.1%
Railroad Track Maintenance	9,258	0.5%
Retention and Severance	41,002	2.1%
Security Modifications	10,000	0.5%
Total [3]	1,941,915	100.0%

Cost Element	Total	Percentage
NRC License Termination	1,250,097	64.4%
Spent Fuel Management	629,040	32.4%
Site Restoration	62,778	3.2%
Total [3]	1,941,915	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.7
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total	Percentage
Decontamination	29,939	1.0%
Removal	130,623	4.5%
Packaging	22,597	0.8%
Transportation	10,222	0.4%
Waste Disposal	82,285	2.8%
Off-site Waste Processing	67,679	2.3%
Program Management [1]	544,148	18.8%
Security	611,726	21.2%
Spent Fuel Pool Isolation	14,576	0.5%
Spent Fuel Storage (Direct Costs) [2]	863,002	29.9%
Insurance and Regulatory Fees	97,864	3.4%
Energy	24,005	0.8%
Characterization and Licensing Surveys	24,381	0.8%
Property Taxes	278,126	9.6%
Miscellaneous Equipment	21,371	0.7%
Railroad Track Maintenance	14,886	0.5%
Retention and Severance	41,002	1.4%
Security Modifications	10,000	0.3%
Total [3]	2,888,431	100.0%

Cost Element	Total	
NRC License Termination	1,248,652	43.2%
Spent Fuel Management	1,580,426	54.7%
Site Restoration	59,354	2.1%
Total [3]	2,888,431	100.0%

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.8
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total	Percentage
Decontamination	29,939	0.6%
Removal	130,623	2.7%
Packaging	22,597	0.5%
Transportation	10,222	0.2%
Waste Disposal	82,285	1.7%
Off-site Waste Processing	67,679	1.4%
Program Management [1]	824,077	16.8%
Security	1,061,840	21.7%
Spent Fuel Pool Isolation	14,576	0.3%
Spent Fuel Storage (Direct Costs) [2]	1,949,073	39.8%
Insurance and Regulatory Fees	175,282	3.6%
Energy	24,005	0.5%
Characterization and Licensing Surveys	24,381	0.5%
Property Taxes	378,076	7.7%
Miscellaneous Equipment	21,371	0.4%
Railroad Track Maintenance	29,275	0.6%
Retention and Severance	41,002	0.8%
Security Modifications	10,000	0.2%
Total [3]	4,896,303	100.0%

Cost Element	Total	
NRC License Termination	1,248,733	25.5%
Spent Fuel Management	3,588,216	73.3%
Site Restoration	59,354	1.2%
Total [3]	4,896,303	100.0%

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

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8. "Nuclear Waste Policy Act of 1982," 42 U.S. Code 10101, et seq. [Open]

9. Charter of the Blue Ribbon Commission on America's Nuclear Future, "Objectives and Scope of Activities," 2010 [Open]

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14. Minnesota Statute 216B.2445, "Nuclear Power Plant Decommissioning and Storage of Used Nuclear Fuel" [Open]

15. "Order Approving Nuclear Decommissioning Study, Assumptions, and Annual Accrual, and Setting Filing Requirements", Page 8, Items 12e and 12g, Minnesota Public Utilities Commission Docket E-002/M-14-761 October 4, 2015 [Open]

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19. "Low-Level Radioactive Waste Policy Amendments Act of 1985," Public Law 99-240, January 15, 1986 [Open]

20. U.S. Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste" [Open]

21. "Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375)," January 2016 [Open]

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(continued)

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23. "Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination," EPA Memorandum OSWER No. 9200.4-18, August 22, 1997 [Open]

24. "Maximum contaminant levels for radionuclides," U.S. Code of Federal Regulations, Title 40, Part 141.66, [Open]

25. "Memorandum of Understanding Between the Environmental Protection Agency and the Nuclear Regulatory Commission: Consultation and Finality on Decommissioning and Decontamination of Contaminated Sites," OSWER 9295.8-06a, October 9, 2002 [Open]

26. "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)," NUREG-1575, Rev. 1, EPA 402-R-97-016, Rev. 1, August 2000 [Open]

27. Minnesota Administrative Rule part 7035.0400 "General Requirements" [Open]

28. T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986 [Open]

29. W.J. Manion and T.S. LaGuardia, "Decommissioning Handbook," U.S. Department of Energy, DOE/EV/10128-1, November 1980 [Open]

30. "Building Construction Cost Data 2020," RSMeans (From the Gordian Group), Rockland, Massachusetts [Open]

31. "Decommissioning of Nuclear Power Reactors," Regulatory Guide 1.184, Nuclear Regulatory Commission, October 2013 [Open]

32. "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors," Regulatory Guide 1.202, Nuclear Regulatory Commission, February 2005 [Open]

33. Project and Cost Engineers' Handbook, Second Edition, p. 239, American Association of Cost Engineers, Marcel Dekker, Inc., New York, New York, 1984 [Open]

7. REFERENCES
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34. DOE/RW-0351, "Civilian Radioactive Waste Management System Waste Acceptance System Requirements Document", Revision 5, May 31, 2007 [Open]

35. "Civilian Radioactive Waste Management System Requirements Document, DOE/RW-0406, Revision 8, September 2007 [Open]

36. "Strategy for Management and Disposal of Greater-Than-Class C Low-Level Radioactive Waste," Federal Register Volume 60, Number 48 (p 13424 et seq.), March 1995 [Open]

37. U.S. Department of Transportation, Title 49 of the Code of Federal Regulations, "Transportation," Parts 173 through 178 [Open]

38. Tri-State Motor Transit Company, published tariffs Interstate Commerce Commission (ICC), Docket No. MC-427719 Rules Tariff, May 2014, Radioactive Materials Tariff, August 2014 [Open}

39. J.C. Evans et al., "Long-Lived Activation Products in Reactor Materials" NUREG/CR-3474, Pacific Northwest Laboratory for the Nuclear Regulatory Commission, August 1984 [Open]

40. R.I. Smith, G.J. Konzek, W.E. Kennedy, Jr., "Technology, Safety and Costs of Decommissioning a Reference Pressurized Water Reactor Power Station," NUREG/CR-0130 and addenda, Pacific Northwest Laboratory for the Nuclear Regulatory Commission, June 1978 [Open Main Report] [Open Appendices]

41. H.D. Oak, et al., "Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station," NUREG/CR-0672 and addenda, Pacific Northwest Laboratory for the Nuclear Regulatory Commission, June 1980 [Open Main Report] [Open Appendices]

42. SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning," June 2000 [Open]

43. "Microsoft Project Professional 2013," Microsoft Corporation, Redmond, WA

44. "Atomic Energy Act of 1954," (68 Stat. 919) [Open]

APPENDIX A

UNIT COST FACTOR DEVELOPMENT

APPENDIX A
UNIT COST FACTOR DEVELOPMENT

Example: Unit Factor for Removal of Contaminated Heat Exchanger < 3,000 lbs.

1. SCOPE

Heat exchangers weighing < 3,000 lbs. will be removed in one piece using a crane or small hoist. They will be disconnected from the inlet and outlet piping. The heat exchanger will be sent to the waste processing area.

2. CALCULATIONS

Act ID	Activity Description	Activity Duration (minutes)	Critical Duration (minutes)*
a	Remove insulation	60	(b)
b	Mount pipe cutters	60	60
c	Install contamination controls	20	(b)
d	Disconnect inlet and outlet lines	60	60
e	Cap openings	20	(d)
f	Rig for removal	30	30
g	Unbolt from mounts	30	30
h	Remove contamination controls	15	15
i	Remove, wrap, send to waste processing area	60	60
	Totals (Activity/Critical)	355	255

Duration adjustment(s):	
+ Respiratory protection adjustment (50 of critical duration)	128
+ Radiation/ALARA adjustment (37.1 of critical duration)	95
Adjusted work duration	478
+ Protective clothing adjustment (30 of adjusted duration)	143
Productive work duration	621
+ Work break adjustment (8.33 of productive duration)	52
Total work duration (minutes)	673

***** Total duration = 11.217 hr *****

* alpha designators indicate activities that can be performed in parallel

APPENDIX A
(continued)

3. LABOR REQUIRED

Crew	Number	Duration (hours)	Rate ($/hr)	Cost
Laborers	3.00	11.217	$61.19	$2,059.10
Craftsmen	2.00	11.217	$76.95	$1,726.30
Foreman	1.00	11.217	$80.53	$903.30
General Foreman	0.25	11.217	$82.80	$232.19
Fire Watch	0.05	11.217	$61.19	$34.32
Health Physics Technician	1.00	11.217	$53.89	$604.48
Total Labor Cost				$5,559.69

4. EQUIPMENT & CONSUMABLES COSTS

Equipment Costs	none
Consumables/Materials Costs	
• Universal Sorbent 50 @ $0.63 sq ft {1}	$31.50
• Tarpaulins (oil resistant/fire retardant) 50 @ $0.47/sq ft {2}	$23.50
• Gas torch consumables 1 @ $20.79/hr x 1 hr {3}	$20.79
Subtotal cost of equipment and materials	$75.79
Overhead & profit on equipment and materials @ 16.88%	$12.79
Total costs, equipment & material	$88.58

TOTAL COST:

Removal of contaminated heat exchanger <3000 pounds:	**$5,648.27**
Total labor cost:	$5,559.69
Total equipment/material costs:	$88.58
Total craft labor man-hours required per unit:	81.88

5. NOTES AND REFERENCES

- Work difficulty factors were developed in conjunction with the Atomic Industrial Forum's (now NEI) program to standardize nuclear decommissioning cost estimates and are delineated in Volume 1, Chapter 5 of the "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986.

- References for equipment & consumables costs:

    1. www.mcmaster.com online catalog, McMaster Carr Spill Control (7193T88)
    2. R.S. Means (2020) Division 01 56, Section 13.60-0600, page 23
    3. R.S. Means (2020) Division 01 54 33, Section 40-6360, page 736

- Material and consumable costs were adjusted using the regional indices for Minneapolis, Minnesota.

APPENDIX B

UNIT COST FACTOR LISTING
(DECON: Power Block Structures Only)

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of clean instrument and sampling tubing, $/linear foot	0.66
Removal of clean pipe 0.25 to 2 inches diameter, $/linear foot	7.12
Removal of clean pipe >2 to 4 inches diameter, $/linear foot	10.10
Removal of clean pipe >4 to 8 inches diameter, $/linear foot	19.57
Removal of clean pipe >8 to 14 inches diameter, $/linear foot	37.90
Removal of clean pipe >14 to 20 inches diameter, $/linear foot	49.31
Removal of clean pipe >20 to 36 inches diameter, $/linear foot	72.54
Removal of clean pipe >36 inches diameter, $/linear foot	86.18
Removal of clean valve >2 to 4 inches	129.74
Removal of clean valve >4 to 8 inches	195.68
Removal of clean valve >8 to 14 inches	379.05
Removal of clean valve >14 to 20 inches	493.07
Removal of clean valve >20 to 36 inches	725.39
Removal of clean valve >36 inches	861.75
Removal of clean pipe hanger for small bore piping	44.86
Removal of clean pipe hanger for large bore piping	160.35
Removal of clean pump, <300 pound	330.70
Removal of clean pump, 300-1000 pound	912.70
Removal of clean pump, 1000-10,000 pound	3,609.83
Removal of clean pump, >10,000 pound	6,983.56
Removal of clean pump motor, 300-1000 pound	381.49
Removal of clean pump motor, 1000-10,000 pound	1,499.79
Removal of clean pump motor, >10,000 pound	3,374.52
Removal of clean heat exchanger <3000 pound	1,938.45
Removal of clean heat exchanger >3000 pound	4,882.77
Removal of clean feedwater heater/deaerator	13,764.03
Removal of clean moisture separator/reheater	28,295.13
Removal of clean tank, <300 gallons	425.32
Removal of clean tank, 300-3000 gallon	1,339.93
Removal of clean tank, >3000 gallons, $/square foot surface area	11.21

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of clean electrical equipment, <300 pound	179.21
Removal of clean electrical equipment, 300-1000 pound	621.10
Removal of clean electrical equipment, 1000-10,000 pound	1,242.20
Removal of clean electrical equipment, >10,000 pound	2,944.57
Removal of clean electrical transformer < 30 tons	2,044.97
Removal of clean electrical transformer > 30 tons	5,889.16
Removal of clean standby diesel generator, <100 kW	2,088.76
Removal of clean standby diesel generator, 100 kW to 1 MW	4,662.25
Removal of clean standby diesel generator, >1 MW	9,651.80
Removal of clean electrical cable tray, $/linear foot	16.85
Removal of clean electrical conduit, $/linear foot	7.36
Removal of clean mechanical equipment, <300 pound	179.21
Removal of clean mechanical equipment, 300-1000 pound	621.10
Removal of clean mechanical equipment, 1000-10,000 pound	1,242.20
Removal of clean mechanical equipment, >10,000 pound	2,944.57
Removal of clean HVAC equipment, <300 pound	216.70
Removal of clean HVAC equipment, 300-1000 pound	746.29
Removal of clean HVAC equipment, 1000-10,000 pound	1,487.38
Removal of clean HVAC equipment, >10,000 pound	2,944.57
Removal of clean HVAC ductwork, $/pound	0.70
Removal of contaminated instrument and sampling tubing, $/linear foot	1.95
Removal of contaminated pipe 0.25 to 2 inches diameter, $/linear foot	27.83
Removal of contaminated pipe >2 to 4 inches diameter, $/linear foot	47.82
Removal of contaminated pipe >4 to 8 inches diameter, $/linear foot	74.96
Removal of contaminated pipe >8 to 14 inches diameter, $/linear foot	148.03
Removal of contaminated pipe >14 to 20 inches diameter, $/linear foot	177.89
Removal of contaminated pipe >20 to 36 inches diameter, $/linear foot	246.18
Removal of contaminated pipe >36 inches diameter, $/linear foot	290.94
Removal of contaminated valve >2 to 4 inches	566.42
Removal of contaminated valve >4 to 8 inches	683.47

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of contaminated valve >8 to 14 inches	1,416.07
Removal of contaminated valve >14 to 20 inches	1,800.35
Removal of contaminated valve >20 to 36 inches	2,397.55
Removal of contaminated valve >36 inches	2,845.15
Removal of contaminated pipe hanger for small bore piping	185.78
Removal of contaminated pipe hanger for large bore piping	626.83
Removal of contaminated pump, <300 pound	1,220.05
Removal of contaminated pump, 300-1000 pound	2,838.23
Removal of contaminated pump, 1000-10,000 pound	9,385.29
Removal of contaminated pump, >10,000 pound	22,861.69
Removal of contaminated pump motor, 300-1000 pound	1,207.33
Removal of contaminated pump motor, 1000-10,000 pound	3,818.35
Removal of contaminated pump motor, >10,000 pound	8,572.65
Removal of contaminated heat exchanger <3000 pound	5,648.27
Removal of contaminated heat exchanger >3000 pound	16,376.90
Removal of contaminated feedwater heater/deaerator	40,348.66
Removal of contaminated moisture separator/reheater	88,508.97
Removal of contaminated tank, <300 gallons	2,028.12
Removal of contaminated tank, >300 gallons, $/square foot	39.80
Removal of contaminated electrical equipment, <300 pound	945.59
Removal of contaminated electrical equipment, 300-1000 pound	2,314.13
Removal of contaminated electrical equipment, 1000-10,000 pound	4,457.30
Removal of contaminated electrical equipment, >10,000 pound	8,759.01
Removal of contaminated electrical cable tray, $/linear foot	45.76
Removal of contaminated electrical conduit, $/linear foot	22.38
Removal of contaminated mechanical equipment, <300 pound	1,051.94
Removal of contaminated mechanical equipment, 300-1000 pound	2,555.55
Removal of contaminated mechanical equipment, 1000-10,000 pound	4,914.24
Removal of contaminated mechanical equipment, >10,000 pound	8,759.01
Removal of contaminated HVAC equipment, <300 pound	1,051.94

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of contaminated HVAC equipment, 300-1000 pound	2,555.55
Removal of contaminated HVAC equipment, 1000-10,000 pound	4,914.24
Removal of contaminated HVAC equipment, >10,000 pound	8,759.01
Removal of contaminated HVAC ductwork, $/pound	2.68
Removal/plasma arc cut of contaminated thin metal components, $/linear in.	5.11
Additional decontamination of surface by washing, $/square foot	10.44
Additional decontamination of surfaces by hydrolasing, $/square foot	45.11
Decontamination rig hook up and flush, $/ 250 foot length	8,866.81
Chemical flush of components/systems, $/gallon	21.45
Removal of clean standard reinforced concrete, $/cubic yard	79.60
Removal of grade slab concrete, $/cubic yard	90.54
Removal of clean concrete floors, $/cubic yard	462.42
Removal of sections of clean concrete floors, $/cubic yard	1,391.16
Removal of clean heavily rein concrete w/#9 rebar, $/cubic yard	115.00
Removal of contaminated heavily rein concrete w/#9 rebar, $/cubic yard	2,709.95
Removal of clean heavily rein concrete w/#18 rebar, $/cubic yard	155.86
Removal of contaminated heavily rein concrete w/#18 rebar, $/cubic yard	3,585.12
Removal heavily rein concrete w/#18 rebar & steel embedments, $/cubic yard	568.99
Removal of below-grade suspended floors, $/cubic yard	218.59
Removal of clean monolithic concrete structures, $/cubic yard	1,160.31
Removal of contaminated monolithic concrete structures, $/cubic yard	2,697.57
Removal of clean foundation concrete, $/cubic yard	910.72
Removal of contaminated foundation concrete, $/cubic yard	2,512.94
Explosive demolition of bulk concrete, $/cubic yard	61.21
Removal of clean hollow masonry block wall, $/cubic yard	27.85
Removal of contaminated hollow masonry block wall, $/cubic yard	72.42
Removal of clean solid masonry block wall, $/cubic yard	27.85
Removal of contaminated solid masonry block wall, $/cubic yard	72.42
Backfill of below-grade voids, $/cubic yard	36.73
Removal of subterranean tunnels/voids, $/linear foot	143.27

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Placement of concrete for below-grade voids, $/cubic yard	142.83
Excavation of clean material, $/cubic yard	3.38
Excavation of contaminated material, $/cubic yard	48.84
Removal of clean concrete rubble (tipping fee included), $/cubic yard	28.05
Removal of contaminated concrete rubble, $/cubic yard	30.62
Removal of building by volume, $/cubic foot	0.35
Removal of clean building metal siding, $/square foot	1.77
Removal of contaminated building metal siding, $/square foot	5.62
Removal of standard asphalt roofing, $/square foot	3.11
Removal of transite panels, $/square foot	2.87
Scarifying contaminated concrete surfaces (drill & spall), $/square foot	15.31
Scabbling contaminated concrete floors, $/square foot	9.92
Scabbling contaminated concrete walls, $/square foot	26.57
Scabbling contaminated ceilings, $/square foot	91.52
Scabbling structural steel, $/square foot	7.85
Removal of clean overhead crane/monorail < 10 ton capacity	863.54
Removal of contaminated overhead crane/monorail < 10 ton capacity	2,333.05
Removal of clean overhead crane/monorail >10-50 ton capacity	2,072.50
Removal of contaminated overhead crane/monorail >10-50 ton capacity	5,598.35
Removal of polar crane > 50 ton capacity	8,635.54
Removal of gantry crane > 50 ton capacity	32,881.12
Removal of structural steel, $/pound	0.25
Removal of clean steel floor grating, $/square foot	6.20
Removal of contaminated steel floor grating, $/square foot	17.35
Removal of clean free standing steel liner, $/square foot	16.80
Removal of contaminated free standing steel liner, $/square foot	46.58
Removal of clean concrete-anchored steel liner, $/square foot	8.40
Removal of contaminated concrete-anchored steel liner, $/square foot	54.29
Placement of scaffolding in clean areas, $/square foot	18.98
Placement of scaffolding in contaminated areas, $/square foot	31.88

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Landscaping with topsoil, $/acre	25,605.38
Cost of CPC B-88 LSA box & preparation for use	2,185.34
Cost of CPC B-25 LSA box & preparation for use	1,785.69
Cost of CPC B-12V 12 gauge LSA box & preparation for use	1,711.39
Cost of CPC B-144 LSA box & preparation for use	10,802.17
Cost of LSA drum & preparation for use	260.76
Cost of cask liner for CNSI 8 120A cask (resins)	12,914.97
Cost of cask liner for CNSI 8 120A cask (filters)	9,404.01
Decontamination of surfaces with vacuuming, $/square foot	1.04

APPENDIX C

DETAILED COST ANALYSIS

SCENARIO 1: DECON with 42 Year DFS

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	632	95	727	654	-	73	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Sacrificial shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Moisture separators/reheaters	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.10	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.11	Pressure suppression structure	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.17.12	Drywell	-	-	-	-	-	-	206	31	236	236	-	-	-	-	-	-	-	-	-	1,600
1a.1.17.13	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
1a.1.17.14	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.15	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	5,486	823	6,308	5,759	-	550	-	-	-	-	-	-	-	42,683
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	16,569	2,485	19,054	18,505	-	550	-	-	-	-	-	-	-	83,013
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,323	198	1,522	-	1,522	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	9,892	1,484	11,376	11,376	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	11,215	1,682	12,897	11,376	1,522	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,328	233	2,561	2,561	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,570	357	3,927	3,927	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	6	-	50	-	15	83	83	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,137	114	1,251	1,251	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,428	343	3,770	-	3,770	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	845	127	971	-	971	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	16,372	2,456	18,827	18,827	-	-	-	-	-	-	-	-	-	245,440
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	27,285	4,093	31,378	31,378	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	6	-	50	59,634	8,703	69,772	64,902	4,870	-	-	610	-	-	-	12,190	20	667,680

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	6	-	50	87,418	12,871	101,724	94,783	6,392	550	-	610	-	-	-	12,190	20	750,693
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	514	77	591	591	-	-	-	-	-	-	-	-	-	4,000
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD housings & NIs	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Removal primary containment	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
1b.1.1.10	Sacrificial shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.11	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
1b.1.1.12	Main Turbine	-	-	-	-	-	-	267	40	307	307	-	-	-	-	-	-	-	-	-	2,080
1b.1.1.13	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1b.1.1.14	Moisture separators & reheaters	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.15	Radwaste building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1.16	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,336	650	4,987	4,524	-	463	-	-	-	-	-	-	-	33,741
1b.1.2	Decon NSSS	296	-	-	-	-	-	-	148	444	444	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	296	-	-	-	-	-	4,336	798	5,431	4,968	-	463	-	-	-	-	-	-	1,067	33,741
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2.2	Site Characterization	-	-	-	-	-	-	5,930	1,779	7,708	7,708	-	-	-	-	-	-	-	-	30,500	10,852
1b.2.3	Mixed & RCRA Waste	-	-	28	29	14	-	-	9	80	80	-	-	43	-	-	-	-	5,253	161	-
1b.2	Subtotal Period 1b Additional Costs	-	-	28	29	14	-	18,605	3,689	22,365	22,365	-	-	43	-	-	-	-	5,253	30,661	10,852
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	38	-	25	45	-	102	-	53	263	263	-	-	-	233	-	-	-	13,991	45	-
1b.3.4	Process decommissioning chemical flush waste	1	-	24	77	-	1,526	-	396	2,024	2,024	-	-	-	-	231	-	-	24,599	43	-
1b.3.5	Small tool allowance	-	2	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	391	59	450	-	450	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	6,335	950	7,285	7,285	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,197	1,202	49	122	-	1,628	7,990	2,302	16,490	16,040	450	-	-	233	231	-	-	38,589	89	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	39	-	-	-	-	-	-	10	48	48	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	1,161	116	1,277	1,277	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,709	171	1,880	1,880	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	344	-	-	-	-	-	86	430	430	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	4	-	29	-	9	49	49	-	-	-	356	-	-	-	7,122	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,812	272	2,083	2,083	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	323	32	355	355	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,416	142	1,557	-	1,557	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	1,305	196	1,500	1,500	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	421	63	484	-	484	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	62	9	72	72	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	8,163	1,225	9,388	9,388	-	-	-	-	-	-	-	-	-	122,384
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,846	877	6,723	6,723	-	-	-	-	-	-	-	-	-	63,266
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	13,682	2,052	15,734	15,734	-	-	-	-	-	-	-	-	-	211,579
1b.4	Subtotal Period 1b Period-Dependent Costs	39	719	7	4	-	29	35,955	5,323	42,076	39,970	2,106	-	-	356	-	-	-	7,122	12	397,229
1b.0	TOTAL PERIOD 1b COST	3,531	1,921	84	154	14	1,657	66,886	12,113	86,361	83,343	2,556	463	43	589	231	-	-	50,964	31,828	441,822
PERIOD 1 TOTALS		3,531	3,288	96	160	14	1,707	154,304	24,984	188,085	178,125	8,948	1,012	43	1,199	231	-	-	63,155	31,848	1,192,515

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Recirculation System Piping & Valves	111	94	27	50	-	528	-	221	1,031	1,031	-	-	-	1,430	-	-	-	99,742	2,905	-
2a.1.1.2	Recirculation Pumps & Motors	40	63	16	51	42	539	-	186	938	938	-	-	96	945	-	-	-	112,200	1,563	-
2a.1.1.3	CRDMs & NIs Removal	194	1,020	415	135	-	1,130	-	696	3,591	3,591	-	-	-	3,741	-	-	-	213,700	17,768	-
2a.1.1.4	Reactor Vessel Internals	244	6,722	12,852	2,696	-	29,845	364	24,027	76,749	76,749	-	-	-	1,252	1,761	898	-	343,150	30,515	1,379
2a.1.1.5	Reactor Vessel	113	9,121	2,672	1,167	-	5,861	364	10,842	30,140	30,140	-	-	-	16,169	-	-	-	1,105,210	30,515	1,379
2a.1.1	Totals	702	17,020	15,982	4,099	42	37,903	728	35,973	112,449	112,449	-	-	96	23,536	1,761	898	-	1,874,002	83,267	2,758
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	385	1,356	521	6,139	439	-	1,341	10,182	10,182	-	-	24,835	1,383	-	-	-	1,577,959	5,438	-
2a.1.3	Main Condensers	-	1,347	360	194	3,225	244	-	947	6,317	6,317	-	-	17,396	727	-	-	-	828,955	18,831	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor Building	-	332	-	-	-	-	-	50	381	381	-	-	-	-	-	-	-	-	2,217	-
2a.1.4.2	Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	127	-
2a.1.4.3	Turbine	-	127	-	-	-	-	-	19	146	146	-	-	-	-	-	-	-	-	1,254	-
2a.1.4	Totals	-	483	-	-	-	-	-	72	556	556	-	-	-	-	-	-	-	-	3,598	-
Disposal of Plant Systems																					
2a.1.5.1	Automatic Press Relief	-	118	7	12	134	70	-	70	410	410	-	-	803	206	-	-	-	45,852	1,656	-
2a.1.5.2	Chemistry Sampling	-	27	1	2	26	13	-	14	83	83	-	-	156	37	-	-	-	8,681	400	-
2a.1.5.3	Chemistry Sampling - Insulated	-	2	0	0	-	0	-	1	3	3	-	-	-	1	-	-	-	72	28	-
2a.1.5.4	Circulating Water - RCA	-	207	14	62	1,114	-	-	230	1,626	1,626	-	-	6,656	-	-	-	-	270,307	2,860	-
2a.1.5.5	Combustible Gas Control - Insul - RCA	-	29	0	2	36	-	-	13	80	80	-	-	212	-	-	-	-	8,617	378	-
2a.1.5.6	Combustible Gas Control - RCA	-	18	1	3	48	-	-	12	81	81	-	-	285	-	-	-	-	11,577	245	-
2a.1.5.7	Condensate & Feedwater	-	987	183	329	3,337	2,464	-	1,431	8,731	8,731	-	-	19,947	7,319	-	-	-	1,275,810	14,196	-
2a.1.5.8	Condensate & Feedwater - Insulated	-	492	34	63	699	408	-	343	2,038	2,038	-	-	4,176	1,207	-	-	-	246,693	6,964	-
2a.1.5.9	Condensate Demin	-	545	30	51	560	339	-	316	1,840	1,840	-	-	3,346	1,000	-	-	-	199,936	7,618	-
2a.1.5.10	Condensate Storage	-	726	33	82	1,193	270	-	444	2,748	2,748	-	-	7,131	795	-	-	-	340,568	10,345	-
2a.1.5.11	Control Rod Drive	-	3	0	0	3	1	-	2	9	9	-	-	19	4	-	-	-	1,009	41	-
2a.1.5.12	Control Rod Drive Hydraulic	-	416	16	26	277	190	-	199	1,124	1,124	-	-	1,658	562	-	-	-	103,306	5,898	-
2a.1.5.13	Core Spray	-	79	20	51	734	176	-	184	1,244	1,244	-	-	4,384	521	-	-	-	211,329	1,163	-
2a.1.5.14	Core Spray - Insulated	-	145	8	13	137	90	-	82	474	474	-	-	818	264	-	-	-	50,149	2,033	-
2a.1.5.15	Demin Water - Insulated - RCA	-	15	0	1	14	-	-	6	36	36	-	-	85	-	-	-	-	3,445	181	-
2a.1.5.16	Demin Water - RCA	-	41	1	2	42	-	-	17	104	104	-	-	253	-	-	-	-	10,278	508	-
2a.1.5.17	Diesel Oil - RCA	-	2	0	0	4	-	-	1	7	7	-	-	23	-	-	-	-	931	25	-
2a.1.5.18	Drywell Atmosphere Cooling - RCA	-	38	1	5	92	-	-	24	159	159	-	-	548	-	-	-	-	22,244	550	-
2a.1.5.19	EDG Emerg Service Water - Insul - RCA	-	0	0	0	0	-	-	0	1	1	-	-	2	-	-	-	-	84	4	-
2a.1.5.20	Electrical - Clean	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	182	-
2a.1.5.21	Emergency Service Water - Insul - RCA	-	21	0	1	23	-	-	9	55	55	-	-	137	-	-	-	-	5,544	281	-
2a.1.5.22	Emergency Service Water - RCA	-	2	0	0	2	-	-	1	5	5	-	-	13	-	-	-	-	512	22	-
2a.1.5.23	GEZIP - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2a.1.5.24	Generator Physical Design - RCA	-	5	0	0	5	-	-	2	12	12	-	-	31	-	-	-	-	1,250	67	-
2a.1.5.25	H2-O2 Control Analyzing	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.26	H2-O2 Control Analyzing - Insulated	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.27	High Pressure Coolant Injection	-	67	6	13	163	70	-	61	381	381	-	-	972	209	-	-	-	52,792	966	-
2a.1.5.28	High Pressure Coolant Injection - Insula	-	219	14	24	267	163	-	141	830	830	-	-	1,598	481	-	-	-	95,733	3,079	-
2a.1.5.29	Hydrogen Cooling	-	8	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	118	-
2a.1.5.30	Hydrogen Cooling - RCA	-	7	0	0	7	-	-	3	17	17	-	-	39	-	-	-	-	1,600	79	-
2a.1.5.31	Hydrogen Seal Oil - RCA	-	17	0	2	32	-	-	9	60	60	-	-	189	-	-	-	-	7,669	212	-
2a.1.5.32	Hydrogen Water Chemistry - RCA	-	24	0	1	23	-	-	10	59	59	-	-	140	-	-	-	-	5,672	304	-
2a.1.5.33	Instrument & Service Air - RCA	-	225	4	17	296	-	-	103	644	644	-	-	1,768	-	-	-	-	71,810	2,733	-
2a.1.5.34	Main Condenser	-	196	12	20	223	139	-	122	712	712	-	-	1,333	411	-	-	-	80,439	2,746	-
2a.1.5.35	Main Steam	-	249	17	32	359	201	-	173	1,029	1,029	-	-	2,148	594	-	-	-	125,135	3,512	-
2a.1.5.36	Main Turbine	-	1,012	205	353	3,306	2,921	-	1,553	9,350	9,350	-	-	19,760	8,687	-	-	-	1,354,661	14,733	-
2a.1.5.37	Main Turbine - Insulated	-	214	18	37	423	225	-	180	1,097	1,097	-	-	2,530	667	-	-	-	145,208	3,069	-
2a.1.5.38	Miscellaneous	-	43	1	3	51	-	-	19	115	115	-	-	302	-	-	-	-	12,283	622	-
2a.1.5.39	Off Gas Recombiner	-	189	19	32	300	257	-	163	960	960	-	-	1,795	764	-	-	-	121,554	2,708	-
2a.1.5.40	Off Gas Recombiner - Insulated	-	387	19	27	229	240	-	197	1,100	1,100	-	-	1,366	709	-	-	-	100,933	5,385	-
2a.1.5.41	Post Accident Sampling	-	25	1	1	9	11	-	11	58	58	-	-	53	33	-	-	-	4,318	345	-
2a.1.5.42	Post Accident Sampling - Insulated	-	17	1	1	3	13	-	8	43	43	-	-	17	37	-	-	-	3,116	212	-
2a.1.5.43	RHR Service Water - Insulated - RCA	-	83	3	14	248	-	-	60	409	409	-	-	1,485	-	-	-	-	60,293	1,125	-
2a.1.5.44	RHR Service Water - RCA	-	4	0	0	6	-	-	2	12	12	-	-	35	-	-	-	-	1,410	57	-
2a.1.5.45	Reactor Feedwater Pump Seal	-	56	2	4	32	33	-	28	155	155	-	-	193	96	-	-	-	14,009	773	-

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2a.1.5.46	Residual Heat Removal	362	252	172	178	1,072	2,051	-	962	5,049	5,049	-	-	6,406	6,012	-	-	-	647,941	4,135	-
2a.1.5.47	Residual Heat Removal - Insulated	622	554	61	82	563	880	-	772	3,535	3,535	-	-	3,367	2,607	-	-	-	303,087	10,340	-
2a.1.5.48	Rx Core Isolation Cooling	-	49	2	4	43	26	-	26	150	150	-	-	259	76	-	-	-	15,396	691	-
2a.1.5.49	Rx Core Isolation Cooling - Insulated	-	107	5	7	48	67	-	52	287	287	-	-	288	198	-	-	-	24,419	1,479	-
2a.1.5.50	Rx Recirculation	56	58	6	4	7	65	-	61	258	258	-	-	43	190	-	-	-	14,095	1,580	-
2a.1.5.51	Snubbers	-	169	2	5	63	30	-	60	331	331	-	-	377	90	-	-	-	21,009	2,548	-
2a.1.5.52	Standby Liquid Control - Insul - RCA	-	4	0	0	4	-	-	2	9	9	-	-	22	-	-	-	-	904	48	-
2a.1.5.53	Standby Liquid Control - RCA	-	26	1	2	41	-	-	13	83	83	-	-	245	-	-	-	-	9,969	341	-
2a.1.5.54	Stator Cooling - RCA	-	7	0	1	21	-	-	5	35	35	-	-	126	-	-	-	-	5,135	98	-
2a.1.5.55	Traversing Incore Probe	0	4	0	0	0	2	-	1	7	7	-	-	1	5	-	-	-	386	51	-
2a.1.5	Totals	1,040	8,221	924	1,572	16,339	11,425	-	8,209	47,730	47,706	-	24	97,654	33,808	-	-	-	6,125,515	119,943	-
2a.1.6	Scaffolding in support of decommissioning	-	2,265	22	12	191	31	-	607	3,127	3,127	-	-	1,030	91	-	-	-	52,111	22,564	-
2a.1	Subtotal Period 2a Activity Costs	1,742	29,721	18,645	6,398	25,937	50,042	728	47,148	180,360	180,336	-	24	141,010	59,545	1,761	898	-	10,458,540	253,640	2,758
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	85	-	57	102	-	232	-	122	598	598	-	-	-	532	-	-	-	31,942	104	-
2a.3.2	Process decommissioning chemical flush waste	5	-	216	702	-	1,619	-	534	3,077	3,077	-	-	-	2,093	-	-	-	223,008	392	-
2a.3.3	Small tool allowance	-	324	-	-	-	-	-	49	373	336	-	37	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	13,661	2,049	15,710	-	15,710	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	13,127	1,969	15,097	15,097	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	91	324	274	804	-	1,851	26,788	4,723	34,854	19,107	15,710	37	-	2,625	-	-	-	254,950	495	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	112	-	-	-	-	-	-	28	140	140	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	1,019	102	1,121	1,121	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	4,377	438	4,814	4,814	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,356	-	-	-	-	-	589	2,945	2,945	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,627	-	-	-	-	-	544	4,171	4,171	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	110	57	-	457	-	134	758	758	-	-	-	5,551	-	-	-	111,023	181	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,501	375	2,876	2,876	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	856	86	942	942	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	4,115	412	4,527	-	4,527	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	3,071	461	3,532	3,532	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	1,224	184	1,408	-	1,408	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	162	24	187	-	187	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	181	27	208	208	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,624	244	1,867	1,867	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	21,881	3,282	25,164	25,164	-	-	-	-	-	-	-	-	-	325,574
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	21,021	3,153	24,174	24,174	-	-	-	-	-	-	-	-	-	229,108
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	27,906	4,186	32,092	32,092	-	-	-	-	-	-	-	-	-	426,562
2a.4	Subtotal Period 2a Period-Dependent Costs	112	5,982	110	57	-	457	89,938	14,267	110,924	104,803	6,121	-	-	5,551	-	-	-	111,023	181	981,244
2a.0	TOTAL PERIOD 2a COST	1,945	36,028	19,028	7,259	25,937	52,350	117,455	66,138	326,139	304,246	21,831	62	141,010	67,722	1,761	898	-	10,824,520	254,317	984,002
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	ALARA/Radiological	-	18	0	1	6	3	-	6	35	35	-	-	35	10	-	-	-	2,060	277	-
2b.1.1.2	Alternate N2 - RCA	-	16	0	1	16	-	-	7	40	40	-	-	93	-	-	-	-	3,765	185	-
2b.1.1.3	Decontamination Projects	-	1	0	0	0	0	-	0	2	2	-	-	2	0	-	-	-	129	17	-
2b.1.1.4	Electrical - Contaminated	-	445	6	24	400	30	-	183	1,089	1,089	-	-	2,389	90	-	-	-	102,726	6,325	-
2b.1.1.5	Electrical - Decontaminated	-	2,698	48	218	3,906	-	-	1,298	8,167	8,167	-	-	23,344	-	-	-	-	948,013	37,107	-
2b.1.1.6	Fire - RCA	-	101	1	6	103	-	-	42	253	253	-	-	614	-	-	-	-	24,917	1,324	-
2b.1.1.7	HVAC Ductwork	-	305	7	27	446	34	-	156	975	975	-	-	2,665	100	-	-	-	114,598	4,111	-
2b.1.1.8	HVAC/Chilled Water - RCA	-	324	6	26	461	-	-	155	971	971	-	-	2,752	-	-	-	-	111,779	3,985	-
2b.1.1.9	Heating & Ventilation	-	483	16	61	1,007	76	-	302	1,945	1,945	-	-	6,018	227	-	-	-	258,789	7,101	-
2b.1.1.10	Heating Boiler - Insulated - RCA	-	3	0	0	4	-	-	1	9	9	-	-	26	-	-	-	-	1,058	35	-
2b.1.1.11	Liquid Radwaste	588	687	48	63	514	586	-	703	3,188	3,188	-	-	3,073	1,728	-	-	-	235,484	17,194	-
2b.1.1.12	Makeup Demin - RCA	-	103	3	14	246	-	-	65	431	431	-	-	1,471	-	-	-	-	59,747	1,412	-
2b.1.1.13	Non-Essential Diesel Generator - RCA	-	27	3	13	238	-	-	45	327	327	-	-	1,424	-	-	-	-	57,832	395	-
2b.1.1.14	Off Gas Holdup	-	342	21	38	461	214	-	216	1,291	1,291	-	-	2,755	630	-	-	-	152,277	4,769	-
2b.1.1.15	Primary Containment	-	455	42	87	1,038	507	-	414	2,543	2,543	-	-	6,201	1,506	-	-	-	347,704	6,454	-
2b.1.1.16	Process Radiation Monitors	-	46	2	2	24	18	-	20	111	111	-	-	142	52	-	-	-	9,115	649	-

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2b.1.1.17	Rx Bldg Closed Clng Water - Insul - RCA	-	114	2	9	163	-	-	54	343	343	-	-	977	-	-	-	-	39,675	1,484	-
2b.1.1.18	Rx Bldg Closed Clng Water - RCA	-	184	15	66	1,187	-	-	235	1,687	1,687	-	-	7,093	-	-	-	-	288,031	2,489	-
2b.1.1.19	Rx Component Handling Equip	27	142	18	27	194	279	-	154	840	840	-	-	1,158	829	-	-	-	99,730	2,462	-
2b.1.1.20	Rx Pressure Vessel	28	47	6	5	13	78	-	48	225	225	-	-	75	230	-	-	-	17,816	1,051	-
2b.1.1.21	Rx Water Cleanup	172	265	19	16	22	251	-	222	965	965	-	-	130	737	-	-	-	52,670	5,736	-
2b.1.1.22	Secondary Containment	-	124	7	14	170	86	-	81	483	483	-	-	1,017	255	-	-	-	57,567	1,763	-
2b.1.1.23	Service & Seal Water - Insulated - RCA	-	120	2	11	197	-	-	62	392	392	-	-	1,180	-	-	-	-	47,917	1,565	-
2b.1.1.24	Service & Seal Water - RCA	-	159	4	17	303	-	-	88	570	570	-	-	1,809	-	-	-	-	73,453	2,016	-
2b.1.1.25	Service Air Blower - RCA	-	15	0	2	34	-	-	9	62	62	-	-	206	-	-	-	-	8,364	206	-
2b.1.1.26	Solid Radwaste	338	494	36	49	399	467	-	480	2,264	2,264	-	-	2,387	1,380	-	-	-	185,221	10,820	-
2b.1.1.27	Structures & Buildings	-	78	2	5	60	29	-	37	210	210	-	-	357	85	-	-	-	19,933	1,128	-
2b.1.1.28	Wells & Domestic Water	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	144	-
2b.1.1.29	Wells & Domestic Water - RCA	-	52	1	3	57	-	-	22	136	136	-	-	342	-	-	-	-	13,874	633	-
2b.1.1	Totals	1,153	7,860	315	804	11,668	2,657	-	5,107	29,563	29,552	-	11	69,735	7,859	-	-	-	3,334,244	122,835	-
2b.1.2	Scaffolding in support of decommissioning	-	2,831	28	16	239	38	-	758	3,909	3,909	-	-	1,287	114	-	-	-	65,139	28,205	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor Building	5,202	2,903	178	516	8,044	1,181	-	4,924	22,948	22,948	-	-	48,077	7,014	-	-	-	2,317,670	112,518	-
2b.1.3.2	Admin	106	6	0	3	-	15	-	59	189	189	-	-	-	145	-	-	-	6,840	1,600	-
2b.1.3.3	HPCI Room	29	28	1	3	20	14	-	29	123	123	-	-	118	125	-	-	-	10,759	789	-
2b.1.3.4	Hot Shop	17	4	0	2	-	11	-	12	46	46	-	-	-	103	-	-	-	4,860	286	-
2b.1.3.5	LLRW Storage & Shipping	58	24	2	8	5	45	-	48	191	191	-	-	31	433	-	-	-	21,708	1,127	-
2b.1.3.6	Offgas Stack	372	269	7	23	225	82	-	312	1,289	1,289	-	-	1,343	669	-	-	-	87,045	8,860	-
2b.1.3.7	Offgas Storage & Compressor	41	17	1	6	4	33	-	34	136	136	-	-	25	316	-	-	-	15,948	785	-
2b.1.3.8	Radwaste	121	61	3	17	29	96	-	107	435	435	-	-	172	910	-	-	-	49,943	2,503	-
2b.1.3.9	Radwaste Material Storage Warehouse	64	24	2	9	-	52	-	52	202	202	-	-	-	495	-	-	-	23,400	1,197	-
2b.1.3.10	Recombiner	27	25	1	5	33	24	-	32	148	148	-	-	199	216	-	-	-	18,405	695	-
2b.1.3.11	Turbine	705	353	21	104	215	564	-	632	2,594	2,594	-	-	1,283	5,299	-	-	-	303,150	14,443	-
2b.1.3.12	Turbine Building Addition	58	21	1	8	-	45	-	47	181	181	-	-	-	434	-	-	-	20,478	1,087	-
2b.1.3	Totals	6,799	3,736	218	704	8,574	2,164	-	6,288	28,483	28,483	-	-	51,247	16,159	-	-	-	2,880,206	145,889	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	7,952	14,427	560	1,524	20,481	4,859	526	12,232	62,561	62,549	-	11	122,269	24,132	-	-	-	6,279,589	296,929	4,096
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	23	92	1,211	-	-	198	1,524	1,524	-	-	11,760	-	-	-	-	294,000	32	-
2b.2.2	Excavation of Underground Services	-	1,972	-	-	-	-	376	550	2,898	2,898	-	-	-	-	-	-	-	-	12,493	-
2b.2.3	Security Modifications	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,972	23	92	1,211	-	9,072	2,052	14,422	14,422	-	-	11,760	-	-	-	-	294,000	12,525	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	198	-	135	240	-	546	-	285	1,404	1,404	-	-	-	1,253	-	-	-	75,186	244	-
2b.3.2	Process decommissioning chemical flush waste	1	-	43	138	-	319	-	105	607	607	-	-	-	413	-	-	-	43,978	77	-
2b.3.3	Small tool allowance	-	364	-	-	-	-	-	55	418	418	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	117,254	17,588	134,843	-	134,843	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	6,299	945	7,244	7,244	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	199	364	178	378	-	865	123,554	18,978	144,516	9,673	134,843	-	-	1,666	-	-	-	119,165	322	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,440	-	-	-	-	-	-	360	1,799	1,799	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	742	74	816	816	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	2,703	270	2,974	2,974	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,376	-	-	-	-	-	594	2,970	2,970	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,711	-	-	-	-	-	407	3,117	3,117	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	101	52	-	419	-	123	694	694	-	-	-	5,084	-	-	-	101,679	166	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,437	216	1,653	1,653	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	623	62	685	685	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,995	299	3,294	-	3,294	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	2,235	335	2,570	2,570	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	891	134	1,024	-	1,024	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	224	34	258	258	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	118	18	136	-	136	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	458	69	527	527	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,182	177	1,359	1,359	-	-	-	-	-	-	-	-	-	-

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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2b Period-Dependent Costs (continued)																					
2b.4.16	Security Staff Cost	-	-	-	-	-	-	15,925	2,389	18,314	18,314	-	-	-	-	-	-	-	-	-	236,949
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	14,772	2,216	16,988	16,988	-	-	-	-	-	-	-	-	-	160,160
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	19,442	2,916	22,358	22,358	-	-	-	-	-	-	-	-	-	297,283
2b.4	Subtotal Period 2b Period-Dependent Costs	1,440	5,087	101	52	-	419	63,747	10,692	81,536	77,082	4,455	-	-	5,084	-	-	-	101,679	166	694,392
2b.0	TOTAL PERIOD 2b COST	9,591	21,850	861	2,046	21,692	6,143	196,899	43,954	303,035	163,726	139,297	11	134,029	30,882	-	-	-	6,794,433	309,941	698,488
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	654	58	103	149	-	2,572	-	1,017	4,553	4,553	-	-	-	7,653	-	-	-	486,170	906	-
Disposal of Plant Systems																					
2d.1.2.1	Cranes/Heavy Loads/Rigging - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2d.1.2.2	Electrical - Contaminated Fuel Pool	-	47	1	2	40	3	-	19	112	112	-	-	240	9	-	-	-	10,334	665	-
2d.1.2.3	Electrical - Decontam. Fuel Pool Area	-	297	5	23	411	-	-	140	876	876	-	-	2,457	-	-	-	-	99,783	4,090	-
2d.1.2.4	Fire - RCA - Fuel Pool Area	-	11	0	1	10	-	-	4	26	26	-	-	62	-	-	-	-	2,499	143	-
2d.1.2.5	Fuel Pool Cooling & Cleanup	246	428	34	37	197	455	-	382	1,781	1,781	-	-	1,179	1,341	-	-	-	133,939	8,380	-
2d.1.2.6	Fuel Pool Cooling & Cleanup - Insulated	27	41	3	3	11	40	-	36	161	161	-	-	67	117	-	-	-	10,220	848	-
2d.1.2.7	HVAC Ductwork - Fuel Pool Area	-	34	1	3	50	4	-	17	108	108	-	-	296	11	-	-	-	12,733	457	-
2d.1.2.8	HVAC/Chilled Water - RCA Fuel Pool Area	-	33	0	2	37	-	-	14	87	87	-	-	223	-	-	-	-	9,072	397	-
2d.1.2.9	Instrument & Service Air-RCA-Fuel Pool	-	29	1	2	45	-	-	14	91	91	-	-	267	-	-	-	-	10,841	357	-
2d.1.2	Totals	273	924	45	75	819	502	-	631	3,268	3,268	-	-	4,894	1,479	-	-	-	293,606	15,385	-
Decontamination of Site Buildings																					
2d.1.3.1	Reactor (Post Fuel)	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.3	Totals	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.4	Scaffolding in support of decommissioning	-	566	6	3	48	8	-	152	782	782	-	-	257	23	-	-	-	13,028	5,641	-
2d.1	Subtotal Period 2d Activity Costs	1,872	4,147	326	1,139	1,196	13,298	-	5,680	27,659	27,659	-	-	7,120	71,852	-	-	-	3,525,210	67,635	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	79	-	54	96	-	220	-	114	563	563	-	-	-	504	-	-	-	30,239	98	-
2d.3.2	Process decommissioning chemical flush waste	1	-	26	84	-	193	-	64	366	366	-	-	-	249	-	-	-	26,553	47	-
2d.3.3	Small tool allowance	-	91	-	-	-	-	-	14	105	105	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	82	1,112	178	-	237	1,739	1,739	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	27	4	32	-	32	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	80	91	210	262	1,112	590	27	432	2,805	2,773	32	-	6,000	1,282	-	-	-	360,400	292	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	244	-	-	-	-	-	-	61	305	305	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	1,664	166	1,830	1,830	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	806	-	-	-	-	-	202	1,008	1,008	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	1,936	-	-	-	-	-	290	2,227	2,227	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	40	21	-	167	-	49	277	277	-	-	-	2,030	-	-	-	40,600	66	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	547	82	630	630	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	424	42	466	466	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	320	48	368	368	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	844	127	971	971	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	7,311	1,097	8,408	8,408	-	-	-	-	-	-	-	-	-	78,356
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	10,052	1,508	11,560	10,670	890	-	-	-	-	-	-	-	-	149,660
2d.4	Subtotal Period 2d Period-Dependent Costs	244	2,743	40	21	-	167	34,579	5,652	43,446	38,604	4,842	-	-	2,030	-	-	-	40,600	66	390,997
2d.0	TOTAL PERIOD 2d COST	2,196	6,981	576	1,422	2,308	14,055	36,065	12,202	75,806	70,932	4,873	-	13,120	75,164	-	-	-	3,926,210	67,993	403,477

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	526	79	605	-	605	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	1,790	268	2,058	1,454	605	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,470	147	1,617	1,617	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	708	-	-	-	-	-	177	884	884	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	4	-	29	-	9	48	48	-	-	-	355	-	-	-	7,097	12	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	274	41	315	315	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	426	43	468	468	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	5,393	809	6,201	6,201	-	-	-	-	-	-	-	-	-	57,200
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	5,762	864	6,626	5,738	888	-	-	-	-	-	-	-	-	80,707
2f.4	Subtotal Period 2f Period-Dependent Costs	-	708	7	4	-	29	26,740	4,070	31,557	26,718	4,839	-	-	355	-	-	-	7,097	12	300,888
2f.0	TOTAL PERIOD 2f COST	-	708	7	4	-	29	35,615	6,464	42,827	37,382	5,444	-	-	355	-	-	-	7,097	95,059	307,128
PERIOD 2 TOTALS		13,731	65,566	20,473	10,731	49,937	72,577	386,033	128,758	747,806	576,287	171,445	73	288,160	174,123	1,761	898	-	21,552,260	727,310	2,393,096
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor Building	-	1,971	-	-	-	-	-	296	2,267	-	-	2,267	-	-	-	-	-	-	13,911	-
3b.1.1.2	Condensate Tanks Foundation	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	50	-
3b.1.1.3	Discharge Retention Basin	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	25	-
3b.1.1.4	HPCI Room	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	97	-
3b.1.1.5	Hot Shop	-	16	-	-	-	-	-	2	19	-	-	19	-	-	-	-	-	-	177	-
3b.1.1.6	Hydrogen & Oxygen Storage	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	19	-
3b.1.1.7	LLRW Storage & Shipping	-	83	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	662	-
3b.1.1.8	MSIV	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	42	-
3b.1.1.9	Misc Structures 2017	-	1,410	-	-	-	-	-	212	1,622	-	-	1,622	-	-	-	-	-	-	13,042	-
3b.1.1.10	Offgas Stack	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	544	-
3b.1.1.11	Offgas Storage & Compressor	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	199	-
3b.1.1.12	Radwaste	-	228	-	-	-	-	-	34	262	-	-	262	-	-	-	-	-	-	1,220	-
3b.1.1.13	Recombiner	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	713	-
3b.1.1.14	Security Barrier	-	186	-	-	-	-	-	28	214	-	-	214	-	-	-	-	-	-	933	-
3b.1.1.15	Structures Greater than 3' Below Grade	-	2,461	-	-	-	-	-	369	2,830	-	-	2,830	-	-	-	-	-	-	12,649	-
3b.1.1.16	Tank Farm	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	21	-
3b.1.1.17	Turbine	-	1,259	-	-	-	-	-	189	1,448	-	-	1,448	-	-	-	-	-	-	13,036	-
3b.1.1.18	Turbine Building Addition	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	618	-
3b.1.1.19	Turbine Pedestal	-	182	-	-	-	-	-	27	209	-	-	209	-	-	-	-	-	-	926	-
3b.1.1	Totals	-	8,169	-	-	-	-	-	1,225	9,394	-	-	9,394	-	-	-	-	-	-	58,885	-
Site Closeout Activities																					
3b.1.2	Grade & landscape site	-	896	-	-	-	-	-	134	1,031	-	-	1,031	-	-	-	-	-	-	1,841	-
3b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	9,065	-	-	-	-	200	1,390	10,655	231	-	10,425	-	-	-	-	-	-	60,726	1,560

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	3,322	-	-	-	-	13	500	3,835	-	-	3,835	-	-	-	-	-	-	12	-
3b.2.2	Intake Structure Cofferdam	-	335	-	-	-	-	-	50	385	-	-	385	-	-	-	-	-	-	2,584	-
3b.2.3	Construction Debris	-	-	-	-	-	-	1,170	176	1,346	-	-	1,346	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	5,583	-	-	-	-	-	837	6,421	-	-	6,421	-	-	-	-	-	-	5,422	-
3b.2.5	Discharge Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
3b.2	Subtotal Period 3b Additional Costs	-	9,682	-	-	-	-	1,183	1,630	12,495	-	-	12,495	-	-	-	-	-	-	11,570	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	110	-	-	-	-	-	17	127	-	-	127	-	-	-	-	-	-	-	-
3b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	5,601	840	6,442	-	6,442	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	110	-	-	-	-	5,601	857	6,568	-	6,442	127	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	1,220	122	1,342	1,342	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	2,540	254	2,794	-	2,794	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	5,842	-	-	-	-	-	876	6,719	-	-	6,719	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	315	47	362	-	362	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	356	36	391	-	391	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	257	26	283	-	283	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,122	168	1,290	429	860	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	194	29	223	-	223	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	543	81	624	249	375	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	25,319	3,798	29,117	0	8,589	20,527	-	-	-	-	-	-	-	375,152
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	11,729	1,759	13,489	-	-	13,489	-	-	-	-	-	-	-	122,646
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	6,873	1,031	7,904	-	2,047	5,857	-	-	-	-	-	-	-	98,297
3b.4	Subtotal Period 3b Period-Dependent Costs	-	5,842	-	-	-	-	50,467	8,228	64,537	2,020	15,926	46,591	-	-	-	-	-	-	-	596,095
3b.0	TOTAL PERIOD 3b COST	-	24,700	-	-	-	-	57,452	12,104	94,255	2,251	22,367	69,638	-	-	-	-	-	-	72,296	597,655
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	35,783	5,367	41,150	-	41,150	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	35,783	5,367	41,150	-	41,150	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	24,661	2,466	27,127	-	27,127	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	31,866	3,187	35,053	-	35,053	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	9,642	964	10,606	-	10,606	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	5,199	520	5,718	-	5,718	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	7,552	1,133	8,685	-	8,685	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	3,925	589	4,513	-	4,513	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	4,384	658	5,042	-	5,042	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	150,798	22,620	173,418	-	173,418	-	-	-	-	-	-	-	-	1,896,208
3c.4.10	Utility Staff Cost	-	-	-	-	-	-	36,023	5,403	41,427	-	41,427	-	-	-	-	-	-	-	-	492,285
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	274,051	37,539	311,590	-	311,590	-	-	-	-	-	-	-	-	2,388,493
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	309,834	42,907	352,740	-	352,740	-	-	-	-	-	-	-	-	2,388,493
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
3d.1.1	Totals	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	55	8	64	-	64	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	55	8	64	-	64	-	-	-	-	-	-	-	-	-

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	27	3	30	30	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	35	3	38	38	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8	1	9	-	9	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	6	1	6	-	6	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	8	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	165	25	190	190	-	-	-	-	-	-	-	-	-	2,074
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	39	6	45	45	-	-	-	-	-	-	-	-	-	539
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	293	40	333	318	15	-	-	-	-	-	-	-	-	2,613
3d.0	TOTAL PERIOD 3d COST	-	-	1,083	-	-	4,313	348	966	6,710	6,632	78	-	-	-	-	-	1,160	225,765	-	2,613
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	57	188	987	-	5,925	2,013	2,292	11,462	11,462	-	-	-	21,949	-	-	-	2,633,402	10,339	2,201
3e.2	Subtotal Period 3e Additional Costs	-	57	188	987	-	5,925	2,013	2,292	11,462	11,462	-	-	-	21,949	-	-	-	2,633,402	10,339	2,201
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	118	30	148	148	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	249	62	312	312	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	12	3	15	15	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	71	18	89	89	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	41	10	52	52	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	352	88	440	440	-	-	-	-	-	-	-	-	-	4,999
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	261	65	326	326	-	-	-	-	-	-	-	-	-	3,792
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	1,105	276	1,381	1,381	-	-	-	-	-	-	-	-	-	8,792
3e.0	TOTAL PERIOD 3e COST	-	57	188	987	-	5,925	3,118	2,569	12,844	12,844	-	-	-	21,949	-	-	-	2,633,402	10,339	10,993
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	1,486	-	-	-	-	233	258	1,977	-	-	1,977	-	-	-	-	-	-	6,957	160
3f.2	Subtotal Period 3f Additional Costs	-	1,486	-	-	-	-	233	258	1,977	-	-	1,977	-	-	-	-	-	-	6,957	160
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	126	13	138	-	-	138	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	117	-	-	-	-	-	17	134	-	-	134	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	7	-	-	7	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	36	5	41	-	-	41	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	21	3	24	-	-	24	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	177	27	204	-	-	204	-	-	-	-	-	-	-	2,520
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	109	16	126	-	-	126	-	-	-	-	-	-	-	1,564
3f.4	Subtotal Period 3f Period-Dependent Costs	-	117	-	-	-	-	475	82	674	-	-	674	-	-	-	-	-	-	-	4,084
3f.0	TOTAL PERIOD 3f COST	-	1,613	-	-	-	-	709	342	2,663	-	-	2,663	-	-	-	-	-	-	6,957	4,244
PERIOD 3 TOTALS		-	26,369	1,271	987	-	10,238	371,460	58,888	469,213	21,726	375,186	72,301	-	21,949	-	-	1,160	2,859,167	89,592	3,003,998
TOTAL COST TO DECOMMISSION		17,263	95,223	21,839	11,878	49,952	84,523	911,797	212,629	1,405,104	776,139	555,579	73,386	288,203	197,270	1,992	898	1,160	24,474,580	848,750	6,589,608

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			

TOTAL COST TO DECOMMISSION WITH 17.83% CONTINGENCY:	**$1,405,104**	**thousands of 2020 dollars**	
TOTAL NRC LICENSE TERMINATION COST IS 55.24% OR:	**$776,139**	**thousands of 2020 dollars**	
SPENT FUEL MANAGEMENT COST IS 39.54% OR:	**$555,579**	**thousands of 2020 dollars**	
NON-NUCLEAR DEMOLITION COST IS 5.22% OR:	**$73,386**	**thousands of 2020 dollars**	
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**200,160**	**Cubic Feet**	
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,160**	**Cubic Feet**	
TOTAL SCRAP METAL REMOVED:	**23,123**	**Tons**	
TOTAL CRAFT LABOR REQUIREMENTS:	**848,750**	**Man-hours**	

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX D

DETAILED COST ANALYSIS

SCENARIO 2: DECON with 60 Year DFS

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	632	95	727	654	-	73	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Sacrificial shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Moisture separators/reheaters	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.10	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.11	Pressure suppression structure	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.17.12	Drywell	-	-	-	-	-	-	206	31	236	236	-	-	-	-	-	-	-	-	-	1,600
1a.1.17.13	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
1a.1.17.14	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.15	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	5,486	823	6,308	5,759	-	550	-	-	-	-	-	-	-	42,683
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	16,569	2,485	19,054	18,505	-	550	-	-	-	-	-	-	-	83,013
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,323	198	1,522	-	1,522	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	9,892	1,484	11,376	11,376	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	11,215	1,682	12,897	11,376	1,522	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,328	233	2,561	2,561	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,570	357	3,927	3,927	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	6	-	50	-	15	83	83	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,137	114	1,251	1,251	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,428	343	3,770	-	3,770	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	845	127	971	-	971	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	16,372	2,456	18,827	18,827	-	-	-	-	-	-	-	-	-	245,440
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	27,285	4,093	31,378	31,378	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	6	-	50	59,634	8,703	69,772	64,902	4,870	-	-	610	-	-	-	12,190	20	667,680

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	6	-	50	87,418	12,871	101,724	94,783	6,392	550	-	610	-	-	-	12,190	20	750,693
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	514	77	591	591	-	-	-	-	-	-	-	-	-	4,000
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD housings & NIs	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Removal primary containment	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
1b.1.1.10	Sacrificial shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.11	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
1b.1.1.12	Main Turbine	-	-	-	-	-	-	267	40	307	307	-	-	-	-	-	-	-	-	-	2,080
1b.1.1.13	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1b.1.1.14	Moisture separators & reheaters	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.15	Radwaste building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1.16	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,336	650	4,987	4,524	-	463	-	-	-	-	-	-	-	33,741
1b.1.2	Decon NSSS	296	-	-	-	-	-	-	148	444	444	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	296	-	-	-	-	-	4,336	798	5,431	4,968	-	463	-	-	-	-	-	-	1,067	33,741
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2.2	Site Characterization	-	-	-	-	-	-	5,930	1,779	7,708	7,708	-	-	-	-	-	-	-	-	30,500	10,852
1b.2.3	Mixed & RCRA Waste	-	-	28	29	14	-	-	9	80	80	-	-	43	-	-	-	-	5,253	161	-
1b.2	Subtotal Period 1b Additional Costs	-	-	28	29	14	-	18,605	3,689	22,365	22,365	-	-	43	-	-	-	-	5,253	30,661	10,852
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	38	-	25	45	-	102	-	53	263	263	-	-	-	233	-	-	-	13,991	45	-
1b.3.4	Process decommissioning chemical flush waste	1	-	24	77	-	1,526	-	396	2,024	2,024	-	-	-	-	231	-	-	24,599	43	-
1b.3.5	Small tool allowance	-	2	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	391	59	450	-	450	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	6,335	950	7,285	7,285	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,197	1,202	49	122	-	1,628	7,990	2,302	16,490	16,040	450	-	-	233	231	-	-	38,589	89	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	39	-	-	-	-	-	-	10	48	48	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	1,161	116	1,277	1,277	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,709	171	1,880	1,880	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	344	-	-	-	-	-	86	430	430	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	4	-	29	-	9	49	49	-	-	-	356	-	-	-	7,122	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,812	272	2,083	2,083	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	323	32	355	355	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,416	142	1,557	-	1,557	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	1,305	196	1,500	1,500	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	421	63	484	-	484	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	62	9	72	72	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	8,163	1,225	9,388	9,388	-	-	-	-	-	-	-	-	-	122,384
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,846	877	6,723	6,723	-	-	-	-	-	-	-	-	-	63,266
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	13,682	2,052	15,734	15,734	-	-	-	-	-	-	-	-	-	211,579
1b.4	Subtotal Period 1b Period-Dependent Costs	39	719	7	4	-	29	35,955	5,323	42,076	39,970	2,106	-	-	356	-	-	-	7,122	12	397,229
1b.0	TOTAL PERIOD 1b COST	3,531	1,921	84	154	14	1,657	66,886	12,113	86,361	83,343	2,556	463	43	589	231	-	-	50,964	31,828	441,822
PERIOD 1 TOTALS		3,531	3,288	96	160	14	1,707	154,304	24,984	188,085	178,125	8,948	1,012	43	1,199	231	-	-	63,155	31,848	1,192,515

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Recirculation System Piping & Valves	111	94	27	50	-	528	-	221	1,031	1,031	-	-	-	1,430	-	-	-	99,742	2,905	-
2a.1.1.2	Recirculation Pumps & Motors	40	63	16	51	42	539	-	186	938	938	-	-	96	945	-	-	-	112,200	1,563	-
2a.1.1.3	CRDMs & NIs Removal	194	1,020	415	135	-	1,130	-	696	3,591	3,591	-	-	-	3,741	-	-	-	213,700	17,768	-
2a.1.1.4	Reactor Vessel Internals	244	6,722	12,852	2,696	-	29,845	364	24,027	76,749	76,749	-	-	-	1,252	1,761	898	-	343,150	30,515	1,379
2a.1.1.5	Reactor Vessel	113	9,121	2,672	1,167	-	5,861	364	10,842	30,140	30,140	-	-	-	16,169	-	-	-	1,105,210	30,515	1,379
2a.1.1	Totals	702	17,020	15,982	4,099	42	37,903	728	35,973	112,449	112,449	-	-	96	23,536	1,761	898	-	1,874,002	83,267	2,758
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	385	1,356	521	6,139	439	-	1,341	10,182	10,182	-	-	24,835	1,383	-	-	-	1,577,959	5,438	-
2a.1.3	Main Condensers	-	1,347	360	194	3,225	244	-	947	6,317	6,317	-	-	17,396	727	-	-	-	828,955	18,831	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor Building	-	332	-	-	-	-	-	50	381	381	-	-	-	-	-	-	-	-	2,217	-
2a.1.4.2	Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	127	-
2a.1.4.3	Turbine	-	127	-	-	-	-	-	19	146	146	-	-	-	-	-	-	-	-	1,254	-
2a.1.4	Totals	-	483	-	-	-	-	-	72	556	556	-	-	-	-	-	-	-	-	3,598	-
Disposal of Plant Systems																					
2a.1.5.1	Automatic Press Relief	-	118	7	12	134	70	-	70	410	410	-	-	803	206	-	-	-	45,852	1,656	-
2a.1.5.2	Chemistry Sampling	-	27	1	2	26	13	-	14	83	83	-	-	156	37	-	-	-	8,681	400	-
2a.1.5.3	Chemistry Sampling - Insulated	-	2	0	0	-	0	-	1	3	3	-	-	-	1	-	-	-	72	28	-
2a.1.5.4	Circulating Water - RCA	-	207	14	62	1,114	-	-	230	1,626	1,626	-	-	6,656	-	-	-	-	270,307	2,860	-
2a.1.5.5	Combustible Gas Control - Insul - RCA	-	29	0	2	36	-	-	13	80	80	-	-	212	-	-	-	-	8,617	378	-
2a.1.5.6	Combustible Gas Control - RCA	-	18	1	3	48	-	-	12	81	81	-	-	285	-	-	-	-	11,577	245	-
2a.1.5.7	Condensate & Feedwater	-	987	183	329	3,337	2,464	-	1,431	8,731	8,731	-	-	19,947	7,319	-	-	-	1,275,810	14,196	-
2a.1.5.8	Condensate & Feedwater - Insulated	-	492	34	63	699	408	-	343	2,038	2,038	-	-	4,176	1,207	-	-	-	246,693	6,964	-
2a.1.5.9	Condensate Demin	-	545	30	51	560	339	-	316	1,840	1,840	-	-	3,346	1,000	-	-	-	199,936	7,618	-
2a.1.5.10	Condensate Storage	-	726	33	82	1,193	270	-	444	2,748	2,748	-	-	7,131	795	-	-	-	340,568	10,345	-
2a.1.5.11	Control Rod Drive	-	3	0	0	3	1	-	2	9	9	-	-	19	4	-	-	-	1,009	41	-
2a.1.5.12	Control Rod Drive Hydraulic	-	416	16	26	277	190	-	199	1,124	1,124	-	-	1,658	562	-	-	-	103,306	5,898	-
2a.1.5.13	Core Spray	-	79	20	51	734	176	-	184	1,244	1,244	-	-	4,384	521	-	-	-	211,329	1,163	-
2a.1.5.14	Core Spray - Insulated	-	145	8	13	137	90	-	82	474	474	-	-	818	264	-	-	-	50,149	2,033	-
2a.1.5.15	Demin Water - Insulated - RCA	-	15	0	1	14	-	-	6	36	36	-	-	85	-	-	-	-	3,445	181	-
2a.1.5.16	Demin Water - RCA	-	41	1	2	42	-	-	17	104	104	-	-	253	-	-	-	-	10,278	508	-
2a.1.5.17	Diesel Oil - RCA	-	2	0	0	4	-	-	1	7	7	-	-	23	-	-	-	-	931	25	-
2a.1.5.18	Drywell Atmosphere Cooling - RCA	-	38	1	5	92	-	-	24	159	159	-	-	548	-	-	-	-	22,244	550	-
2a.1.5.19	EDG Emerg Service Water - Insul - RCA	-	0	0	0	0	-	-	0	1	1	-	-	2	-	-	-	-	84	4	-
2a.1.5.20	Electrical - Clean	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	182	-
2a.1.5.21	Emergency Service Water - Insul - RCA	-	21	0	1	23	-	-	9	55	55	-	-	137	-	-	-	-	5,544	281	-
2a.1.5.22	Emergency Service Water - RCA	-	2	0	0	2	-	-	1	5	5	-	-	13	-	-	-	-	512	22	-
2a.1.5.23	GEZIP - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2a.1.5.24	Generator Physical Design - RCA	-	5	0	0	5	-	-	2	12	12	-	-	31	-	-	-	-	1,250	67	-
2a.1.5.25	H2-O2 Control Analyzing	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.26	H2-O2 Control Analyzing - Insulated	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.27	High Pressure Coolant Injection	-	67	6	13	163	70	-	61	381	381	-	-	972	209	-	-	-	52,792	966	-
2a.1.5.28	High Pressure Coolant Injection - Insula	-	219	14	24	267	163	-	141	830	830	-	-	1,598	481	-	-	-	95,733	3,079	-
2a.1.5.29	Hydrogen Cooling	-	8	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	118	-
2a.1.5.30	Hydrogen Cooling - RCA	-	7	0	0	7	-	-	3	17	17	-	-	39	-	-	-	-	1,600	79	-
2a.1.5.31	Hydrogen Seal Oil - RCA	-	17	0	2	32	-	-	9	60	60	-	-	189	-	-	-	-	7,669	212	-
2a.1.5.32	Hydrogen Water Chemistry - RCA	-	24	0	1	23	-	-	10	59	59	-	-	140	-	-	-	-	5,672	304	-
2a.1.5.33	Instrument & Service Air - RCA	-	225	4	17	296	-	-	103	644	644	-	-	1,768	-	-	-	-	71,810	2,733	-
2a.1.5.34	Main Condenser	-	196	12	20	223	139	-	122	712	712	-	-	1,333	411	-	-	-	80,439	2,746	-
2a.1.5.35	Main Steam	-	249	17	32	359	201	-	173	1,029	1,029	-	-	2,148	594	-	-	-	125,135	3,512	-
2a.1.5.36	Main Turbine	-	1,012	205	353	3,306	2,921	-	1,553	9,350	9,350	-	-	19,760	8,687	-	-	-	1,354,661	14,733	-
2a.1.5.37	Main Turbine - Insulated	-	214	18	37	423	225	-	180	1,097	1,097	-	-	2,530	667	-	-	-	145,208	3,069	-
2a.1.5.38	Miscellaneous	-	43	1	3	51	-	-	19	115	115	-	-	302	-	-	-	-	12,283	622	-
2a.1.5.39	Off Gas Recombiner	-	189	19	32	300	257	-	163	960	960	-	-	1,795	764	-	-	-	121,554	2,708	-
2a.1.5.40	Off Gas Recombiner - Insulated	-	387	19	27	229	240	-	197	1,100	1,100	-	-	1,366	709	-	-	-	100,933	5,385	-
2a.1.5.41	Post Accident Sampling	-	25	1	1	9	11	-	11	58	58	-	-	53	33	-	-	-	4,318	345	-
2a.1.5.42	Post Accident Sampling - Insulated	-	17	1	1	3	13	-	8	43	43	-	-	17	37	-	-	-	3,116	212	-
2a.1.5.43	RHR Service Water - Insulated - RCA	-	83	3	14	248	-	-	60	409	409	-	-	1,485	-	-	-	-	60,293	1,125	-
2a.1.5.44	RHR Service Water - RCA	-	4	0	0	6	-	-	2	12	12	-	-	35	-	-	-	-	1,410	57	-
2a.1.5.45	Reactor Feedwater Pump Seal	-	56	2	4	32	33	-	28	155	155	-	-	193	96	-	-	-	14,009	773	-

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2a.1.5.46	Residual Heat Removal	362	252	172	178	1,072	2,051	-	962	5,049	5,049	-	-	6,406	6,012	-	-	-	647,941	4,135	-
2a.1.5.47	Residual Heat Removal - Insulated	622	554	61	82	563	880	-	772	3,535	3,535	-	-	3,367	2,607	-	-	-	303,087	10,340	-
2a.1.5.48	Rx Core Isolation Cooling	-	49	2	4	43	26	-	26	150	150	-	-	259	76	-	-	-	15,396	691	-
2a.1.5.49	Rx Core Isolation Cooling - Insulated	-	107	5	7	48	67	-	52	287	287	-	-	288	198	-	-	-	24,419	1,479	-
2a.1.5.50	Rx Recirculation	56	58	6	4	7	65	-	61	258	258	-	-	43	190	-	-	-	14,095	1,580	-
2a.1.5.51	Snubbers	-	169	2	5	63	30	-	60	331	331	-	-	377	90	-	-	-	21,009	2,548	-
2a.1.5.52	Standby Liquid Control - Insul - RCA	-	4	0	0	4	-	-	2	9	9	-	-	22	-	-	-	-	904	48	-
2a.1.5.53	Standby Liquid Control - RCA	-	26	1	2	41	-	-	13	83	83	-	-	245	-	-	-	-	9,969	341	-
2a.1.5.54	Stator Cooling - RCA	-	7	0	1	21	-	-	5	35	35	-	-	126	-	-	-	-	5,135	98	-
2a.1.5.55	Traversing Incore Probe	0	4	0	0	0	2	-	1	7	7	-	-	1	5	-	-	-	386	51	-
2a.1.5	Totals	1,040	8,221	924	1,572	16,339	11,425	-	8,209	47,730	47,706	-	24	97,654	33,808	-	-	-	6,125,515	119,943	-
2a.1.6	Scaffolding in support of decommissioning	-	2,265	22	12	191	31	-	607	3,127	3,127	-	-	1,030	91	-	-	-	52,111	22,564	-
2a.1	Subtotal Period 2a Activity Costs	1,742	29,721	18,645	6,398	25,937	50,042	728	47,148	180,360	180,336	-	24	141,010	59,545	1,761	898	-	10,458,540	253,640	2,758
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	85	-	57	102	-	232	-	122	598	598	-	-	-	532	-	-	-	31,942	104	-
2a.3.2	Process decommissioning chemical flush waste	5	-	216	702	-	1,619	-	534	3,077	3,077	-	-	-	2,093	-	-	-	223,008	392	-
2a.3.3	Small tool allowance	-	324	-	-	-	-	-	49	373	336	-	37	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	13,661	2,049	15,710	-	15,710	-	-	-	-	-	-	-	-	-
2a.3.6	On-site survey and release of 0.0 tons clean metallic waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	91	324	274	804	-	1,851	26,788	4,723	34,854	19,107	15,710	37	-	2,625	-	-	-	254,950	495	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	112	-	-	-	-	-	-	28	140	140	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	1,019	102	1,121	1,121	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	4,377	438	4,814	4,814	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,356	-	-	-	-	-	589	2,945	2,945	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,627	-	-	-	-	-	544	4,171	4,171	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	110	57	-	457	-	134	758	758	-	-	-	5,551	-	-	-	111,023	181	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,501	375	2,876	2,876	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	856	86	942	942	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	4,115	412	4,527	-	4,527	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	3,071	461	3,532	3,532	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	1,224	184	1,408	-	1,408	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	162	24	187	-	187	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	181	27	208	208	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,624	244	1,867	1,867	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	21,881	3,282	25,164	25,164	-	-	-	-	-	-	-	-	-	325,574
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	21,021	3,153	24,174	24,174	-	-	-	-	-	-	-	-	-	229,108
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	27,906	4,186	32,092	32,092	-	-	-	-	-	-	-	-	-	426,562
2a.4	Subtotal Period 2a Period-Dependent Costs	112	5,982	110	57	-	457	89,938	14,267	110,924	104,803	6,121	-	-	5,551	-	-	-	111,023	181	981,244
2a.0	TOTAL PERIOD 2a COST	1,945	36,028	19,028	7,259	25,937	52,350	117,455	66,138	326,139	304,246	21,831	62	141,010	67,722	1,761	898	-	10,824,520	254,317	984,002
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	ALARA/Radiological	-	18	0	1	6	3	-	6	35	35	-	-	35	10	-	-	-	2,060	277	-
2b.1.1.2	Alternate N2 - RCA	-	16	0	1	16	-	-	7	40	40	-	-	93	-	-	-	-	3,765	185	-
2b.1.1.3	Decontamination Projects	-	1	0	0	0	0	-	0	2	2	-	-	2	0	-	-	-	129	17	-
2b.1.1.4	Electrical - Contaminated	-	445	6	24	400	30	-	183	1,089	1,089	-	-	2,389	90	-	-	-	102,726	6,325	-
2b.1.1.5	Electrical - Decontaminated	-	2,698	48	218	3,906	-	-	1,298	8,167	8,167	-	-	23,344	-	-	-	-	948,013	37,107	-
2b.1.1.6	Fire - RCA	-	101	1	6	103	-	-	42	253	253	-	-	614	-	-	-	-	24,917	1,324	-
2b.1.1.7	HVAC Ductwork	-	305	7	27	446	34	-	156	975	975	-	-	2,665	100	-	-	-	114,598	4,111	-
2b.1.1.8	HVAC/Chilled Water - RCA	-	324	6	26	461	-	-	155	971	971	-	-	2,752	-	-	-	-	111,779	3,985	-
2b.1.1.9	Heating & Ventilation	-	483	16	61	1,007	76	-	302	1,945	1,945	-	-	6,018	227	-	-	-	258,789	7,101	-
2b.1.1.10	Heating Boiler - Insulated - RCA	-	3	0	0	4	-	-	1	9	9	-	-	26	-	-	-	-	1,058	35	-
2b.1.1.11	Liquid Radwaste	588	687	48	63	514	586	-	703	3,188	3,188	-	-	3,073	1,728	-	-	-	235,484	17,194	-
2b.1.1.12	Makeup Demin - RCA	-	103	3	14	246	-	-	65	431	431	-	-	1,471	-	-	-	-	59,747	1,412	-
2b.1.1.13	Non-Essential Diesel Generator - RCA	-	27	3	13	238	-	-	45	327	327	-	-	1,424	-	-	-	-	57,832	395	-
2b.1.1.14	Off Gas Holdup	-	342	21	38	461	214	-	216	1,291	1,291	-	-	2,755	630	-	-	-	152,277	4,769	-
2b.1.1.15	Primary Containment	-	455	42	87	1,038	507	-	414	2,543	2,543	-	-	6,201	1,506	-	-	-	347,704	6,454	-

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2b.1.1.16	Process Radiation Monitors	-	46	2	2	24	18	-	20	111	111	-	-	142	52	-	-	-	9,115	649	-
2b.1.1.17	Rx Bldg Closed Clng Water - Insul - RCA	-	114	2	9	163	-	-	54	343	343	-	-	977	-	-	-	-	39,675	1,484	-
2b.1.1.18	Rx Bldg Closed Clng Water - RCA	-	184	15	66	1,187	-	-	235	1,687	1,687	-	-	7,093	-	-	-	-	288,031	2,489	-
2b.1.1.19	Rx Component Handling Equip	27	142	18	27	194	279	-	154	840	840	-	-	1,158	829	-	-	-	99,730	2,462	-
2b.1.1.20	Rx Pressure Vessel	28	47	6	5	13	78	-	48	225	225	-	-	75	230	-	-	-	17,816	1,051	-
2b.1.1.21	Rx Water Cleanup	172	265	19	16	22	251	-	222	965	965	-	-	130	737	-	-	-	52,670	5,736	-
2b.1.1.22	Secondary Containment	-	124	7	14	170	86	-	81	483	483	-	-	1,017	255	-	-	-	57,567	1,763	-
2b.1.1.23	Service & Seal Water - Insulated - RCA	-	120	2	11	197	-	-	62	392	392	-	-	1,180	-	-	-	-	47,917	1,565	-
2b.1.1.24	Service & Seal Water - RCA	-	159	4	17	303	-	-	88	570	570	-	-	1,809	-	-	-	-	73,453	2,016	-
2b.1.1.25	Service Air Blower - RCA	-	15	0	2	34	-	-	9	62	62	-	-	206	-	-	-	-	8,364	206	-
2b.1.1.26	Solid Radwaste	338	494	36	49	399	467	-	480	2,264	2,264	-	-	2,387	1,380	-	-	-	185,221	10,820	-
2b.1.1.27	Structures & Buildings	-	78	2	5	60	29	-	37	210	210	-	-	357	85	-	-	-	19,933	1,128	-
2b.1.1.28	Wells & Domestic Water	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	144	-
2b.1.1.29	Wells & Domestic Water - RCA	-	52	1	3	57	-	-	22	136	136	-	-	342	-	-	-	-	13,874	633	-
2b.1.1	Totals	1,153	7,860	315	804	11,668	2,657	-	5,107	29,563	29,552	-	11	69,735	7,859	-	-	-	3,334,244	122,835	-
2b.1.2	Scaffolding in support of decommissioning	-	2,831	28	16	239	38	-	758	3,909	3,909	-	-	1,287	114	-	-	-	65,139	28,205	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor Building	5,202	2,903	178	516	8,044	1,181	-	4,924	22,948	22,948	-	-	48,077	7,014	-	-	-	2,317,670	112,518	-
2b.1.3.2	Admin	106	6	0	3	-	15	-	59	189	189	-	-	-	145	-	-	-	6,840	1,600	-
2b.1.3.3	HPCI Room	29	28	1	3	20	14	-	29	123	123	-	-	118	125	-	-	-	10,759	789	-
2b.1.3.4	Hot Shop	17	4	0	2	-	11	-	12	46	46	-	-	-	103	-	-	-	4,860	286	-
2b.1.3.5	LLRW Storage & Shipping	58	24	2	8	5	45	-	48	191	191	-	-	31	433	-	-	-	21,708	1,127	-
2b.1.3.6	Offgas Stack	372	269	7	23	225	82	-	312	1,289	1,289	-	-	1,343	669	-	-	-	87,045	8,860	-
2b.1.3.7	Offgas Storage & Compressor	41	17	1	6	4	33	-	34	136	136	-	-	25	316	-	-	-	15,948	785	-
2b.1.3.8	Radwaste	121	61	3	17	29	96	-	107	435	435	-	-	172	910	-	-	-	49,943	2,503	-
2b.1.3.9	Radwaste Material Storage Warehouse	64	24	2	9	-	52	-	52	202	202	-	-	-	495	-	-	-	23,400	1,197	-
2b.1.3.10	Recombiner	27	25	1	5	33	24	-	32	148	148	-	-	199	216	-	-	-	18,405	695	-
2b.1.3.11	Turbine	705	353	21	104	215	564	-	632	2,594	2,594	-	-	1,283	5,299	-	-	-	303,150	14,443	-
2b.1.3.12	Turbine Building Addition	58	21	1	8	-	45	-	47	181	181	-	-	-	434	-	-	-	20,478	1,087	-
2b.1.3	Totals	6,799	3,736	218	704	8,574	2,164	-	6,288	28,483	28,483	-	-	51,247	16,159	-	-	-	2,880,206	145,889	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	7,952	14,427	560	1,524	20,481	4,859	526	12,232	62,561	62,549	-	11	122,269	24,132	-	-	-	6,279,589	296,929	4,096
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	23	92	1,211	-	-	198	1,524	1,524	-	-	11,760	-	-	-	-	294,000	32	-
2b.2.2	Excavation of Underground Services	-	1,972	-	-	-	-	376	550	2,898	2,898	-	-	-	-	-	-	-	-	12,493	-
2b.2.3	Security Modifications	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,972	23	92	1,211	-	9,072	2,052	14,422	14,422	-	-	11,760	-	-	-	-	294,000	12,525	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	198	-	135	240	-	546	-	285	1,404	1,404	-	-	-	1,253	-	-	-	75,186	244	-
2b.3.2	Process decommissioning chemical flush waste	1	-	43	138	-	319	-	105	607	607	-	-	-	413	-	-	-	43,978	77	-
2b.3.3	Small tool allowance	-	364	-	-	-	-	-	55	418	418	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	117,254	17,588	134,843	-	134,843	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	6,299	945	7,244	7,244	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	199	364	178	378	-	865	123,554	18,978	144,516	9,673	134,843	-	-	1,666	-	-	-	119,165	322	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,440	-	-	-	-	-	-	360	1,799	1,799	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	742	74	816	816	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	2,703	270	2,974	2,974	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,376	-	-	-	-	-	594	2,970	2,970	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,711	-	-	-	-	-	407	3,117	3,117	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	101	52	-	419	-	123	694	694	-	-	-	5,084	-	-	-	101,679	166	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,437	216	1,653	1,653	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	623	62	685	685	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,995	299	3,294	-	3,294	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	2,235	335	2,570	2,570	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	891	134	1,024	-	1,024	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	224	34	258	258	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	118	18	136	-	136	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	458	69	527	527	-	-	-	-	-	-	-	-	-	-

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2b Period-Dependent Costs (continued)																					
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,182	177	1,359	1,359	-	-	-	-	-	-	-	-	-	-
2b.4.16	Security Staff Cost	-	-	-	-	-	-	15,925	2,389	18,314	18,314	-	-	-	-	-	-	-	-	-	236,949
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	14,772	2,216	16,988	16,988	-	-	-	-	-	-	-	-	-	160,160
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	19,442	2,916	22,358	22,358	-	-	-	-	-	-	-	-	-	297,283
2b.4	Subtotal Period 2b Period-Dependent Costs	1,440	5,087	101	52	-	419	63,747	10,692	81,536	77,082	4,455	-	-	5,084	-	-	-	101,679	166	694,392
2b.0	TOTAL PERIOD 2b COST	9,591	21,850	861	2,046	21,692	6,143	196,899	43,954	303,035	163,726	139,297	11	134,029	30,882	-	-	-	6,794,433	309,941	698,488
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	654	58	103	149	-	2,572	-	1,017	4,553	4,553	-	-	-	7,653	-	-	-	486,170	906	-
Disposal of Plant Systems																					
2d.1.2.1	Cranes/Heavy Loads/Rigging - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2d.1.2.2	Electrical - Contaminated Fuel Pool	-	47	1	2	40	3	-	19	112	112	-	-	240	9	-	-	-	10,334	665	-
2d.1.2.3	Electrical - Decontam. Fuel Pool Area	-	297	5	23	411	-	-	140	876	876	-	-	2,457	-	-	-	-	99,783	4,090	-
2d.1.2.4	Fire - RCA - Fuel Pool Area	-	11	0	1	10	-	-	4	26	26	-	-	62	-	-	-	-	2,499	143	-
2d.1.2.5	Fuel Pool Cooling & Cleanup	246	428	34	37	197	455	-	382	1,781	1,781	-	-	1,179	1,341	-	-	-	133,939	8,380	-
2d.1.2.6	Fuel Pool Cooling & Cleanup - Insulated	27	41	3	3	11	40	-	36	161	161	-	-	67	117	-	-	-	10,220	848	-
2d.1.2.7	HVAC Ductwork - Fuel Pool Area	-	34	1	3	50	4	-	17	108	108	-	-	296	11	-	-	-	12,733	457	-
2d.1.2.8	HVAC/Chilled Water - RCA Fuel Pool Area	-	33	0	2	37	-	-	14	87	87	-	-	223	-	-	-	-	9,072	397	-
2d.1.2.9	Instrument & Service Air-RCA-Fuel Pool	-	29	1	2	45	-	-	14	91	91	-	-	267	-	-	-	-	10,841	357	-
2d.1.2	Totals	273	924	45	75	819	502	-	631	3,268	3,268	-	-	4,894	1,479	-	-	-	293,606	15,385	-
Decontamination of Site Buildings																					
2d.1.3.1	Reactor (Post Fuel)	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.3	Totals	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.4	Scaffolding in support of decommissioning	-	566	6	3	48	8	-	152	782	782	-	-	257	23	-	-	-	13,028	5,641	-
2d.1	Subtotal Period 2d Activity Costs	1,872	4,147	326	1,139	1,196	13,298	-	5,680	27,659	27,659	-	-	7,120	71,852	-	-	-	3,525,210	67,635	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	79	-	54	96	-	220	-	114	563	563	-	-	-	504	-	-	-	30,239	98	-
2d.3.2	Process decommissioning chemical flush waste	1	-	26	84	-	193	-	64	366	366	-	-	-	249	-	-	-	26,553	47	-
2d.3.3	Small tool allowance	-	91	-	-	-	-	-	14	105	105	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	82	1,112	178	-	237	1,739	1,739	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	27	4	32	-	32	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	80	91	210	262	1,112	590	27	432	2,805	2,773	32	-	6,000	1,282	-	-	-	360,400	292	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	244	-	-	-	-	-	-	61	305	305	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	1,664	166	1,830	1,830	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	806	-	-	-	-	-	202	1,008	1,008	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	1,936	-	-	-	-	-	290	2,227	2,227	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	40	21	-	167	-	49	277	277	-	-	-	2,030	-	-	-	40,600	66	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	547	82	630	630	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	424	42	466	466	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	320	48	368	368	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	844	127	971	971	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	7,311	1,097	8,408	8,408	-	-	-	-	-	-	-	-	-	78,356
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	10,052	1,508	11,560	10,670	890	-	-	-	-	-	-	-	-	149,660
2d.4	Subtotal Period 2d Period-Dependent Costs	244	2,743	40	21	-	167	34,579	5,652	43,446	38,604	4,842	-	-	2,030	-	-	-	40,600	66	390,997
2d.0	TOTAL PERIOD 2d COST	2,196	6,981	576	1,422	2,308	14,055	36,065	12,202	75,806	70,932	4,873	-	13,120	75,164	-	-	-	3,926,210	67,993	403,477

Monticello Nuclear Generating Plant
Decommissioning Cost Analysis

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Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	47	7	54	-	54	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	1,311	197	1,508	1,454	54	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,470	147	1,617	1,617	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	708	-	-	-	-	-	177	884	884	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	4	-	29	-	9	48	48	-	-	-	355	-	-	-	7,097	12	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	274	41	315	315	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	426	43	468	468	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	5,393	809	6,201	6,201	-	-	-	-	-	-	-	-	-	57,200
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	5,762	864	6,626	5,738	888	-	-	-	-	-	-	-	-	80,707
2f.4	Subtotal Period 2f Period-Dependent Costs	-	708	7	4	-	29	26,740	4,070	31,557	26,718	4,839	-	-	355	-	-	-	7,097	12	300,888
2f.0	TOTAL PERIOD 2f COST	-	708	7	4	-	29	35,137	6,392	42,276	37,382	4,893	-	-	355	-	-	-	7,097	95,059	307,128
PERIOD 2 TOTALS		13,731	65,566	20,473	10,731	49,937	72,577	385,554	128,686	747,255	576,287	170,895	73	288,160	174,123	1,761	898	-	21,552,260	727,310	2,393,096
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor Building	-	1,971	-	-	-	-	-	296	2,267	-	-	2,267	-	-	-	-	-	-	13,911	-
3b.1.1.2	Condensate Tanks Foundation	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	50	-
3b.1.1.3	Discharge Retention Basin	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	25	-
3b.1.1.4	HPCI Room	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	97	-
3b.1.1.5	Hot Shop	-	16	-	-	-	-	-	2	19	-	-	19	-	-	-	-	-	-	177	-
3b.1.1.6	Hydrogen & Oxygen Storage	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	19	-
3b.1.1.7	LLRW Storage & Shipping	-	83	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	662	-
3b.1.1.8	MSIV	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	42	-
3b.1.1.9	Misc Structures 2017	-	1,410	-	-	-	-	-	212	1,622	-	-	1,622	-	-	-	-	-	-	13,042	-
3b.1.1.10	Offgas Stack	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	544	-
3b.1.1.11	Offgas Storage & Compressor	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	199	-
3b.1.1.12	Radwaste	-	228	-	-	-	-	-	34	262	-	-	262	-	-	-	-	-	-	1,220	-
3b.1.1.13	Recombiner	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	713	-
3b.1.1.14	Security Barrier	-	186	-	-	-	-	-	28	214	-	-	214	-	-	-	-	-	-	933	-
3b.1.1.15	Structures Greater than 3' Below Grade	-	2,461	-	-	-	-	-	369	2,830	-	-	2,830	-	-	-	-	-	-	12,649	-
3b.1.1.16	Tank Farm	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	21	-
3b.1.1.17	Turbine	-	1,259	-	-	-	-	-	189	1,448	-	-	1,448	-	-	-	-	-	-	13,036	-
3b.1.1.18	Turbine Building Addition	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	618	-
3b.1.1.19	Turbine Pedestal	-	182	-	-	-	-	-	27	209	-	-	209	-	-	-	-	-	-	926	-
3b.1.1	Totals	-	8,169	-	-	-	-	-	1,225	9,394	-	-	9,394	-	-	-	-	-	-	58,885	-
Site Closeout Activities																					
3b.1.2	Grade & landscape site	-	896	-	-	-	-	-	134	1,031	-	-	1,031	-	-	-	-	-	-	1,841	-
3b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	9,065	-	-	-	-	200	1,390	10,655	231	-	10,425	-	-	-	-	-	-	60,726	1,560

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	3,322	-	-	-	-	13	500	3,835	-	-	3,835	-	-	-	-	-	-	12	-
3b.2.2	Intake Structure Cofferdam	-	335	-	-	-	-	-	50	385	-	-	385	-	-	-	-	-	-	2,584	-
3b.2.3	Construction Debris	-	-	-	-	-	-	1,170	176	1,346	-	-	1,346	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	5,583	-	-	-	-	-	837	6,421	-	-	6,421	-	-	-	-	-	-	5,422	-
3b.2.5	Discharge Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
3b.2	Subtotal Period 3b Additional Costs	-	9,682	-	-	-	-	1,183	1,630	12,495	-	-	12,495	-	-	-	-	-	-	11,570	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	110	-	-	-	-	-	17	127	-	-	127	-	-	-	-	-	-	-	-
3b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	108	16	125	-	125	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	110	-	-	-	-	108	33	252	-	125	127	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	1,220	122	1,342	1,342	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	2,540	254	2,794	-	2,794	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	5,842	-	-	-	-	-	876	6,719	-	-	6,719	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	315	47	362	-	362	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	356	36	391	-	391	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	257	26	283	-	283	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,122	168	1,290	429	860	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	194	29	223	-	223	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	543	81	624	249	375	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	25,319	3,798	29,117	0	8,589	20,527	-	-	-	-	-	-	-	375,152
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	11,729	1,759	13,489	-	-	13,489	-	-	-	-	-	-	-	122,646
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	6,873	1,031	7,904	-	2,047	5,857	-	-	-	-	-	-	-	98,297
3b.4	Subtotal Period 3b Period-Dependent Costs	-	5,842	-	-	-	-	50,467	8,228	64,537	2,020	15,926	46,591	-	-	-	-	-	-	-	596,095
3b.0	TOTAL PERIOD 3b COST	-	24,700	-	-	-	-	51,959	11,280	87,939	2,251	16,050	69,638	-	-	-	-	-	-	72,296	597,655
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	85,327	12,799	98,126	-	98,126	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	85,327	12,799	98,126	-	98,126	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	37,329	3,733	41,062	-	41,062	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	48,222	4,822	53,044	-	53,044	-	-	-	-	-	-	-	-	-
3c.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	12,360	1,236	13,596	-	13,596	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	7,869	787	8,656	-	8,656	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	11,432	1,715	13,147	-	13,147	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	5,940	891	6,832	-	6,832	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	6,636	995	7,632	-	7,632	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	228,259	34,239	262,498	-	262,498	-	-	-	-	-	-	-	-	2,870,241
3c.4.10	Utility Staff Cost	-	-	-	-	-	-	54,527	8,179	62,706	-	62,706	-	-	-	-	-	-	-	-	745,159
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	412,574	56,597	469,171	-	469,171	-	-	-	-	-	-	-	-	3,615,399
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	497,902	69,396	567,298	-	567,298	-	-	-	-	-	-	-	-	3,615,399
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
3d.1.1	Totals	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	27	3	30	30	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	35	3	38	38	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8	1	9	-	9	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	6	1	6	-	6	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	8	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	165	25	190	190	-	-	-	-	-	-	-	-	-	2,074
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	39	6	45	45	-	-	-	-	-	-	-	-	-	539
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	293	40	333	318	15	-	-	-	-	-	-	-	-	2,613
3d.0	TOTAL PERIOD 3d COST	-	-	1,083	-	-	4,313	321	962	6,678	6,632	47	-	-	-	-	-	1,160	225,765	-	2,613
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	57	188	987	-	5,925	2,013	2,292	11,462	11,462	-	-	-	21,949	-	-	-	2,633,402	10,339	2,201
3e.2	Subtotal Period 3e Additional Costs	-	57	188	987	-	5,925	2,013	2,292	11,462	11,462	-	-	-	21,949	-	-	-	2,633,402	10,339	2,201
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	118	30	148	148	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	249	62	312	312	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	12	3	15	15	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	71	18	89	89	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	41	10	52	52	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	352	88	440	440	-	-	-	-	-	-	-	-	-	4,999
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	261	65	326	326	-	-	-	-	-	-	-	-	-	3,792
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	1,105	276	1,381	1,381	-	-	-	-	-	-	-	-	-	8,792
3e.0	TOTAL PERIOD 3e COST	-	57	188	987	-	5,925	3,118	2,569	12,844	12,844	-	-	-	21,949	-	-	-	2,633,402	10,339	10,993
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	1,486	-	-	-	-	233	258	1,977	-	-	1,977	-	-	-	-	-	-	6,957	160
3f.2	Subtotal Period 3f Additional Costs	-	1,486	-	-	-	-	233	258	1,977	-	-	1,977	-	-	-	-	-	-	6,957	160
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	126	13	138	-	-	138	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	117	-	-	-	-	-	17	134	-	-	134	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	7	-	-	7	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	36	5	41	-	-	41	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	21	3	24	-	-	24	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	177	27	204	-	-	204	-	-	-	-	-	-	-	2,520
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	109	16	126	-	-	126	-	-	-	-	-	-	-	1,564
3f.4	Subtotal Period 3f Period-Dependent Costs	-	117	-	-	-	-	475	82	674	-	-	674	-	-	-	-	-	-	-	4,084
3f.0	TOTAL PERIOD 3f COST	-	1,613	-	-	-	-	709	342	2,663	-	-	2,663	-	-	-	-	-	-	6,957	4,244
PERIOD 3 TOTALS		-	26,369	1,271	987	-	10,238	554,007	84,549	677,422	21,726	583,395	72,301	-	21,949	-	-	1,160	2,859,167	89,592	4,230,904
TOTAL COST TO DECOMMISSION		17,263	95,223	21,839	11,878	49,952	84,523	1,093,866	238,219	1,612,762	776,139	763,237	73,386	288,203	197,270	1,992	898	1,160	24,474,580	848,750	7,816,514

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			

TOTAL COST TO DECOMMISSION WITH 17.33% CONTINGENCY:	$1,612,762	thousands of 2020 dollars	
TOTAL NRC LICENSE TERMINATION COST IS 48.12% OR:	$776,139	thousands of 2020 dollars	
SPENT FUEL MANAGEMENT COST IS 47.32% OR:	$763,237	thousands of 2020 dollars	
NON-NUCLEAR DEMOLITION COST IS 4.55% OR:	$73,386	thousands of 2020 dollars	
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	200,160	Cubic Feet	
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	1,160	Cubic Feet	
TOTAL SCRAP METAL REMOVED:	23,123	Tons	
TOTAL CRAFT LABOR REQUIREMENTS:	848,750	Man-hours	

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX E

DETAILED COST ANALYSIS

SCENARIO 3: DECON with 100 Year DFS

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	632	95	727	654	-	73	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Sacrificial shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Moisture separators/reheaters	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.10	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.11	Pressure suppression structure	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.17.12	Drywell	-	-	-	-	-	-	206	31	236	236	-	-	-	-	-	-	-	-	-	1,600
1a.1.17.13	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
1a.1.17.14	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.15	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	5,486	823	6,308	5,759	-	550	-	-	-	-	-	-	-	42,683
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	16,569	2,485	19,054	18,505	-	550	-	-	-	-	-	-	-	83,013
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,323	198	1,522	-	1,522	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	9,892	1,484	11,376	11,376	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	11,215	1,682	12,897	11,376	1,522	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,328	233	2,561	2,561	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,570	357	3,927	3,927	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	6	-	50	-	15	83	83	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,137	114	1,251	1,251	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,428	343	3,770	-	3,770	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	845	127	971	-	971	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	16,372	2,456	18,827	18,827	-	-	-	-	-	-	-	-	-	245,440
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	27,285	4,093	31,378	31,378	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	6	-	50	59,634	8,703	69,772	64,902	4,870	-	-	610	-	-	-	12,190	20	667,680

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	6	-	50	87,418	12,871	101,724	94,783	6,392	550	-	610	-	-	-	12,190	20	750,693
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	514	77	591	591	-	-	-	-	-	-	-	-	-	4,000
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD housings & NIs	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Removal primary containment	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
1b.1.1.10	Sacrificial shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.11	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
1b.1.1.12	Main Turbine	-	-	-	-	-	-	267	40	307	307	-	-	-	-	-	-	-	-	-	2,080
1b.1.1.13	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1b.1.1.14	Moisture separators & reheaters	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.15	Radwaste building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1.16	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,336	650	4,987	4,524	-	463	-	-	-	-	-	-	-	33,741
1b.1.2	Decon NSSS	296	-	-	-	-	-	-	148	444	444	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	296	-	-	-	-	-	4,336	798	5,431	4,968	-	463	-	-	-	-	-	-	1,067	33,741
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2.2	Site Characterization	-	-	-	-	-	-	5,930	1,779	7,708	7,708	-	-	-	-	-	-	-	-	30,500	10,852
1b.2.3	Mixed & RCRA Waste	-	-	28	29	14	-	-	9	80	80	-	-	43	-	-	-	-	5,253	161	-
1b.2	Subtotal Period 1b Additional Costs	-	-	28	29	14	-	18,605	3,689	22,365	22,365	-	-	43	-	-	-	-	5,253	30,661	10,852
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	38	-	25	45	-	102	-	53	263	263	-	-	-	233	-	-	-	13,991	45	-
1b.3.4	Process decommissioning chemical flush waste	1	-	24	77	-	1,526	-	396	2,024	2,024	-	-	-	-	231	-	-	24,599	43	-
1b.3.5	Small tool allowance	-	2	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,735	410	3,145	-	3,145	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	6,335	950	7,285	7,285	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,197	1,202	49	122	-	1,628	10,334	2,653	19,185	16,040	3,145	-	-	233	231	-	-	38,589	89	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	39	-	-	-	-	-	-	10	48	48	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	1,161	116	1,277	1,277	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,709	171	1,880	1,880	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	344	-	-	-	-	-	86	430	430	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	4	-	29	-	9	49	49	-	-	-	356	-	-	-	7,122	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,812	272	2,083	2,083	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	323	32	355	355	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,416	142	1,557	-	1,557	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	1,305	196	1,500	1,500	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	421	63	484	-	484	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	62	9	72	72	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	8,163	1,225	9,388	9,388	-	-	-	-	-	-	-	-	-	122,384
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,846	877	6,723	6,723	-	-	-	-	-	-	-	-	-	63,266
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	13,682	2,052	15,734	15,734	-	-	-	-	-	-	-	-	-	211,579
1b.4	Subtotal Period 1b Period-Dependent Costs	39	719	7	4	-	29	35,955	5,323	42,076	39,970	2,106	-	-	356	-	-	-	7,122	12	397,229
1b.0	TOTAL PERIOD 1b COST	3,531	1,921	84	154	14	1,657	69,230	12,465	89,056	83,343	5,251	463	43	589	231	-	-	50,964	31,828	441,822
PERIOD 1 TOTALS		3,531	3,288	96	160	14	1,707	156,648	25,335	190,780	178,125	11,643	1,012	43	1,199	231	-	-	63,155	31,848	1,192,515

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Recirculation System Piping & Valves	111	94	27	50	-	528	-	221	1,031	1,031	-	-	-	1,430	-	-	-	99,742	2,905	-
2a.1.1.2	Recirculation Pumps & Motors	40	63	16	51	42	539	-	186	938	938	-	-	96	945	-	-	-	112,200	1,563	-
2a.1.1.3	CRDMs & NIs Removal	194	1,020	415	135	-	1,130	-	696	3,591	3,591	-	-	-	3,741	-	-	-	213,700	17,768	-
2a.1.1.4	Reactor Vessel Internals	244	6,722	12,852	2,696	-	29,845	364	24,027	76,749	76,749	-	-	-	1,252	1,761	898	-	343,150	30,515	1,379
2a.1.1.5	Reactor Vessel	113	9,121	2,672	1,167	-	5,861	364	10,842	30,140	30,140	-	-	-	16,169	-	-	-	1,105,210	30,515	1,379
2a.1.1	Totals	702	17,020	15,982	4,099	42	37,903	728	35,973	112,449	112,449	-	-	96	23,536	1,761	898	-	1,874,002	83,267	2,758
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	385	1,356	521	6,139	439	-	1,341	10,182	10,182	-	-	24,835	1,383	-	-	-	1,577,959	5,438	-
2a.1.3	Main Condensers	-	1,347	360	194	3,225	244	-	947	6,317	6,317	-	-	17,396	727	-	-	-	828,955	18,831	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor Building	-	332	-	-	-	-	-	50	381	381	-	-	-	-	-	-	-	-	2,217	-
2a.1.4.2	Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	127	-
2a.1.4.3	Turbine	-	127	-	-	-	-	-	19	146	146	-	-	-	-	-	-	-	-	1,254	-
2a.1.4	Totals	-	483	-	-	-	-	-	72	556	556	-	-	-	-	-	-	-	-	3,598	-
Disposal of Plant Systems																					
2a.1.5.1	Automatic Press Relief	-	118	7	12	134	70	-	70	410	410	-	-	803	206	-	-	-	45,852	1,656	-
2a.1.5.2	Chemistry Sampling	-	27	1	2	26	13	-	14	83	83	-	-	156	37	-	-	-	8,681	400	-
2a.1.5.3	Chemistry Sampling - Insulated	-	2	0	0	-	0	-	1	3	3	-	-	-	1	-	-	-	72	28	-
2a.1.5.4	Circulating Water - RCA	-	207	14	62	1,114	-	-	230	1,626	1,626	-	-	6,656	-	-	-	-	270,307	2,860	-
2a.1.5.5	Combustible Gas Control - Insul - RCA	-	29	0	2	36	-	-	13	80	80	-	-	212	-	-	-	-	8,617	378	-
2a.1.5.6	Combustible Gas Control - RCA	-	18	1	3	48	-	-	12	81	81	-	-	285	-	-	-	-	11,577	245	-
2a.1.5.7	Condensate & Feedwater	-	987	183	329	3,337	2,464	-	1,431	8,731	8,731	-	-	19,947	7,319	-	-	-	1,275,810	14,196	-
2a.1.5.8	Condensate & Feedwater - Insulated	-	492	34	63	699	408	-	343	2,038	2,038	-	-	4,176	1,207	-	-	-	246,693	6,964	-
2a.1.5.9	Condensate Demin	-	545	30	51	560	339	-	316	1,840	1,840	-	-	3,346	1,000	-	-	-	199,936	7,618	-
2a.1.5.10	Condensate Storage	-	726	33	82	1,193	270	-	444	2,748	2,748	-	-	7,131	795	-	-	-	340,568	10,345	-
2a.1.5.11	Control Rod Drive	-	3	0	0	3	1	-	2	9	9	-	-	19	4	-	-	-	1,009	41	-
2a.1.5.12	Control Rod Drive Hydraulic	-	416	16	26	277	190	-	199	1,124	1,124	-	-	1,658	562	-	-	-	103,306	5,898	-
2a.1.5.13	Core Spray	-	79	20	51	734	176	-	184	1,244	1,244	-	-	4,384	521	-	-	-	211,329	1,163	-
2a.1.5.14	Core Spray - Insulated	-	145	8	13	137	90	-	82	474	474	-	-	818	264	-	-	-	50,149	2,033	-
2a.1.5.15	Demin Water - Insulated - RCA	-	15	0	1	14	-	-	6	36	36	-	-	85	-	-	-	-	3,445	181	-
2a.1.5.16	Demin Water - RCA	-	41	1	2	42	-	-	17	104	104	-	-	253	-	-	-	-	10,278	508	-
2a.1.5.17	Diesel Oil - RCA	-	2	0	0	4	-	-	1	7	7	-	-	23	-	-	-	-	931	25	-
2a.1.5.18	Drywell Atmosphere Cooling - RCA	-	38	1	5	92	-	-	24	159	159	-	-	548	-	-	-	-	22,244	550	-
2a.1.5.19	EDG Emerg Service Water - Insul - RCA	-	0	0	0	0	-	-	0	1	1	-	-	2	-	-	-	-	84	4	-
2a.1.5.20	Electrical - Clean	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	182	-
2a.1.5.21	Emergency Service Water - Insul - RCA	-	21	0	1	23	-	-	9	55	55	-	-	137	-	-	-	-	5,544	281	-
2a.1.5.22	Emergency Service Water - RCA	-	2	0	0	2	-	-	1	5	5	-	-	13	-	-	-	-	512	22	-
2a.1.5.23	GEZIP - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2a.1.5.24	Generator Physical Design - RCA	-	5	0	0	5	-	-	2	12	12	-	-	31	-	-	-	-	1,250	67	-
2a.1.5.25	H2-O2 Control Analyzing	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.26	H2-O2 Control Analyzing - Insulated	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.27	High Pressure Coolant Injection	-	67	6	13	163	70	-	61	381	381	-	-	972	209	-	-	-	52,792	966	-
2a.1.5.28	High Pressure Coolant Injection - Insula	-	219	14	24	267	163	-	141	830	830	-	-	1,598	481	-	-	-	95,733	3,079	-
2a.1.5.29	Hydrogen Cooling	-	8	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	118	-
2a.1.5.30	Hydrogen Cooling - RCA	-	7	0	0	7	-	-	3	17	17	-	-	39	-	-	-	-	1,600	79	-
2a.1.5.31	Hydrogen Seal Oil - RCA	-	17	0	2	32	-	-	9	60	60	-	-	189	-	-	-	-	7,669	212	-
2a.1.5.32	Hydrogen Water Chemistry - RCA	-	24	0	1	23	-	-	10	59	59	-	-	140	-	-	-	-	5,672	304	-
2a.1.5.33	Instrument & Service Air - RCA	-	225	4	17	296	-	-	103	644	644	-	-	1,768	-	-	-	-	71,810	2,733	-
2a.1.5.34	Main Condenser	-	196	12	20	223	139	-	122	712	712	-	-	1,333	411	-	-	-	80,439	2,746	-
2a.1.5.35	Main Steam	-	249	17	32	359	201	-	173	1,029	1,029	-	-	2,148	594	-	-	-	125,135	3,512	-
2a.1.5.36	Main Turbine	-	1,012	205	353	3,306	2,921	-	1,553	9,350	9,350	-	-	19,760	8,687	-	-	-	1,354,661	14,733	-
2a.1.5.37	Main Turbine - Insulated	-	214	18	37	423	225	-	180	1,097	1,097	-	-	2,530	667	-	-	-	145,208	3,069	-
2a.1.5.38	Miscellaneous	-	43	1	3	51	-	-	19	115	115	-	-	302	-	-	-	-	12,283	622	-
2a.1.5.39	Off Gas Recombiner	-	189	19	32	300	257	-	163	960	960	-	-	1,795	764	-	-	-	121,554	2,708	-
2a.1.5.40	Off Gas Recombiner - Insulated	-	387	19	27	229	240	-	197	1,100	1,100	-	-	1,366	709	-	-	-	100,933	5,385	-
2a.1.5.41	Post Accident Sampling	-	25	1	1	9	11	-	11	58	58	-	-	53	33	-	-	-	4,318	345	-
2a.1.5.42	Post Accident Sampling - Insulated	-	17	1	1	3	13	-	8	43	43	-	-	17	37	-	-	-	3,116	212	-
2a.1.5.43	RHR Service Water - Insulated - RCA	-	83	3	14	248	-	-	60	409	409	-	-	1,485	-	-	-	-	60,293	1,125	-
2a.1.5.44	RHR Service Water - RCA	-	4	0	0	6	-	-	2	12	12	-	-	35	-	-	-	-	1,410	57	-
2a.1.5.45	Reactor Feedwater Pump Seal	-	56	2	4	32	33	-	28	155	155	-	-	193	96	-	-	-	14,009	773	-

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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2a.1.5.46	Residual Heat Removal	362	252	172	178	1,072	2,051	-	962	5,049	5,049	-	-	6,406	6,012	-	-	-	647,941	4,135	-
2a.1.5.47	Residual Heat Removal - Insulated	622	554	61	82	563	880	-	772	3,535	3,535	-	-	3,367	2,607	-	-	-	303,087	10,340	-
2a.1.5.48	Rx Core Isolation Cooling	-	49	2	4	43	26	-	26	150	150	-	-	259	76	-	-	-	15,396	691	-
2a.1.5.49	Rx Core Isolation Cooling - Insulated	-	107	5	7	48	67	-	52	287	287	-	-	288	198	-	-	-	24,419	1,479	-
2a.1.5.50	Rx Recirculation	56	58	6	4	7	65	-	61	258	258	-	-	43	190	-	-	-	14,095	1,580	-
2a.1.5.51	Snubbers	-	169	2	5	63	30	-	60	331	331	-	-	377	90	-	-	-	21,009	2,548	-
2a.1.5.52	Standby Liquid Control - Insul - RCA	-	4	0	0	4	-	-	2	9	9	-	-	22	-	-	-	-	904	48	-
2a.1.5.53	Standby Liquid Control - RCA	-	26	1	2	41	-	-	13	83	83	-	-	245	-	-	-	-	9,969	341	-
2a.1.5.54	Stator Cooling - RCA	-	7	0	1	21	-	-	5	35	35	-	-	126	-	-	-	-	5,135	98	-
2a.1.5.55	Traversing Incore Probe	0	4	0	0	0	2	-	1	7	7	-	-	1	5	-	-	-	386	51	-
2a.1.5	Totals	1,040	8,221	924	1,572	16,339	11,425	-	8,209	47,730	47,706	-	24	97,654	33,808	-	-	-	6,125,515	119,943	-
2a.1.6	Scaffolding in support of decommissioning	-	2,265	22	12	191	31	-	607	3,127	3,127	-	-	1,030	91	-	-	-	52,111	22,564	-
2a.1	Subtotal Period 2a Activity Costs	1,742	29,721	18,645	6,398	25,937	50,042	728	47,148	180,360	180,336	-	24	141,010	59,545	1,761	898	-	10,458,540	253,640	2,758
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	85	-	57	102	-	232	-	122	598	598	-	-	-	532	-	-	-	31,942	104	-
2a.3.2	Process decommissioning chemical flush waste	5	-	216	702	-	1,619	-	534	3,077	3,077	-	-	-	2,093	-	-	-	223,008	392	-
2a.3.3	Small tool allowance	-	324	-	-	-	-	-	49	373	336	-	37	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	24,119	3,618	27,737	-	27,737	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	13,127	1,969	15,097	15,097	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	91	324	274	804	-	1,851	37,247	6,292	46,882	19,107	27,737	37	-	2,625	-	-	-	254,950	495	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	112	-	-	-	-	-	-	28	140	140	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	1,019	102	1,121	1,121	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	4,377	438	4,814	4,814	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,356	-	-	-	-	-	589	2,945	2,945	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,627	-	-	-	-	-	544	4,171	4,171	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	110	57	-	457	-	134	758	758	-	-	-	5,551	-	-	-	111,023	181	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,501	375	2,876	2,876	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	856	86	942	942	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	4,115	412	4,527	-	4,527	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	3,071	461	3,532	3,532	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	1,224	184	1,408	-	1,408	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	162	24	187	-	187	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	181	27	208	208	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,624	244	1,867	1,867	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	21,881	3,282	25,164	25,164	-	-	-	-	-	-	-	-	-	325,574
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	21,021	3,153	24,174	24,174	-	-	-	-	-	-	-	-	-	229,108
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	27,906	4,186	32,092	32,092	-	-	-	-	-	-	-	-	-	426,562
2a.4	Subtotal Period 2a Period-Dependent Costs	112	5,982	110	57	-	457	89,938	14,267	110,924	104,803	6,121	-	-	5,551	-	-	-	111,023	181	981,244
2a.0	TOTAL PERIOD 2a COST	1,945	36,028	19,028	7,259	25,937	52,350	127,913	67,707	338,166	304,246	33,858	62	141,010	67,722	1,761	898	-	10,824,520	254,317	984,002
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	ALARA/Radiological	-	18	0	1	6	3	-	6	35	35	-	-	35	10	-	-	-	2,060	277	-
2b.1.1.2	Alternate N2 - RCA	-	16	0	1	16	-	-	7	40	40	-	-	93	-	-	-	-	3,765	185	-
2b.1.1.3	Decontamination Projects	-	1	0	0	0	0	-	0	2	2	-	-	2	0	-	-	-	129	17	-
2b.1.1.4	Electrical - Contaminated	-	445	6	24	400	30	-	183	1,089	1,089	-	-	2,389	90	-	-	-	102,726	6,325	-
2b.1.1.5	Electrical - Decontaminated	-	2,698	48	218	3,906	-	-	1,298	8,167	8,167	-	-	23,344	-	-	-	-	948,013	37,107	-
2b.1.1.6	Fire - RCA	-	101	1	6	103	-	-	42	253	253	-	-	614	-	-	-	-	24,917	1,324	-
2b.1.1.7	HVAC Ductwork	-	305	7	27	446	34	-	156	975	975	-	-	2,665	100	-	-	-	114,598	4,111	-
2b.1.1.8	HVAC/Chilled Water - RCA	-	324	6	26	461	-	-	155	971	971	-	-	2,752	-	-	-	-	111,779	3,985	-
2b.1.1.9	Heating & Ventilation	-	483	16	61	1,007	76	-	302	1,945	1,945	-	-	6,018	227	-	-	-	258,789	7,101	-
2b.1.1.10	Heating Boiler - Insulated - RCA	-	3	0	0	4	-	-	1	9	9	-	-	26	-	-	-	-	1,058	35	-
2b.1.1.11	Liquid Radwaste	588	687	48	63	514	586	-	703	3,188	3,188	-	-	3,073	1,728	-	-	-	235,484	17,194	-
2b.1.1.12	Makeup Demin - RCA	-	103	3	14	246	-	-	65	431	431	-	-	1,471	-	-	-	-	59,747	1,412	-
2b.1.1.13	Non-Essential Diesel Generator - RCA	-	27	3	13	238	-	-	45	327	327	-	-	1,424	-	-	-	-	57,832	395	-
2b.1.1.14	Off Gas Holdup	-	342	21	38	461	214	-	216	1,291	1,291	-	-	2,755	630	-	-	-	152,277	4,769	-
2b.1.1.15	Primary Containment	-	455	42	87	1,038	507	-	414	2,543	2,543	-	-	6,201	1,506	-	-	-	347,704	6,454	-
2b.1.1.16	Process Radiation Monitors	-	46	2	2	24	18	-	20	111	111	-	-	142	52	-	-	-	9,115	649	-

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Disposal of Plant Systems (continued)																					
2b.1.1.17	Rx Bldg Closed Clng Water - Insul - RCA	-	114	2	9	163	-	-	54	343	343	-	-	977	-	-	-	-	39,675	1,484	-
2b.1.1.18	Rx Bldg Closed Clng Water - RCA	-	184	15	66	1,187	-	-	235	1,687	1,687	-	-	7,093	-	-	-	-	288,031	2,489	-
2b.1.1.19	Rx Component Handling Equip	27	142	18	27	194	279	-	154	840	840	-	-	1,158	829	-	-	-	99,730	2,462	-
2b.1.1.20	Rx Pressure Vessel	28	47	6	5	13	78	-	48	225	225	-	-	75	230	-	-	-	17,816	1,051	-
2b.1.1.21	Rx Water Cleanup	172	265	19	16	22	251	-	222	965	965	-	-	130	737	-	-	-	52,670	5,736	-
2b.1.1.22	Secondary Containment	-	124	7	14	170	86	-	81	483	483	-	-	1,017	255	-	-	-	57,567	1,763	-
2b.1.1.23	Service & Seal Water - Insulated - RCA	-	120	2	11	197	-	-	62	392	392	-	-	1,180	-	-	-	-	47,917	1,565	-
2b.1.1.24	Service & Seal Water - RCA	-	159	4	17	303	-	-	88	570	570	-	-	1,809	-	-	-	-	73,453	2,016	-
2b.1.1.25	Service Air Blower - RCA	-	15	0	2	34	-	-	9	62	62	-	-	206	-	-	-	-	8,364	206	-
2b.1.1.26	Solid Radwaste	338	494	36	49	399	467	-	480	2,264	2,264	-	-	2,387	1,380	-	-	-	185,221	10,820	-
2b.1.1.27	Structures & Buildings	-	78	2	5	60	29	-	37	210	210	-	-	357	85	-	-	-	19,933	1,128	-
2b.1.1.28	Wells & Domestic Water	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	144	-
2b.1.1.29	Wells & Domestic Water - RCA	-	52	1	3	57	-	-	22	136	136	-	-	342	-	-	-	-	13,874	633	-
2b.1.1	Totals	1,153	7,860	315	804	11,668	2,657	-	5,107	29,563	29,552	-	11	69,735	7,859	-	-	-	3,334,244	122,835	-
2b.1.2	Scaffolding in support of decommissioning	-	2,831	28	16	239	38	-	758	3,909	3,909	-	-	1,287	114	-	-	-	65,139	28,205	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor Building	5,202	2,903	178	516	8,044	1,181	-	4,924	22,948	22,948	-	-	48,077	7,014	-	-	-	2,317,670	112,518	-
2b.1.3.2	Admin	106	6	0	3	-	15	-	59	189	189	-	-	-	145	-	-	-	6,840	1,600	-
2b.1.3.3	HPCI Room	29	28	1	3	20	14	-	29	123	123	-	-	118	125	-	-	-	10,759	789	-
2b.1.3.4	Hot Shop	17	4	0	2	-	11	-	12	46	46	-	-	-	103	-	-	-	4,860	286	-
2b.1.3.5	LLRW Storage & Shipping	58	24	2	8	5	45	-	48	191	191	-	-	31	433	-	-	-	21,708	1,127	-
2b.1.3.6	Offgas Stack	372	269	7	23	225	82	-	312	1,289	1,289	-	-	1,343	669	-	-	-	87,045	8,860	-
2b.1.3.7	Offgas Storage & Compressor	41	17	1	6	4	33	-	34	136	136	-	-	25	316	-	-	-	15,948	785	-
2b.1.3.8	Radwaste	121	61	3	17	29	96	-	107	435	435	-	-	172	910	-	-	-	49,943	2,503	-
2b.1.3.9	Radwaste Material Storage Warehouse	64	24	2	9	-	52	-	52	202	202	-	-	-	495	-	-	-	23,400	1,197	-
2b.1.3.10	Recombiner	27	25	1	5	33	24	-	32	148	148	-	-	199	216	-	-	-	18,405	695	-
2b.1.3.11	Turbine	705	353	21	104	215	564	-	632	2,594	2,594	-	-	1,283	5,299	-	-	-	303,150	14,443	-
2b.1.3.12	Turbine Building Addition	58	21	1	8	-	45	-	47	181	181	-	-	-	434	-	-	-	20,478	1,087	-
2b.1.3	Totals	6,799	3,736	218	704	8,574	2,164	-	6,288	28,483	28,483	-	-	51,247	16,159	-	-	-	2,880,206	145,889	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	7,952	14,427	560	1,524	20,481	4,859	526	12,232	62,561	62,549	-	11	122,269	24,132	-	-	-	6,279,589	296,929	4,096
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	23	92	1,211	-	-	198	1,524	1,524	-	-	11,760	-	-	-	-	294,000	32	-
2b.2.2	Excavation of Underground Services	-	1,972	-	-	-	-	376	550	2,898	2,898	-	-	-	-	-	-	-	-	12,493	-
2b.2.3	Security Modifications	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,972	23	92	1,211	-	9,072	2,052	14,422	14,422	-	-	11,760	-	-	-	-	294,000	12,525	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	198	-	135	240	-	546	-	285	1,404	1,404	-	-	-	1,253	-	-	-	75,186	244	-
2b.3.2	Process decommissioning chemical flush waste	1	-	43	138	-	319	-	105	607	607	-	-	-	413	-	-	-	43,978	77	-
2b.3.3	Small tool allowance	-	364	-	-	-	-	-	55	418	418	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	117,254	17,588	134,843	-	134,843	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	6,299	945	7,244	7,244	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	199	364	178	378	-	865	123,554	18,978	144,516	9,673	134,843	-	-	1,666	-	-	-	119,165	322	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,440	-	-	-	-	-	-	360	1,799	1,799	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	742	74	816	816	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	2,703	270	2,974	2,974	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,376	-	-	-	-	-	594	2,970	2,970	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,711	-	-	-	-	-	407	3,117	3,117	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	101	52	-	419	-	123	694	694	-	-	-	5,084	-	-	-	101,679	166	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,437	216	1,653	1,653	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	623	62	685	685	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,995	299	3,294	-	3,294	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	2,235	335	2,570	2,570	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	891	134	1,024	-	1,024	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	224	34	258	258	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	118	18	136	-	136	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	458	69	527	527	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,182	177	1,359	1,359	-	-	-	-	-	-	-	-	-	-

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2b Period-Dependent Costs (continued)																					
2b.4.16	Security Staff Cost	-	-	-	-	-	-	15,925	2,389	18,314	18,314	-	-	-	-	-	-	-	-	-	236,949
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	14,772	2,216	16,988	16,988	-	-	-	-	-	-	-	-	-	160,160
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	19,442	2,916	22,358	22,358	-	-	-	-	-	-	-	-	-	297,283
2b.4	Subtotal Period 2b Period-Dependent Costs	1,440	5,087	101	52	-	419	63,747	10,692	81,536	77,082	4,455	-	-	5,084	-	-	-	101,679	166	694,392
2b.0	TOTAL PERIOD 2b COST	9,591	21,850	861	2,046	21,692	6,143	196,899	43,954	303,035	163,726	139,297	11	134,029	30,882	-	-	-	6,794,433	309,941	698,488
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	654	58	103	149	-	2,572	-	1,017	4,553	4,553	-	-	-	7,653	-	-	-	486,170	906	-
Disposal of Plant Systems																					
2d.1.2.1	Cranes/Heavy Loads/Rigging - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2d.1.2.2	Electrical - Contaminated Fuel Pool	-	47	1	2	40	3	-	19	112	112	-	-	240	9	-	-	-	10,334	665	-
2d.1.2.3	Electrical - Decontam. Fuel Pool Area	-	297	5	23	411	-	-	140	876	876	-	-	2,457	-	-	-	-	99,783	4,090	-
2d.1.2.4	Fire - RCA - Fuel Pool Area	-	11	0	1	10	-	-	4	26	26	-	-	62	-	-	-	-	2,499	143	-
2d.1.2.5	Fuel Pool Cooling & Cleanup	246	428	34	37	197	455	-	382	1,781	1,781	-	-	1,179	1,341	-	-	-	133,939	8,380	-
2d.1.2.6	Fuel Pool Cooling & Cleanup - Insulated	27	41	3	3	11	40	-	36	161	161	-	-	67	117	-	-	-	10,220	848	-
2d.1.2.7	HVAC Ductwork - Fuel Pool Area	-	34	1	3	50	4	-	17	108	108	-	-	296	11	-	-	-	12,733	457	-
2d.1.2.8	HVAC/Chilled Water - RCA Fuel Pool Area	-	33	0	2	37	-	-	14	87	87	-	-	223	-	-	-	-	9,072	397	-
2d.1.2.9	Instrument & Service Air-RCA-Fuel Pool	-	29	1	2	45	-	-	14	91	91	-	-	267	-	-	-	-	10,841	357	-
2d.1.2	Totals	273	924	45	75	819	502	-	631	3,268	3,268	-	-	4,894	1,479	-	-	-	293,606	15,385	-
Decontamination of Site Buildings																					
2d.1.3.1	Reactor (Post Fuel)	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.3	Totals	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.4	Scaffolding in support of decommissioning	-	566	6	3	48	8	-	152	782	782	-	-	257	23	-	-	-	13,028	5,641	-
2d.1	Subtotal Period 2d Activity Costs	1,872	4,147	326	1,139	1,196	13,298	-	5,680	27,659	27,659	-	-	7,120	71,852	-	-	-	3,525,210	67,635	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	79	-	54	96	-	220	-	114	563	563	-	-	-	504	-	-	-	30,239	98	-
2d.3.2	Process decommissioning chemical flush waste	1	-	26	84	-	193	-	64	366	366	-	-	-	249	-	-	-	26,553	47	-
2d.3.3	Small tool allowance	-	91	-	-	-	-	-	14	105	105	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	82	1,112	178	-	237	1,739	1,739	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	27	4	32	-	32	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	80	91	210	262	1,112	590	27	432	2,805	2,773	32	-	6,000	1,282	-	-	-	360,400	292	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	244	-	-	-	-	-	-	61	305	305	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	1,664	166	1,830	1,830	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	806	-	-	-	-	-	202	1,008	1,008	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	1,936	-	-	-	-	-	290	2,227	2,227	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	40	21	-	167	-	49	277	277	-	-	-	2,030	-	-	-	40,600	66	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	547	82	630	630	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	424	42	466	466	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	320	48	368	368	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	844	127	971	971	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	7,311	1,097	8,408	8,408	-	-	-	-	-	-	-	-	-	78,356
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	10,052	1,508	11,560	10,670	890	-	-	-	-	-	-	-	-	149,660
2d.4	Subtotal Period 2d Period-Dependent Costs	244	2,743	40	21	-	167	34,579	5,652	43,446	38,604	4,842	-	-	2,030	-	-	-	40,600	66	390,997
2d.0	TOTAL PERIOD 2d COST	2,196	6,981	576	1,422	2,308	14,055	36,065	12,202	75,806	70,932	4,873	-	13,120	75,164	-	-	-	3,926,210	67,993	403,477

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	47	7	54	-	54	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	1,311	197	1,508	1,454	54	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,470	147	1,617	1,617	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	708	-	-	-	-	-	177	884	884	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	4	-	29	-	9	48	48	-	-	-	355	-	-	-	7,097	12	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	274	41	315	315	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	426	43	468	468	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	5,393	809	6,201	6,201	-	-	-	-	-	-	-	-	-	57,200
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	5,762	864	6,626	5,738	888	-	-	-	-	-	-	-	-	80,707
2f.4	Subtotal Period 2f Period-Dependent Costs	-	708	7	4	-	29	26,740	4,070	31,557	26,718	4,839	-	-	355	-	-	-	7,097	12	300,888
2f.0	TOTAL PERIOD 2f COST	-	708	7	4	-	29	35,137	6,392	42,276	37,382	4,893	-	-	355	-	-	-	7,097	95,059	307,128
PERIOD 2 TOTALS		13,731	65,566	20,473	10,731	49,937	72,577	396,013	130,255	759,282	576,287	182,922	73	288,160	174,123	1,761	898	-	21,552,260	727,310	2,393,096
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor Building	-	1,971	-	-	-	-	-	296	2,267	-	-	2,267	-	-	-	-	-	-	13,911	-
3b.1.1.2	Condensate Tanks Foundation	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	50	-
3b.1.1.3	Discharge Retention Basin	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	25	-
3b.1.1.4	HPCI Room	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	97	-
3b.1.1.5	Hot Shop	-	16	-	-	-	-	-	2	19	-	-	19	-	-	-	-	-	-	177	-
3b.1.1.6	Hydrogen & Oxygen Storage	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	19	-
3b.1.1.7	LLRW Storage & Shipping	-	83	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	662	-
3b.1.1.8	MSIV	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	42	-
3b.1.1.9	Misc Structures 2017	-	1,410	-	-	-	-	-	212	1,622	-	-	1,622	-	-	-	-	-	-	13,042	-
3b.1.1.10	Offgas Stack	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	544	-
3b.1.1.11	Offgas Storage & Compressor	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	199	-
3b.1.1.12	Radwaste	-	228	-	-	-	-	-	34	262	-	-	262	-	-	-	-	-	-	1,220	-
3b.1.1.13	Recombiner	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	713	-
3b.1.1.14	Security Barrier	-	186	-	-	-	-	-	28	214	-	-	214	-	-	-	-	-	-	933	-
3b.1.1.15	Structures Greater than 3' Below Grade	-	2,461	-	-	-	-	-	369	2,830	-	-	2,830	-	-	-	-	-	-	12,649	-
3b.1.1.16	Tank Farm	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	21	-
3b.1.1.17	Turbine	-	1,259	-	-	-	-	-	189	1,448	-	-	1,448	-	-	-	-	-	-	13,036	-
3b.1.1.18	Turbine Building Addition	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	618	-
3b.1.1.19	Turbine Pedestal	-	182	-	-	-	-	-	27	209	-	-	209	-	-	-	-	-	-	926	-
3b.1.1	Totals	-	8,169	-	-	-	-	-	1,225	9,394	-	-	9,394	-	-	-	-	-	-	58,885	-
Site Closeout Activities																					
3b.1.2	Grade & landscape site	-	896	-	-	-	-	-	134	1,031	-	-	1,031	-	-	-	-	-	-	1,841	-
3b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	9,065	-	-	-	-	200	1,390	10,655	231	-	10,425	-	-	-	-	-	-	60,726	1,560

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	3,322	-	-	-	-	13	500	3,835	-	-	3,835	-	-	-	-	-	-	12	-
3b.2.2	Intake Structure Cofferdam	-	335	-	-	-	-	-	50	385	-	-	385	-	-	-	-	-	-	2,584	-
3b.2.3	Construction Debris	-	-	-	-	-	-	1,170	176	1,346	-	-	1,346	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	5,583	-	-	-	-	-	837	6,421	-	-	6,421	-	-	-	-	-	-	5,422	-
3b.2.5	Discharge Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
3b.2.6	Disposition of Original MPC Canisters	-	55	185	954	-	5,641	-	1,709	8,544	8,544	-	-	-	21,097	-	-	-	2,505,700	337	-
3b.2	Subtotal Period 3b Additional Costs	-	9,737	185	954	-	5,641	1,183	3,339	21,039	8,544	-	12,495	-	21,097	-	-	-	2,505,700	11,907	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	111	-	-	-	-	-	17	127	-	-	127	-	-	-	-	-	-	-	-
3b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	108	16	125	-	125	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	111	-	-	-	-	108	33	252	-	125	127	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	1,220	122	1,342	1,342	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	2,540	254	2,794	-	2,794	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	5,842	-	-	-	-	-	876	6,719	-	-	6,719	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	315	47	362	-	362	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	356	36	391	-	391	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	257	26	283	-	283	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,122	168	1,290	429	860	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	194	29	223	-	223	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	543	81	624	249	375	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	25,319	3,798	29,117	0	8,589	20,527	-	-	-	-	-	-	-	375,152
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	11,729	1,759	13,489	-	-	13,489	-	-	-	-	-	-	-	122,646
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	7,148	1,072	8,220	-	2,129	6,091	-	-	-	-	-	-	-	101,904
3b.4	Subtotal Period 3b Period-Dependent Costs	-	5,842	-	-	-	-	50,742	8,269	64,854	2,020	16,007	46,826	-	-	-	-	-	-	-	599,702
3b.0	TOTAL PERIOD 3b COST	-	24,755	185	954	-	5,641	52,234	13,030	96,800	10,795	16,132	69,873	-	21,097	-	-	-	2,505,700	72,633	601,262
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	553,074	82,961	636,035	-	636,035	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	553,074	82,961	636,035	-	636,035	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	65,480	6,548	72,028	-	72,028	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	84,567	8,457	93,024	-	93,024	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	20,571	2,057	22,628	-	22,628	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	13,803	1,380	15,183	-	15,183	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	20,053	3,008	23,061	-	23,061	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	10,420	1,563	11,983	-	11,983	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	11,641	1,746	13,387	-	13,387	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	400,396	60,059	460,455	-	460,455	-	-	-	-	-	-	-	-	5,034,774
3c.4.10	DOC Staff Cost	-	-	-	-	-	-	28,541	4,281	32,822	-	32,822	-	-	-	-	-	-	-	-	193,645
3c.4.11	Utility Staff Cost	-	-	-	-	-	-	177,875	26,681	204,556	-	204,556	-	-	-	-	-	-	-	-	2,565,798
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	833,346	115,781	949,127	-	949,127	-	-	-	-	-	-	-	-	7,794,217
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	1,386,420	198,742	1,585,162	-	1,585,162	-	-	-	-	-	-	-	-	7,794,217
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	-	1,160	225,765	-	-
3d.1.1	Totals	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	-	1,160	225,765	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	-	1,160	225,765	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-	-

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	27	3	30	30	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	35	3	38	38	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8	1	9	-	9	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	6	1	6	-	6	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	8	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	165	25	190	190	-	-	-	-	-	-	-	-	-	2,074
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	39	6	45	45	-	-	-	-	-	-	-	-	-	539
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	293	40	333	318	15	-	-	-	-	-	-	-	-	2,613
3d.0	TOTAL PERIOD 3d COST	-	-	1,083	-	-	4,313	321	962	6,678	6,632	47	-	-	-	-	-	1,160	225,765	-	2,613
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	0	3	33	-	283	2,086	602	3,008	3,008	-	-	-	848	-	-	-	131,507	10,502	2,225
3e.2	Subtotal Period 3e Additional Costs	-	0	3	33	-	283	2,086	602	3,008	3,008	-	-	-	848	-	-	-	131,507	10,502	2,225
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	118	30	148	148	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	249	62	312	312	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	12	3	15	15	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	71	18	89	89	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	41	10	52	52	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	352	88	440	440	-	-	-	-	-	-	-	-	-	4,999
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	261	65	326	326	-	-	-	-	-	-	-	-	-	3,792
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	1,105	276	1,381	1,381	-	-	-	-	-	-	-	-	-	8,792
3e.0	TOTAL PERIOD 3e COST	-	0	3	33	-	283	3,191	878	4,389	4,389	-	-	-	848	-	-	-	131,507	10,502	11,017
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	1,564	-	-	-	-	256	273	2,093	-	-	2,093	-	-	-	-	-	-	7,309	160
3f.2	Subtotal Period 3f Additional Costs	-	1,564	-	-	-	-	256	273	2,093	-	-	2,093	-	-	-	-	-	-	7,309	160
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	11	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	11	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	126	13	138	-	-	138	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	117	-	-	-	-	-	17	134	-	-	134	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	7	-	-	7	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	36	5	41	-	-	41	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	21	3	24	-	-	24	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	177	27	204	-	-	204	-	-	-	-	-	-	-	2,520
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	109	16	126	-	-	126	-	-	-	-	-	-	-	1,564
3f.4	Subtotal Period 3f Period-Dependent Costs	-	117	-	-	-	-	475	82	674	-	-	674	-	-	-	-	-	-	-	4,084
3f.0	TOTAL PERIOD 3f COST	-	1,691	-	-	-	-	731	357	2,779	-	-	2,779	-	-	-	-	-	-	7,309	4,244
PERIOD 3 TOTALS		-	26,446	1,271	987	-	10,238	1,442,897	213,969	1,695,809	21,816	1,601,341	72,652	-	21,944	-	-	1,160	2,862,972	90,443	8,413,353
TOTAL COST TO DECOMMISSION		17,263	95,300	21,839	11,878	49,952	84,522	1,995,558	369,559	2,645,871	776,228	1,795,906	73,737	288,203	197,266	1,992	898	1,160	24,478,380	849,601	11,998,960

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
TOTAL COST TO DECOMMISSION WITH 16.23% CONTINGENCY:					**$2,645,871**	**thousands of 2020 dollars**															
TOTAL NRC LICENSE TERMINATION COST IS 29.34% OR:					**$776,228**	**thousands of 2020 dollars**															
SPENT FUEL MANAGEMENT COST IS 67.88% OR:					**$1,795,906**	**thousands of 2020 dollars**															
NON-NUCLEAR DEMOLITION COST IS 2.79% OR:					**$73,737**	**thousands of 2020 dollars**															
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):					**200,155**	**Cubic Feet**															
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:					**1,160**	**Cubic Feet**															
TOTAL SCRAP METAL REMOVED:					**23,123**	**Tons**															
TOTAL CRAFT LABOR REQUIREMENTS:					**849,601**	**Man-hours**															

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX F

DETAILED COST ANALYSIS

SCENARIO 4: DECON with 200 Year DFS

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	632	95	727	654	-	73	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Sacrificial shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Moisture separators/reheaters	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.10	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.11	Pressure suppression structure	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.17.12	Drywell	-	-	-	-	-	-	206	31	236	236	-	-	-	-	-	-	-	-	-	1,600
1a.1.17.13	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
1a.1.17.14	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.15	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	5,486	823	6,308	5,759	-	550	-	-	-	-	-	-	-	42,683
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	16,569	2,485	19,054	18,505	-	550	-	-	-	-	-	-	-	83,013
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,323	198	1,522	-	1,522	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	9,892	1,484	11,376	11,376	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	11,215	1,682	12,897	11,376	1,522	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,328	233	2,561	2,561	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,570	357	3,927	3,927	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	6	-	50	-	15	83	83	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,137	114	1,251	1,251	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,428	343	3,770	-	3,770	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	845	127	971	-	971	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	16,372	2,456	18,827	18,827	-	-	-	-	-	-	-	-	-	245,440
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	27,285	4,093	31,378	31,378	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	6	-	50	59,634	8,703	69,772	64,902	4,870	-	-	610	-	-	-	12,190	20	667,680

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	6	-	50	87,418	12,871	101,724	94,783	6,392	550	-	610	-	-	-	12,190	20	750,693
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	514	77	591	591	-	-	-	-	-	-	-	-	-	4,000
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD housings & NIs	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Removal primary containment	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
1b.1.1.10	Sacrificial shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.11	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
1b.1.1.12	Main Turbine	-	-	-	-	-	-	267	40	307	307	-	-	-	-	-	-	-	-	-	2,080
1b.1.1.13	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1b.1.1.14	Moisture separators & reheaters	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.15	Radwaste building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1.16	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,336	650	4,987	4,524	-	463	-	-	-	-	-	-	-	33,741
1b.1.2	Decon NSSS	296	-	-	-	-	-	-	148	444	444	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	296	-	-	-	-	-	4,336	798	5,431	4,968	-	463	-	-	-	-	-	-	1,067	33,741
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2.2	Site Characterization	-	-	-	-	-	-	5,930	1,779	7,708	7,708	-	-	-	-	-	-	-	-	30,500	10,852
1b.2.3	Mixed & RCRA Waste	-	-	28	29	14	-	-	9	80	80	-	-	43	-	-	-	-	5,253	161	-
1b.2	Subtotal Period 1b Additional Costs	-	-	28	29	14	-	18,605	3,689	22,365	22,365	-	-	43	-	-	-	-	5,253	30,661	10,852
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	38	-	25	45	-	102	-	53	263	263	-	-	-	233	-	-	-	13,991	45	-
1b.3.4	Process decommissioning chemical flush waste	1	-	24	77	-	1,526	-	396	2,024	2,024	-	-	-	-	231	-	-	24,599	43	-
1b.3.5	Small tool allowance	-	2	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,735	410	3,145	-	3,145	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	6,335	950	7,285	7,285	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,197	1,202	49	122	-	1,628	10,334	2,653	19,185	16,040	3,145	-	-	233	231	-	-	38,589	89	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	39	-	-	-	-	-	-	10	48	48	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	1,161	116	1,277	1,277	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,709	171	1,880	1,880	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	344	-	-	-	-	-	86	430	430	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	4	-	29	-	9	49	49	-	-	-	356	-	-	-	7,122	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,812	272	2,083	2,083	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	323	32	355	355	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,416	142	1,557	-	1,557	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	1,305	196	1,500	1,500	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	421	63	484	-	484	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	62	9	72	72	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	8,163	1,225	9,388	9,388	-	-	-	-	-	-	-	-	-	122,384
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,846	877	6,723	6,723	-	-	-	-	-	-	-	-	-	63,266
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	13,682	2,052	15,734	15,734	-	-	-	-	-	-	-	-	-	211,579
1b.4	Subtotal Period 1b Period-Dependent Costs	39	719	7	4	-	29	35,955	5,323	42,076	39,970	2,106	-	-	356	-	-	-	7,122	12	397,229
1b.0	TOTAL PERIOD 1b COST	3,531	1,921	84	154	14	1,657	69,230	12,465	89,056	83,343	5,251	463	43	589	231	-	-	50,964	31,828	441,822
PERIOD 1 TOTALS		3,531	3,288	96	160	14	1,707	156,648	25,335	190,780	178,125	11,643	1,012	43	1,199	231	-	-	63,155	31,848	1,192,515

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Recirculation System Piping & Valves	111	94	27	50	-	528	-	221	1,031	1,031	-	-	-	1,430	-	-	-	99,742	2,905	-
2a.1.1.2	Recirculation Pumps & Motors	40	63	16	51	42	539	-	186	938	938	-	-	96	945	-	-	-	112,200	1,563	-
2a.1.1.3	CRDMs & NIs Removal	194	1,020	415	135	-	1,130	-	696	3,591	3,591	-	-	-	3,741	-	-	-	213,700	17,768	-
2a.1.1.4	Reactor Vessel Internals	244	6,722	12,852	2,696	-	29,845	364	24,027	76,749	76,749	-	-	-	1,252	1,761	898	-	343,150	30,515	1,379
2a.1.1.5	Reactor Vessel	113	9,121	2,672	1,167	-	5,861	364	10,842	30,140	30,140	-	-	-	16,169	-	-	-	1,105,210	30,515	1,379
2a.1.1	Totals	702	17,020	15,982	4,099	42	37,903	728	35,973	112,449	112,449	-	-	96	23,536	1,761	898	-	1,874,002	83,267	2,758
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	385	1,356	521	6,139	439	-	1,341	10,182	10,182	-	-	24,835	1,383	-	-	-	1,577,959	5,438	-
2a.1.3	Main Condensers	-	1,347	360	194	3,225	244	-	947	6,317	6,317	-	-	17,396	727	-	-	-	828,955	18,831	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor Building	-	332	-	-	-	-	-	50	381	381	-	-	-	-	-	-	-	-	2,217	-
2a.1.4.2	Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	127	-
2a.1.4.3	Turbine	-	127	-	-	-	-	-	19	146	146	-	-	-	-	-	-	-	-	1,254	-
2a.1.4	Totals	-	483	-	-	-	-	-	72	556	556	-	-	-	-	-	-	-	-	3,598	-
Disposal of Plant Systems																					
2a.1.5.1	Automatic Press Relief	-	118	7	12	134	70	-	70	410	410	-	-	803	206	-	-	-	45,852	1,656	-
2a.1.5.2	Chemistry Sampling	-	27	1	2	26	13	-	14	83	83	-	-	156	37	-	-	-	8,681	400	-
2a.1.5.3	Chemistry Sampling - Insulated	-	2	0	0	-	0	-	1	3	3	-	-	-	1	-	-	-	72	28	-
2a.1.5.4	Circulating Water - RCA	-	207	14	62	1,114	-	-	230	1,626	1,626	-	-	6,656	-	-	-	-	270,307	2,860	-
2a.1.5.5	Combustible Gas Control - Insul - RCA	-	29	0	2	36	-	-	13	80	80	-	-	212	-	-	-	-	8,617	378	-
2a.1.5.6	Combustible Gas Control - RCA	-	18	1	3	48	-	-	12	81	81	-	-	285	-	-	-	-	11,577	245	-
2a.1.5.7	Condensate & Feedwater	-	987	183	329	3,337	2,464	-	1,431	8,731	8,731	-	-	19,947	7,319	-	-	-	1,275,810	14,196	-
2a.1.5.8	Condensate & Feedwater - Insulated	-	492	34	63	699	408	-	343	2,038	2,038	-	-	4,176	1,207	-	-	-	246,693	6,964	-
2a.1.5.9	Condensate Demin	-	545	30	51	560	339	-	316	1,840	1,840	-	-	3,346	1,000	-	-	-	199,936	7,618	-
2a.1.5.10	Condensate Storage	-	726	33	82	1,193	270	-	444	2,748	2,748	-	-	7,131	795	-	-	-	340,568	10,345	-
2a.1.5.11	Control Rod Drive	-	3	0	0	3	1	-	2	9	9	-	-	19	4	-	-	-	1,009	41	-
2a.1.5.12	Control Rod Drive Hydraulic	-	416	16	26	277	190	-	199	1,124	1,124	-	-	1,658	562	-	-	-	103,306	5,898	-
2a.1.5.13	Core Spray	-	79	20	51	734	176	-	184	1,244	1,244	-	-	4,384	521	-	-	-	211,329	1,163	-
2a.1.5.14	Core Spray - Insulated	-	145	8	13	137	90	-	82	474	474	-	-	818	264	-	-	-	50,149	2,033	-
2a.1.5.15	Demin Water - Insulated - RCA	-	15	0	1	14	-	-	6	36	36	-	-	85	-	-	-	-	3,445	181	-
2a.1.5.16	Demin Water - RCA	-	41	1	2	42	-	-	17	104	104	-	-	253	-	-	-	-	10,278	508	-
2a.1.5.17	Diesel Oil - RCA	-	2	0	0	4	-	-	1	7	7	-	-	23	-	-	-	-	931	25	-
2a.1.5.18	Drywell Atmosphere Cooling - RCA	-	38	1	5	92	-	-	24	159	159	-	-	548	-	-	-	-	22,244	550	-
2a.1.5.19	EDG Emerg Service Water - Insul - RCA	-	0	0	0	0	-	-	0	1	1	-	-	2	-	-	-	-	84	4	-
2a.1.5.20	Electrical - Clean	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	182	-
2a.1.5.21	Emergency Service Water - Insul - RCA	-	21	0	1	23	-	-	9	55	55	-	-	137	-	-	-	-	5,544	281	-
2a.1.5.22	Emergency Service Water - RCA	-	2	0	0	2	-	-	1	5	5	-	-	13	-	-	-	-	512	22	-
2a.1.5.23	GEZIP - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2a.1.5.24	Generator Physical Design - RCA	-	5	0	0	5	-	-	2	12	12	-	-	31	-	-	-	-	1,250	67	-
2a.1.5.25	H2-O2 Control Analyzing	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.26	H2-O2 Control Analyzing - Insulated	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.27	High Pressure Coolant Injection	-	67	6	13	163	70	-	61	381	381	-	-	972	209	-	-	-	52,792	966	-
2a.1.5.28	High Pressure Coolant Injection - Insula	-	219	14	24	267	163	-	141	830	830	-	-	1,598	481	-	-	-	95,733	3,079	-
2a.1.5.29	Hydrogen Cooling	-	8	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	118	-
2a.1.5.30	Hydrogen Cooling - RCA	-	7	0	0	7	-	-	3	17	17	-	-	39	-	-	-	-	1,600	79	-
2a.1.5.31	Hydrogen Seal Oil - RCA	-	17	0	2	32	-	-	9	60	60	-	-	189	-	-	-	-	7,669	212	-
2a.1.5.32	Hydrogen Water Chemistry - RCA	-	24	0	1	23	-	-	10	59	59	-	-	140	-	-	-	-	5,672	304	-
2a.1.5.33	Instrument & Service Air - RCA	-	225	4	17	296	-	-	103	644	644	-	-	1,768	-	-	-	-	71,810	2,733	-
2a.1.5.34	Main Condenser	-	196	12	20	223	139	-	122	712	712	-	-	1,333	411	-	-	-	80,439	2,746	-
2a.1.5.35	Main Steam	-	249	17	32	359	201	-	173	1,029	1,029	-	-	2,148	594	-	-	-	125,135	3,512	-
2a.1.5.36	Main Turbine	-	1,012	205	353	3,306	2,921	-	1,553	9,350	9,350	-	-	19,760	8,687	-	-	-	1,354,661	14,733	-
2a.1.5.37	Main Turbine - Insulated	-	214	18	37	423	225	-	180	1,097	1,097	-	-	2,530	667	-	-	-	145,208	3,069	-
2a.1.5.38	Miscellaneous	-	43	1	3	51	-	-	19	115	115	-	-	302	-	-	-	-	12,283	622	-
2a.1.5.39	Off Gas Recombiner	-	189	19	32	300	257	-	163	960	960	-	-	1,795	764	-	-	-	121,554	2,708	-
2a.1.5.40	Off Gas Recombiner - Insulated	-	387	19	27	229	240	-	197	1,100	1,100	-	-	1,366	709	-	-	-	100,933	5,385	-
2a.1.5.41	Post Accident Sampling	-	25	1	1	9	11	-	11	58	58	-	-	53	33	-	-	-	4,318	345	-
2a.1.5.42	Post Accident Sampling - Insulated	-	17	1	1	3	13	-	8	43	43	-	-	17	37	-	-	-	3,116	212	-
2a.1.5.43	RHR Service Water - Insulated - RCA	-	83	3	14	248	-	-	60	409	409	-	-	1,485	-	-	-	-	60,293	1,125	-
2a.1.5.44	RHR Service Water - RCA	-	4	0	0	6	-	-	2	12	12	-	-	35	-	-	-	-	1,410	57	-
2a.1.5.45	Reactor Feedwater Pump Seal	-	56	2	4	32	33	-	28	155	155	-	-	193	96	-	-	-	14,009	773	-

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2a.1.5.46	Residual Heat Removal	362	252	172	178	1,072	2,051	-	962	5,049	5,049	-	-	6,406	6,012	-	-	-	647,941	4,135	-
2a.1.5.47	Residual Heat Removal - Insulated	622	554	61	82	563	880	-	772	3,535	3,535	-	-	3,367	2,607	-	-	-	303,087	10,340	-
2a.1.5.48	Rx Core Isolation Cooling	-	49	2	4	43	26	-	26	150	150	-	-	259	76	-	-	-	15,396	691	-
2a.1.5.49	Rx Core Isolation Cooling - Insulated	-	107	5	7	48	67	-	52	287	287	-	-	288	198	-	-	-	24,419	1,479	-
2a.1.5.50	Rx Recirculation	56	58	6	4	7	65	-	61	258	258	-	-	43	190	-	-	-	14,095	1,580	-
2a.1.5.51	Snubbers	-	169	2	5	63	30	-	60	331	331	-	-	377	90	-	-	-	21,009	2,548	-
2a.1.5.52	Standby Liquid Control - Insul - RCA	-	4	0	0	4	-	-	2	9	9	-	-	22	-	-	-	-	904	48	-
2a.1.5.53	Standby Liquid Control - RCA	-	26	1	2	41	-	-	13	83	83	-	-	245	-	-	-	-	9,969	341	-
2a.1.5.54	Stator Cooling - RCA	-	7	0	1	21	-	-	5	35	35	-	-	126	-	-	-	-	5,135	98	-
2a.1.5.55	Traversing Incore Probe	0	4	0	0	0	2	-	1	7	7	-	-	1	5	-	-	-	386	51	-
2a.1.5	Totals	1,040	8,221	924	1,572	16,339	11,425	-	8,209	47,730	47,706	-	24	97,654	33,808	-	-	-	6,125,515	119,943	-
2a.1.6	Scaffolding in support of decommissioning	-	2,265	22	12	191	31	-	607	3,127	3,127	-	-	1,030	91	-	-	-	52,111	22,564	-
2a.1	Subtotal Period 2a Activity Costs	1,742	29,721	18,645	6,398	25,937	50,042	728	47,148	180,360	180,336	-	24	141,010	59,545	1,761	898	-	10,458,540	253,640	2,758
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	85	-	57	102	-	232	-	122	598	598	-	-	-	532	-	-	-	31,942	104	-
2a.3.2	Process decommissioning chemical flush waste	5	-	216	702	-	1,619	-	534	3,077	3,077	-	-	-	2,093	-	-	-	223,008	392	-
2a.3.3	Small tool allowance	-	324	-	-	-	-	-	49	373	336	-	37	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	24,119	3,618	27,737	-	27,737	-	-	-	-	-	-	-	-	-
2a.3.6	On-site survey and release of 0.0 tons clean metallic waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	91	324	274	804	-	1,851	37,247	6,292	46,882	19,107	27,737	37	-	2,625	-	-	-	254,950	495	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	112	-	-	-	-	-	-	28	140	140	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	1,019	102	1,121	1,121	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	4,377	438	4,814	4,814	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,356	-	-	-	-	-	589	2,945	2,945	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,627	-	-	-	-	-	544	4,171	4,171	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	110	57	-	457	-	134	758	758	-	-	-	5,551	-	-	-	111,023	181	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,501	375	2,876	2,876	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	856	86	942	942	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	4,115	412	4,527	-	4,527	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	3,071	461	3,532	3,532	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	1,224	184	1,408	-	1,408	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	162	24	187	-	187	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	181	27	208	208	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,624	244	1,867	1,867	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	22,088	3,313	25,401	25,401	-	-	-	-	-	-	-	-	-	325,574
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	21,021	3,153	24,174	24,174	-	-	-	-	-	-	-	-	-	229,108
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	27,906	4,186	32,092	32,092	-	-	-	-	-	-	-	-	-	426,562
2a.4	Subtotal Period 2a Period-Dependent Costs	112	5,982	110	57	-	457	90,145	14,298	111,162	105,041	6,121	-	-	5,551	-	-	-	111,023	181	981,244
2a.0	TOTAL PERIOD 2a COST	1,945	36,028	19,028	7,259	25,937	52,350	128,120	67,738	338,404	304,484	33,858	62	141,010	67,722	1,761	898	-	10,824,520	254,317	984,002
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	ALARA/Radiological	-	18	0	1	6	3	-	6	35	35	-	-	35	10	-	-	-	2,060	277	-
2b.1.1.2	Alternate N2 - RCA	-	16	0	1	16	-	-	7	40	40	-	-	93	-	-	-	-	3,765	185	-
2b.1.1.3	Decontamination Projects	-	1	0	0	0	0	-	0	2	2	-	-	2	0	-	-	-	129	17	-
2b.1.1.4	Electrical - Contaminated	-	445	6	24	400	30	-	183	1,089	1,089	-	-	2,389	90	-	-	-	102,726	6,325	-
2b.1.1.5	Electrical - Decontaminated	-	2,698	48	218	3,906	-	-	1,298	8,167	8,167	-	-	23,344	-	-	-	-	948,013	37,107	-
2b.1.1.6	Fire - RCA	-	101	1	6	103	-	-	42	253	253	-	-	614	-	-	-	-	24,917	1,324	-
2b.1.1.7	HVAC Ductwork	-	305	7	27	446	34	-	156	975	975	-	-	2,665	100	-	-	-	114,598	4,111	-
2b.1.1.8	HVAC/Chilled Water - RCA	-	324	6	26	461	-	-	155	971	971	-	-	2,752	-	-	-	-	111,779	3,985	-
2b.1.1.9	Heating & Ventilation	-	483	16	61	1,007	76	-	302	1,945	1,945	-	-	6,018	227	-	-	-	258,789	7,101	-
2b.1.1.10	Heating Boiler - Insulated - RCA	-	3	0	0	4	-	-	1	9	9	-	-	26	-	-	-	-	1,058	35	-
2b.1.1.11	Liquid Radwaste	588	687	48	63	514	586	-	703	3,188	3,188	-	-	3,073	1,728	-	-	-	235,484	17,194	-
2b.1.1.12	Makeup Demin - RCA	-	103	3	14	246	-	-	65	431	431	-	-	1,471	-	-	-	-	59,747	1,412	-
2b.1.1.13	Non-Essential Diesel Generator - RCA	-	27	3	13	238	-	-	45	327	327	-	-	1,424	-	-	-	-	57,832	395	-
2b.1.1.14	Off Gas Holdup	-	342	21	38	461	214	-	216	1,291	1,291	-	-	2,755	630	-	-	-	152,277	4,769	-
2b.1.1.15	Primary Containment	-	455	42	87	1,038	507	-	414	2,543	2,543	-	-	6,201	1,506	-	-	-	347,704	6,454	-

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
2b.1.1.16	Process Radiation Monitors	-	46	2	2	24	18	-	20	111	111	-	-	142	52	-	-	-	9,115	649	-
2b.1.1.17	Rx Bldg Closed Clng Water - Insul - RCA	-	114	2	9	163	-	-	54	343	343	-	-	977	-	-	-	-	39,675	1,484	-
2b.1.1.18	Rx Bldg Closed Clng Water - RCA	-	184	15	66	1,187	-	-	235	1,687	1,687	-	-	7,093	-	-	-	-	288,031	2,489	-
2b.1.1.19	Rx Component Handling Equip	27	142	18	27	194	279	-	154	840	840	-	-	1,158	829	-	-	-	99,730	2,462	-
2b.1.1.20	Rx Pressure Vessel	28	47	6	5	13	78	-	48	225	225	-	-	75	230	-	-	-	17,816	1,051	-
2b.1.1.21	Rx Water Cleanup	172	265	19	16	22	251	-	222	965	965	-	-	130	737	-	-	-	52,670	5,736	-
2b.1.1.22	Secondary Containment	-	124	7	14	170	86	-	81	483	483	-	-	1,017	255	-	-	-	57,567	1,763	-
2b.1.1.23	Service & Seal Water - Insulated - RCA	-	120	2	11	197	-	-	62	392	392	-	-	1,180	-	-	-	-	47,917	1,565	-
2b.1.1.24	Service & Seal Water - RCA	-	159	4	17	303	-	-	88	570	570	-	-	1,809	-	-	-	-	73,453	2,016	-
2b.1.1.25	Service Air Blower - RCA	-	15	0	2	34	-	-	9	62	62	-	-	206	-	-	-	-	8,364	206	-
2b.1.1.26	Solid Radwaste	338	494	36	49	399	467	-	480	2,264	2,264	-	-	2,387	1,380	-	-	-	185,221	10,820	-
2b.1.1.27	Structures & Buildings	-	78	2	5	60	29	-	37	210	210	-	-	357	85	-	-	-	19,933	1,128	-
2b.1.1.28	Wells & Domestic Water	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	144	-
2b.1.1.29	Wells & Domestic Water - RCA	-	52	1	3	57	-	-	22	136	136	-	-	342	-	-	-	-	13,874	633	-
2b.1.1	Totals	1,153	7,860	315	804	11,668	2,657	-	5,107	29,563	29,552	-	11	69,735	7,859	-	-	-	3,334,244	122,835	-
2b.1.2	Scaffolding in support of decommissioning	-	2,831	28	16	239	38	-	758	3,909	3,909	-	-	1,287	114	-	-	-	65,139	28,205	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor Building	5,202	2,903	178	516	8,044	1,181	-	4,924	22,948	22,948	-	-	48,077	7,014	-	-	-	2,317,670	112,518	-
2b.1.3.2	Admin	106	6	0	3	-	15	-	59	189	189	-	-	-	145	-	-	-	6,840	1,600	-
2b.1.3.3	HPCI Room	29	28	1	3	20	14	-	29	123	123	-	-	118	125	-	-	-	10,759	789	-
2b.1.3.4	Hot Shop	17	4	0	2	-	11	-	12	46	46	-	-	-	103	-	-	-	4,860	286	-
2b.1.3.5	LLRW Storage & Shipping	58	24	2	8	5	45	-	48	191	191	-	-	31	433	-	-	-	21,708	1,127	-
2b.1.3.6	Offgas Stack	372	269	7	23	225	82	-	312	1,289	1,289	-	-	1,343	669	-	-	-	87,045	8,860	-
2b.1.3.7	Offgas Storage & Compressor	41	17	1	6	4	33	-	34	136	136	-	-	25	316	-	-	-	15,948	785	-
2b.1.3.8	Radwaste	121	61	3	17	29	96	-	107	435	435	-	-	172	910	-	-	-	49,943	2,503	-
2b.1.3.9	Radwaste Material Storage Warehouse	64	24	2	9	-	52	-	52	202	202	-	-	-	495	-	-	-	23,400	1,197	-
2b.1.3.10	Recombiner	27	25	1	5	33	24	-	32	148	148	-	-	199	216	-	-	-	18,405	695	-
2b.1.3.11	Turbine	705	353	21	104	215	564	-	632	2,594	2,594	-	-	1,283	5,299	-	-	-	303,150	14,443	-
2b.1.3.12	Turbine Building Addition	58	21	1	8	-	45	-	47	181	181	-	-	-	434	-	-	-	20,478	1,087	-
2b.1.3	Totals	6,799	3,736	218	704	8,574	2,164	-	6,288	28,483	28,483	-	-	51,247	16,159	-	-	-	2,880,206	145,889	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	7,952	14,427	560	1,524	20,481	4,859	526	12,232	62,561	62,549	-	11	122,269	24,132	-	-	-	6,279,589	296,929	4,096
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	23	92	1,211	-	-	198	1,524	1,524	-	-	11,760	-	-	-	-	294,000	32	-
2b.2.2	Excavation of Underground Services	-	1,972	-	-	-	-	376	550	2,898	2,898	-	-	-	-	-	-	-	-	12,493	-
2b.2.3	Security Modifications	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,972	23	92	1,211	-	9,072	2,052	14,422	14,422	-	-	11,760	-	-	-	-	294,000	12,525	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	198	-	135	240	-	546	-	285	1,404	1,404	-	-	-	1,253	-	-	-	75,186	244	-
2b.3.2	Process decommissioning chemical flush waste	1	-	43	138	-	319	-	105	607	607	-	-	-	413	-	-	-	43,978	77	-
2b.3.3	Small tool allowance	-	364	-	-	-	-	-	55	418	418	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	117,254	17,588	134,843	-	134,843	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	6,299	945	7,244	7,244	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	199	364	178	378	-	865	123,554	18,978	144,516	9,673	134,843	-	-	1,666	-	-	-	119,165	322	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,440	-	-	-	-	-	-	360	1,799	1,799	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	742	74	816	816	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	2,703	270	2,974	2,974	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,376	-	-	-	-	-	594	2,970	2,970	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,711	-	-	-	-	-	407	3,117	3,117	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	101	52	-	419	-	123	694	694	-	-	-	5,084	-	-	-	101,679	166	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,437	216	1,653	1,653	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	623	62	685	685	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,995	299	3,294	-	3,294	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	2,235	335	2,570	2,570	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	891	134	1,024	-	1,024	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	224	34	258	258	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	118	18	136	-	136	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	458	69	527	527	-	-	-	-	-	-	-	-	-	-

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2b Period-Dependent Costs (continued)																					
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,182	177	1,359	1,359	-	-	-	-	-	-	-	-	-	-
2b.4.16	Security Staff Cost	-	-	-	-	-	-	15,718	2,358	18,076	18,076	-	-	-	-	-	-	-	-	-	236,949
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	14,772	2,216	16,988	16,988	-	-	-	-	-	-	-	-	-	160,160
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	19,442	2,916	22,358	22,358	-	-	-	-	-	-	-	-	-	297,283
2b.4	Subtotal Period 2b Period-Dependent Costs	1,440	5,087	101	52	-	419	63,540	10,661	81,298	76,844	4,455	-	-	5,084	-	-	-	101,679	166	694,392
2b.0	TOTAL PERIOD 2b COST	9,591	21,850	861	2,046	21,692	6,143	196,692	43,923	302,797	163,488	139,297	11	134,029	30,882	-	-	-	6,794,433	309,941	698,488
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	654	58	103	149	-	2,572	-	1,017	4,553	4,553	-	-	-	7,653	-	-	-	486,170	906	-
Disposal of Plant Systems																					
2d.1.2.1	Cranes/Heavy Loads/Rigging - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2d.1.2.2	Electrical - Contaminated Fuel Pool	-	47	1	2	40	3	-	19	112	112	-	-	240	9	-	-	-	10,334	665	-
2d.1.2.3	Electrical - Decontam. Fuel Pool Area	-	297	5	23	411	-	-	140	876	876	-	-	2,457	-	-	-	-	99,783	4,090	-
2d.1.2.4	Fire - RCA - Fuel Pool Area	-	11	0	1	10	-	-	4	26	26	-	-	62	-	-	-	-	2,499	143	-
2d.1.2.5	Fuel Pool Cooling & Cleanup	246	428	34	37	197	455	-	382	1,781	1,781	-	-	1,179	1,341	-	-	-	133,939	8,380	-
2d.1.2.6	Fuel Pool Cooling & Cleanup - Insulated	27	41	3	3	11	40	-	36	161	161	-	-	67	117	-	-	-	10,220	848	-
2d.1.2.7	HVAC Ductwork - Fuel Pool Area	-	34	1	3	50	4	-	17	108	108	-	-	296	11	-	-	-	12,733	457	-
2d.1.2.8	HVAC/Chilled Water - RCA Fuel Pool Area	-	33	0	2	37	-	-	14	87	87	-	-	223	-	-	-	-	9,072	397	-
2d.1.2.9	Instrument & Service Air-RCA-Fuel Pool	-	29	1	2	45	-	-	14	91	91	-	-	267	-	-	-	-	10,841	357	-
2d.1.2	Totals	273	924	45	75	819	502	-	631	3,268	3,268	-	-	4,894	1,479	-	-	-	293,606	15,385	-
Decontamination of Site Buildings																					
2d.1.3.1	Reactor (Post Fuel)	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.3	Totals	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.4	Scaffolding in support of decommissioning	-	566	6	3	48	8	-	152	782	782	-	-	257	23	-	-	-	13,028	5,641	-
2d.1	Subtotal Period 2d Activity Costs	1,872	4,147	326	1,139	1,196	13,298	-	5,680	27,659	27,659	-	-	7,120	71,852	-	-	-	3,525,210	67,635	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	79	-	54	96	-	220	-	114	563	563	-	-	-	504	-	-	-	30,239	98	-
2d.3.2	Process decommissioning chemical flush waste	1	-	26	84	-	193	-	64	366	366	-	-	-	249	-	-	-	26,553	47	-
2d.3.3	Small tool allowance	-	91	-	-	-	-	-	14	105	105	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	82	1,112	178	-	237	1,739	1,739	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	27	4	32	-	32	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	80	91	210	262	1,112	590	27	432	2,805	2,773	32	-	6,000	1,282	-	-	-	360,400	292	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	244	-	-	-	-	-	-	61	305	305	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	1,664	166	1,830	1,830	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	806	-	-	-	-	-	202	1,008	1,008	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	1,936	-	-	-	-	-	290	2,227	2,227	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	40	21	-	167	-	49	277	277	-	-	-	2,030	-	-	-	40,600	66	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	547	82	630	630	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	424	42	466	466	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	320	48	368	368	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	844	127	971	971	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	7,311	1,097	8,408	8,408	-	-	-	-	-	-	-	-	-	78,356
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	10,052	1,508	11,560	10,670	890	-	-	-	-	-	-	-	-	149,660
2d.4	Subtotal Period 2d Period-Dependent Costs	244	2,743	40	21	-	167	34,579	5,652	43,446	38,604	4,842	-	-	2,030	-	-	-	40,600	66	390,997
2d.0	TOTAL PERIOD 2d COST	2,196	6,981	576	1,422	2,308	14,055	36,065	12,202	75,806	70,932	4,873	-	13,120	75,164	-	-	-	3,926,210	67,993	403,477

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	47	7	54	-	54	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	1,311	197	1,508	1,454	54	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,470	147	1,617	1,617	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	708	-	-	-	-	-	177	884	884	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	4	-	29	-	9	48	48	-	-	-	355	-	-	-	7,097	12	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	274	41	315	315	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	426	43	468	468	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	5,393	809	6,201	6,201	-	-	-	-	-	-	-	-	-	57,200
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	5,762	864	6,626	5,738	888	-	-	-	-	-	-	-	-	80,707
2f.4	Subtotal Period 2f Period-Dependent Costs	-	708	7	4	-	29	26,740	4,070	31,557	26,718	4,839	-	-	355	-	-	-	7,097	12	300,888
2f.0	TOTAL PERIOD 2f COST	-	708	7	4	-	29	35,137	6,392	42,276	37,382	4,893	-	-	355	-	-	-	7,097	95,059	307,128
PERIOD 2 TOTALS		13,731	65,566	20,473	10,731	49,937	72,577	396,013	130,255	759,282	576,287	182,922	73	288,160	174,123	1,761	898	-	21,552,260	727,310	2,393,096
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor Building	-	1,971	-	-	-	-	-	296	2,267	-	-	2,267	-	-	-	-	-	-	13,911	-
3b.1.1.2	Condensate Tanks Foundation	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	50	-
3b.1.1.3	Discharge Retention Basin	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	25	-
3b.1.1.4	HPCI Room	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	97	-
3b.1.1.5	Hot Shop	-	16	-	-	-	-	-	2	19	-	-	19	-	-	-	-	-	-	177	-
3b.1.1.6	Hydrogen & Oxygen Storage	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	19	-
3b.1.1.7	LLRW Storage & Shipping	-	83	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	662	-
3b.1.1.8	MSIV	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	42	-
3b.1.1.9	Misc Structures 2017	-	1,410	-	-	-	-	-	212	1,622	-	-	1,622	-	-	-	-	-	-	13,042	-
3b.1.1.10	Offgas Stack	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	544	-
3b.1.1.11	Offgas Storage & Compressor	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	199	-
3b.1.1.12	Radwaste	-	228	-	-	-	-	-	34	262	-	-	262	-	-	-	-	-	-	1,220	-
3b.1.1.13	Recombiner	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	713	-
3b.1.1.14	Security Barrier	-	186	-	-	-	-	-	28	214	-	-	214	-	-	-	-	-	-	933	-
3b.1.1.15	Structures Greater than 3' Below Grade	-	2,461	-	-	-	-	-	369	2,830	-	-	2,830	-	-	-	-	-	-	12,649	-
3b.1.1.16	Tank Farm	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	21	-
3b.1.1.17	Turbine	-	1,259	-	-	-	-	-	189	1,448	-	-	1,448	-	-	-	-	-	-	13,036	-
3b.1.1.18	Turbine Building Addition	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	618	-
3b.1.1.19	Turbine Pedestal	-	182	-	-	-	-	-	27	209	-	-	209	-	-	-	-	-	-	926	-
3b.1.1	Totals	-	8,169	-	-	-	-	-	1,225	9,394	-	-	9,394	-	-	-	-	-	-	58,885	-
Site Closeout Activities																					
3b.1.2	Grade & landscape site	-	896	-	-	-	-	-	134	1,031	-	-	1,031	-	-	-	-	-	-	1,841	-
3b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	9,065	-	-	-	-	200	1,390	10,655	231	-	10,425	-	-	-	-	-	-	60,726	1,560

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	3,322	-	-	-	-	13	500	3,835	-	-	3,835	-	-	-	-	-	-	12	-
3b.2.2	Intake Structure Cofferdam	-	335	-	-	-	-	-	50	385	-	-	385	-	-	-	-	-	-	2,584	-
3b.2.3	Construction Debris	-	-	-	-	-	-	1,170	176	1,346	-	-	1,346	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	5,583	-	-	-	-	-	837	6,421	-	-	6,421	-	-	-	-	-	-	5,422	-
3b.2.5	Discharge Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
3b.2.6	Disposition of Original MPC Canisters	-	55	185	954	-	5,641	-	1,709	8,544	8,544	-	-	-	21,097	-	-	-	2,505,700	337	-
3b.2	Subtotal Period 3b Additional Costs	-	9,737	185	954	-	5,641	1,183	3,339	21,039	8,544	-	12,495	-	21,097	-	-	-	2,505,700	11,907	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	111	-	-	-	-	-	17	127	-	-	127	-	-	-	-	-	-	-	-
3b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	108	16	125	-	125	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	111	-	-	-	-	108	33	252	-	125	127	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	1,220	122	1,342	1,342	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	2,540	254	2,794	-	2,794	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	5,842	-	-	-	-	-	876	6,719	-	-	6,719	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	315	47	362	-	362	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	356	36	391	-	391	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	257	26	283	-	283	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,122	168	1,290	429	860	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	194	29	223	-	223	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	543	81	624	249	375	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	25,319	3,798	29,117	0	8,589	20,527	-	-	-	-	-	-	-	375,152
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	11,729	1,759	13,489	-	-	13,489	-	-	-	-	-	-	-	122,646
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	7,148	1,072	8,220	-	2,129	6,091	-	-	-	-	-	-	-	101,904
3b.4	Subtotal Period 3b Period-Dependent Costs	-	5,842	-	-	-	-	50,742	8,269	64,854	2,020	16,007	46,826	-	-	-	-	-	-	-	599,702
3b.0	TOTAL PERIOD 3b COST	-	24,755	185	954	-	5,641	52,234	13,030	96,800	10,795	16,132	69,873	-	21,097	-	-	-	2,505,700	72,633	601,262
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,452,427	217,864	1,670,291	-	1,670,291	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	1,452,427	217,864	1,670,291	-	1,670,291	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	135,860	13,586	149,445	-	149,445	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	175,431	17,543	192,974	-	192,974	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	41,099	4,110	45,209	-	45,209	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	28,639	2,864	31,503	-	31,503	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	41,607	6,241	47,848	-	47,848	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	21,621	3,243	24,864	-	24,864	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	24,154	3,623	27,777	-	27,777	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	830,756	124,613	955,369	-	955,369	-	-	-	-	-	-	-	-	10,446,330
3c.4.10	DOC Staff Cost	-	-	-	-	-	-	59,217	8,883	68,100	-	68,100	-	-	-	-	-	-	-	-	401,782
3c.4.11	Utility Staff Cost	-	-	-	-	-	-	369,061	55,359	424,420	-	424,420	-	-	-	-	-	-	-	-	5,323,611
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	1,727,443	240,065	1,967,509	-	1,967,509	-	-	-	-	-	-	-	-	16,171,720
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	3,179,870	457,929	3,637,800	-	3,637,800	-	-	-	-	-	-	-	-	16,171,720
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
3d.1.1	Totals	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	27	3	30	30	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	35	3	38	38	-	-	-	-	-	-	-	-	-	-
3d.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8	1	9	-	9	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	6	1	6	-	6	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	8	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	165	25	190	190	-	-	-	-	-	-	-	-	-	2,074
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	39	6	45	45	-	-	-	-	-	-	-	-	-	539
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	293	40	333	318	15	-	-	-	-	-	-	-	-	2,613
3d.0	TOTAL PERIOD 3d COST	-	-	1,083	-	-	4,313	321	962	6,678	6,632	47	-	-	-	-	-	1,160	225,765	-	2,613
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	0	3	33	-	283	2,086	602	3,008	3,008	-	-	-	848	-	-	-	131,507	10,502	2,225
3e.2	Subtotal Period 3e Additional Costs	-	0	3	33	-	283	2,086	602	3,008	3,008	-	-	-	848	-	-	-	131,507	10,502	2,225
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	118	30	148	148	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	249	62	312	312	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	12	3	15	15	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	71	18	89	89	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	41	10	52	52	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	352	88	440	440	-	-	-	-	-	-	-	-	-	4,999
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	261	65	326	326	-	-	-	-	-	-	-	-	-	3,792
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	1,105	276	1,381	1,381	-	-	-	-	-	-	-	-	-	8,792
3e.0	TOTAL PERIOD 3e COST	-	0	3	33	-	283	3,191	878	4,389	4,389	-	-	-	848	-	-	-	131,507	10,502	11,017
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	1,564	-	-	-	-	256	273	2,093	-	-	2,093	-	-	-	-	-	-	7,309	160
3f.2	Subtotal Period 3f Additional Costs	-	1,564	-	-	-	-	256	273	2,093	-	-	2,093	-	-	-	-	-	-	7,309	160
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	11	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	11	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	126	13	138	-	-	138	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	117	-	-	-	-	-	17	134	-	-	134	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	7	-	-	7	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	36	5	41	-	-	41	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	21	3	24	-	-	24	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	177	27	204	-	-	204	-	-	-	-	-	-	-	2,520
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	109	16	126	-	-	126	-	-	-	-	-	-	-	1,564
3f.4	Subtotal Period 3f Period-Dependent Costs	-	117	-	-	-	-	475	82	674	-	-	674	-	-	-	-	-	-	-	4,084
3f.0	TOTAL PERIOD 3f COST	-	1,691	-	-	-	-	731	357	2,779	-	-	2,779	-	-	-	-	-	-	7,309	4,244
PERIOD 3 TOTALS		-	26,446	1,271	987	-	10,238	3,236,348	473,156	3,748,446	21,816	3,653,978	72,652	-	21,944	-	-	1,160	2,862,972	90,443	16,790,860
TOTAL COST TO DECOMMISSION		17,263	95,300	21,839	11,878	49,952	84,522	3,789,008	628,746	4,698,509	776,228	3,848,543	73,737	288,203	197,266	1,992	898	1,160	24,478,380	849,601	20,376,470

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
TOTAL COST TO DECOMMISSION WITH 15.45% CONTINGENCY:					**$4,698,509**	**thousands of 2020 dollars**															
TOTAL NRC LICENSE TERMINATION COST IS 16.52% OR:					**$776,228**	**thousands of 2020 dollars**															
SPENT FUEL MANAGEMENT COST IS 81.91% OR:					**$3,848,543**	**thousands of 2020 dollars**															
NON-NUCLEAR DEMOLITION COST IS 1.57% OR:					**$73,737**	**thousands of 2020 dollars**															
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):					**200,155**	**Cubic Feet**															
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:					**1,160**	**Cubic Feet**															
TOTAL SCRAP METAL REMOVED:					**23,123**	**Tons**															
TOTAL CRAFT LABOR REQUIREMENTS:					**849,601**	**Man-hours**															

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX G

DETAILED COST ANALYSIS

SCENARIO 5: SAFSTOR with 42 Year DFS

Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	415	124	539	539	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	193	29	222	222	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	632	95	727	727	-	-	-	-	-	-	-	-	-	4,920
1a.1.16.2	Plant systems	-	-	-	-	-	-	536	80	616	616	-	-	-	-	-	-	-	-	-	4,167
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
1a.1.16.4	Waste management	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.16	Total	-	-	-	-	-	-	2,083	312	2,395	2,395	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	152	23	175	175	-	-	-	-	-	-	-	-	-	1,183
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1a.1.17	Total	-	-	-	-	-	-	306	46	352	352	-	-	-	-	-	-	-	-	-	2,383
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	13	2	15	15	-	-	-	-	-	-	-	-	-	100
1a.1.19	Drain/de-energize non-cont. systems									a											
1a.1.20	Drain & dry NSSS									a											
1a.1.21	Drain/de-energize contaminated systems									a											
1a.1.22	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	5,027	816	5,844	5,844	-	-	-	-	-	-	-	-	-	35,890
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,323	198	1,522	-	1,522	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	9,892	1,484	11,376	11,376	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	11,215	1,682	12,897	11,376	1,522	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,328	233	2,561	2,561	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,570	357	3,927	3,927	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	6	-	50	-	15	83	83	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	892	89	981	981	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,428	343	3,770	-	3,770	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	845	127	971	-	971	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	16,372	2,456	18,827	18,827	-	-	-	-	-	-	-	-	-	245,440
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	27,285	4,093	31,378	31,378	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	6	-	50	59,389	8,679	69,502	64,632	4,870	-	-	610	-	-	-	12,190	20	667,680
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	6	-	50	75,631	11,177	88,244	81,852	6,392	-	-	610	-	-	-	12,190	20	703,570

Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor Building	5,155	-	-	-	-	-	-	2,577	7,732	7,732	-	-	-	-	-	-	-	-	70,157	-
1b.1.1.2	Admin	106	-	-	-	-	-	-	53	159	159	-	-	-	-	-	-	-	-	1,526	-
1b.1.1.3	HPCI Room	28	-	-	-	-	-	-	14	42	42	-	-	-	-	-	-	-	-	391	-
1b.1.1.4	Hot Shop	16	-	-	-	-	-	-	8	24	24	-	-	-	-	-	-	-	-	234	-
1b.1.1.5	LLRW Storage & Shipping	54	-	-	-	-	-	-	27	82	82	-	-	-	-	-	-	-	-	788	-
1b.1.1.6	Offgas Stack	362	-	-	-	-	-	-	181	542	542	-	-	-	-	-	-	-	-	5,112	-
1b.1.1.7	Offgas Storage & Compressor	38	-	-	-	-	-	-	19	57	57	-	-	-	-	-	-	-	-	550	-
1b.1.1.8	Radwaste	114	-	-	-	-	-	-	57	171	171	-	-	-	-	-	-	-	-	1,647	-
1b.1.1.9	Radwaste Material Storage Warehouse	60	-	-	-	-	-	-	30	90	90	-	-	-	-	-	-	-	-	864	-
1b.1.1.10	Recombiner	25	-	-	-	-	-	-	13	38	38	-	-	-	-	-	-	-	-	363	-
1b.1.1.11	Turbine	664	-	-	-	-	-	-	332	996	996	-	-	-	-	-	-	-	-	9,600	-
1b.1.1.12	Turbine Building Addition	55	-	-	-	-	-	-	27	82	82	-	-	-	-	-	-	-	-	793	-
1b.1.1.13	Reactor (Post Fuel)	924	-	-	-	-	-	-	462	1,386	1,386	-	-	-	-	-	-	-	-	12,653	-
1b.1.1	Totals	7,601	-	-	-	-	-	-	3,800	11,401	11,401	-	-	-	-	-	-	-	-	104,679	-
1b.1	Subtotal Period 1b Activity Costs	7,601	-	-	-	-	-	-	3,800	11,401	11,401	-	-	-	-	-	-	-	-	104,679	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	220	-	146	259	-	589	-	310	1,523	1,523	-	-	-	1,352	-	-	-	81,127	264	-
1b.3.4	Small tool allowance	-	130	-	-	-	-	-	20	150	150	-	-	-	-	-	-	-	-	-	-
1b.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	196	29	225	-	225	-	-	-	-	-	-	-	-	-
1b.3.6	Retention and Severance	-	-	-	-	-	-	3,601	540	4,141	4,141	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,275	130	146	259	-	589	3,796	1,058	7,252	7,027	225	-	-	1,352	-	-	-	81,127	264	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,562	-	-	-	-	-	-	391	1,953	1,953	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	580	58	638	638	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	890	89	979	979	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	750	-	-	-	-	-	187	937	937	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	12	6	-	48	-	14	80	80	-	-	-	588	-	-	-	11,769	19	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	453	68	521	521	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	708	71	779	-	779	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	652	98	750	750	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	4,082	612	4,694	4,694	-	-	-	-	-	-	-	-	-	61,192
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	6,803	1,020	7,823	7,823	-	-	-	-	-	-	-	-	-	105,271
1b.4	Subtotal Period 1b Period-Dependent Costs	1,562	938	12	6	-	48	14,599	2,693	19,858	18,805	1,053	-	-	588	-	-	-	11,769	19	166,463
1b.0	TOTAL PERIOD 1b COST	10,438	1,068	157	265	-	637	31,070	9,453	53,088	51,810	1,278	-	-	1,941	-	-	-	92,896	104,962	166,463
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	527	-	-	-	-	-	79	606	606	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	54	-	-	-	-	-	8	62	62	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	12,801	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	75	11	86	86	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	581	-	-	-	-	808	318	1,707	1,707	-	-	-	-	-	-	-	-	16,501	583
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	161	-	107	190	-	433	-	228	1,120	1,120	-	-	-	994	-	-	-	59,653	194	-

Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1c Collateral Costs (continued)																					
1c.3.3	Small tool allowance	-	5	-	-	-	-	-	1	6	6	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	195	29	225	-	225	-	-	-	-	-	-	-	-	-
1c.3.5	Retention and Severance	-	-	-	-	-	-	2,734	410	3,145	3,145	-	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	161	5	107	190	-	433	2,930	668	4,495	4,270	225	-	-	994	-	-	-	59,653	194	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	580	58	638	638	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	888	89	977	977	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	248	-	-	-	-	-	62	310	310	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	2	-	13	-	4	21	21	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	453	68	521	521	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	708	71	779	-	779	-	-	-	-	-	-	-	-	-
1c.4.9	Fixed Overhead	-	-	-	-	-	-	652	98	750	750	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
1c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1c.4.13	Security Staff Cost	-	-	-	-	-	-	4,082	612	4,694	4,694	-	-	-	-	-	-	-	-	-	61,192
1c.4.14	Utility Staff Cost	-	-	-	-	-	-	6,803	1,020	7,823	7,823	-	-	-	-	-	-	-	-	-	105,271
1c.4	Subtotal Period 1c Period-Dependent Costs	-	436	3	2	-	13	14,597	2,166	17,216	16,163	1,053	-	-	152	-	-	-	3,039	5	166,463
1c.0	TOTAL PERIOD 1c COST	161	1,021	110	192	-	446	18,335	3,153	23,418	22,140	1,278	-	-	1,146	-	-	-	62,692	16,700	167,046
PERIOD 1 TOTALS		10,599	3,456	279	463	-	1,133	125,036	23,783	164,750	155,802	8,948	-	-	3,696	-	-	-	167,779	121,681	1,037,079
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	155	23	178	178	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	349	87	437	437	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	504	111	615	615	-	-	-	-	-	-	-	-	-	-
Period 2a Additional Costs																					
2a.2.1	Security Modifications	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	130,915	19,637	150,553	-	150,553	-	-	-	-	-	-	-	-	-
2a.3.2	Retention and Severance	-	-	-	-	-	-	19,427	2,914	22,341	22,341	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	150,342	22,551	172,893	22,341	150,553	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,761	176	1,937	1,937	-	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	8,932	893	9,825	9,825	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	617	-	-	-	-	-	154	771	771	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	11	6	-	47	-	14	79	79	-	-	-	576	-	-	-	11,523	19	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	910	136	1,046	1,046	-	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	610	61	671	671	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	7,110	711	7,821	-	7,821	-	-	-	-	-	-	-	-	-
2a.4.8	Fixed Overhead	-	-	-	-	-	-	5,306	796	6,102	6,102	-	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	2,115	317	2,432	-	2,432	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	280	42	322	-	322	-	-	-	-	-	-	-	-	-
2a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	639	96	735	735	-	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	37,806	5,671	43,477	31,086	12,391	-	-	-	-	-	-	-	-	562,523
2a.4.13	Utility Staff Cost	-	-	-	-	-	-	13,543	2,031	15,574	12,615	2,959	-	-	-	-	-	-	-	-	205,738
2a.4	Subtotal Period 2a Period-Dependent Costs	-	617	11	6	-	47	79,012	11,099	90,793	64,868	25,925	-	-	576	-	-	-	11,523	19	768,261
2a.0	TOTAL PERIOD 2a COST	-	617	11	6	-	47	238,554	35,065	274,301	97,823	176,478	-	-	576	-	-	-	11,523	19	768,261

Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	2,368	355	2,723	2,723	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	5,351	1,338	6,689	6,689	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	7,719	1,693	9,412	9,412	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	41,993	6,299	48,292	-	48,292	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	41,993	6,299	48,292	-	48,292	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	26,968	2,697	29,664	29,664	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	136,792	13,679	150,471	150,471	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	4,580	-	-	-	-	-	1,145	5,725	5,725	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	84	43	-	349	-	102	579	579	-	-	-	4,238	-	-	-	84,754	138	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	6,965	1,045	8,010	8,010	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	8,721	872	9,594	9,594	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	5,685	568	6,253	-	6,253	-	-	-	-	-	-	-	-	-
2b.4.8	Fixed Overhead	-	-	-	-	-	-	8,259	1,239	9,498	9,498	-	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	4,292	644	4,935	-	4,935	-	-	-	-	-	-	-	-	-
2b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	4,794	719	5,514	5,514	-	-	-	-	-	-	-	-	-	-
2b.4.11	Security Staff Cost	-	-	-	-	-	-	212,676	31,901	244,577	55,030	189,547	-	-	-	-	-	-	-	-	2,871,084
2b.4.12	Utility Staff Cost	-	-	-	-	-	-	86,757	13,014	99,770	54,475	45,296	-	-	-	-	-	-	-	-	1,276,037
2b.4	Subtotal Period 2b Period-Dependent Costs	-	4,580	84	43	-	349	501,908	67,625	574,590	328,559	246,032	-	-	4,238	-	-	-	84,754	138	4,147,121
2b.0	TOTAL PERIOD 2b COST	-	4,580	84	43	-	349	551,620	75,617	632,294	337,971	294,324	-	-	4,238	-	-	-	84,754	138	4,147,121
PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage																					
Period 2c Direct Decommissioning Activities																					
2c.1.1	Quarterly Inspection									a											
2c.1.2	Semi-annual environmental survey									a											
2c.1.3	Prepare reports									a											
2c.1.4	Bituminous roof replacement	-	-	-	-	-	-	759	114	872	872	-	-	-	-	-	-	-	-	-	-
2c.1.5	Maintenance supplies	-	-	-	-	-	-	1,714	429	2,143	2,143	-	-	-	-	-	-	-	-	-	-
2c.1	Subtotal Period 2c Activity Costs	-	-	-	-	-	-	2,473	542	3,015	3,015	-	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	4,931	493	5,424	5,424	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	37,270	3,727	40,997	40,997	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	1,380	-	-	-	-	-	345	1,725	1,725	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	25	13	-	103	-	30	171	171	-	-	-	1,250	-	-	-	25,004	41	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	2,231	335	2,566	2,566	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	2,520	252	2,772	2,772	-	-	-	-	-	-	-	-	-	-
2c.4.7	Fixed Overhead	-	-	-	-	-	-	2,646	397	3,042	3,042	-	-	-	-	-	-	-	-	-	-
2c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	1,536	230	1,766	1,766	-	-	-	-	-	-	-	-	-	-
2c.4.9	Security Staff Cost	-	-	-	-	-	-	29,690	4,453	34,143	34,143	-	-	-	-	-	-	-	-	-	383,204
2c.4.10	Utility Staff Cost	-	-	-	-	-	-	14,429	2,164	16,593	16,593	-	-	-	-	-	-	-	-	-	223,536
2c.4	Subtotal Period 2c Period-Dependent Costs	-	1,380	25	13	-	103	95,252	12,427	109,199	109,199	-	-	-	1,250	-	-	-	25,004	41	606,740
2c.0	TOTAL PERIOD 2c COST	-	1,380	25	13	-	103	97,724	12,969	112,214	112,214	-	-	-	1,250	-	-	-	25,004	41	606,740
PERIOD 2 TOTALS		-	6,577	120	62	-	500	887,899	123,652	1,018,809	548,008	470,802	-	-	6,064	-	-	-	121,281	198	5,522,123
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100

Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3a Direct Decommissioning Activities (continued)																					
3a.1.8	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
3a.1.9	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
3a.1.10	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	947	142	1,089	980	-	109	-	-	-	-	-	-	-	7,370
3a.1.11.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
3a.1.11.3	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
3a.1.11.5	Sacrificial shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
3a.1.11.6	Moisture separators/reheaters	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
3a.1.11.8	Main Turbine	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.9	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.10	Pressure suppression structure	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
3a.1.11.11	Drywell	-	-	-	-	-	-	206	31	236	236	-	-	-	-	-	-	-	-	-	1,600
3a.1.11.12	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
3a.1.11.13	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.11.14	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
3a.1.11	Total	-	-	-	-	-	-	5,736	860	6,597	6,011	-	586	-	-	-	-	-	-	-	44,633
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	16,434	2,465	18,899	18,313	-	586	-	-	-	-	-	-	-	81,963
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	5,930	1,779	7,708	7,708	-	-	-	-	-	-	-	-	30,500	10,852
3a.2.2	Mixed & RCRA Waste	-	-	28	29	14	-	-	9	80	80	-	-	43	-	-	-	-	5,253	161	-
3a.2	Subtotal Period 3a Additional Costs	-	-	28	29	14	-	5,930	1,788	7,788	7,788	-	-	43	-	-	-	-	5,253	30,661	10,852
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	401	40	442	442	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	2,945	295	3,240	3,240	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	537	-	-	-	-	-	134	672	672	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	5	-	42	-	12	70	70	-	-	-	514	-	-	-	10,287	17	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	335	33	368	368	-	-	-	-	-	-	-	-	-	-
3a.4.8	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
3a.4.9	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
3a.4.10	Security Staff Cost	-	-	-	-	-	-	4,441	666	5,107	5,107	-	-	-	-	-	-	-	-	-	65,000
3a.4.11	Utility Staff Cost	-	-	-	-	-	-	16,594	2,489	19,084	19,084	-	-	-	-	-	-	-	-	-	257,920
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,290	10	5	-	42	29,274	4,467	35,089	35,089	-	-	-	514	-	-	-	10,287	17	322,920
3a.0	TOTAL PERIOD 3a COST	-	1,290	38	34	14	42	51,638	8,720	61,777	61,191	-	586	43	514	-	-	-	15,540	30,678	415,735
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	514	77	591	591	-	-	-	-	-	-	-	-	-	4,000
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD housings & NIs	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Removal primary containment	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
3b.1.1.9	Sacrificial shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.10	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
3b.1.1.11	Main Turbine	-	-	-	-	-	-	267	40	307	307	-	-	-	-	-	-	-	-	-	2,080
3b.1.1.12	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088

Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Detailed Work Procedures (continued)																					
3b.1.1.13	Moisture separators & reheaters	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.14	Radwaste building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1.15	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	4,208	631	4,839	4,376	-	463	-	-	-	-	-	-	-	32,741
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	4,208	631	4,839	4,376	-	463	-	-	-	-	-	-	-	32,741
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	1,055	1,200	-	-	-	-	1,264	528	4,047	4,047	-	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	39	-	-	-	-	-	-	10	48	48	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	351	35	386	386	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	1,348	135	1,483	1,483	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	295	-	-	-	-	-	74	369	369	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	6	3	-	24	-	7	40	40	-	-	-	290	-	-	-	5,802	9	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	906	136	1,042	1,042	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	167	17	183	183	-	-	-	-	-	-	-	-	-	-
3b.4.9	Fixed Overhead	-	-	-	-	-	-	1,305	196	1,500	1,500	-	-	-	-	-	-	-	-	-	-
3b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	62	9	72	72	-	-	-	-	-	-	-	-	-	-
3b.4.11	Security Staff Cost	-	-	-	-	-	-	2,214	332	2,546	2,546	-	-	-	-	-	-	-	-	-	32,411
3b.4.12	DOC Staff Cost	-	-	-	-	-	-	5,344	802	6,146	6,146	-	-	-	-	-	-	-	-	-	58,080
3b.4.13	Utility Staff Cost	-	-	-	-	-	-	8,274	1,241	9,516	9,516	-	-	-	-	-	-	-	-	-	128,607
3b.4	Subtotal Period 3b Period-Dependent Costs	39	670	6	3	-	24	19,971	3,049	23,762	23,762	-	-	-	290	-	-	-	5,802	9	219,098
3b.0	TOTAL PERIOD 3b COST	1,093	1,870	6	3	-	24	25,443	4,208	32,647	32,185	-	463	-	290	-	-	-	5,802	9	251,839
PERIOD 3 TOTALS		1,093	3,161	44	37	14	66	77,081	12,928	94,424	93,375	-	1,049	43	804	-	-	-	21,343	30,688	667,574
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Recirculation System Piping & Valves	23	85	27	32	185	264	-	134	750	750	-	-	676	715	-	-	-	94,867	1,594	-
4a.1.1.2	Recirculation Pumps & Motors	8	56	16	37	252	270	-	131	771	771	-	-	568	473	-	-	-	112,200	1,049	-
4a.1.1.3	CRDMs & NIs Removal	41	801	415	98	-	1,130	-	560	3,045	3,045	-	-	-	3,741	-	-	-	213,700	12,506	-
4a.1.1.4	Reactor Vessel Internals	139	6,098	8,236	1,029	-	25,657	278	19,830	61,268	61,268	-	-	-	2,943	1,628	600	-	337,343	22,415	1,055
4a.1.1.5	Vessel & Internals GTCC Disposal	-	-	-	-	-	4,313	-	647	4,960	4,960	-	-	-	-	-	-	1,160	225,765	-	-
4a.1.1.6	Reactor Vessel	-	8,498	1,818	837	-	6,301	278	10,229	27,961	27,961	-	-	-	17,823	-	-	-	1,110,260	22,415	1,055
4a.1.1	Totals	211	15,538	10,512	2,034	438	37,935	557	31,530	98,755	98,755	-	-	1,244	25,695	1,628	600	1,160	2,094,136	59,979	2,110
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	340	1,356	521	6,139	439	-	1,330	10,126	10,126	-	-	24,835	1,383	-	-	-	1,577,959	4,796	-
4a.1.3	Main Condensers	-	1,207	360	194	3,225	244	-	912	6,142	6,142	-	-	17,396	727	-	-	-	828,955	16,823	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor Building	-	332	-	-	-	-	-	50	381	381	-	-	-	-	-	-	-	-	2,217	-
4a.1.4.2	Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	127	-
4a.1.4.3	Turbine	-	127	-	-	-	-	-	19	146	146	-	-	-	-	-	-	-	-	1,254	-
4a.1.4	Totals	-	483	-	-	-	-	-	72	556	556	-	-	-	-	-	-	-	-	3,598	-
Disposal of Plant Systems																					
4a.1.5.1	Automatic Press Relief	-	106	2	10	182	-	-	56	356	356	-	-	1,088	-	-	-	-	44,184	1,468	-
4a.1.5.2	Chemistry Sampling	-	24	0	2	35	-	-	12	73	73	-	-	207	-	-	-	-	8,422	356	-
4a.1.5.3	Chemistry Sampling - Insulated	-	2	0	0	0	-	-	0	2	2	-	-	1	-	-	-	-	61	25	-
4a.1.5.4	Circulating Water - RCA	-	207	14	62	1,114	-	-	230	1,626	1,626	-	-	6,656	-	-	-	-	270,307	2,860	-
4a.1.5.5	Combustible Gas Control - Insul - RCA	-	29	0	2	36	-	-	13	80	80	-	-	212	-	-	-	-	8,617	378	-
4a.1.5.6	Combustible Gas Control - RCA	-	18	1	3	48	-	-	12	81	81	-	-	285	-	-	-	-	11,577	245	-
4a.1.5.7	Condensate & Feedwater	-	888	60	281	5,046	-	-	1,027	7,303	7,303	-	-	30,157	-	-	-	-	1,224,704	12,501	-
4a.1.5.8	Condensate & Feedwater - Insulated	-	444	12	55	980	-	-	267	1,757	1,757	-	-	5,855	-	-	-	-	237,764	6,185	-
4a.1.5.9	Condensate Demin	-	494	9	44	792	-	-	250	1,590	1,590	-	-	4,735	-	-	-	-	192,293	6,784	-
4a.1.5.10	Condensate Storage	-	657	16	77	1,378	-	-	384	2,512	2,512	-	-	8,237	-	-	-	-	334,489	9,265	-
4a.1.5.11	Control Rod Drive	-	3	0	0	4	-	-	1	8	8	-	-	24	-	-	-	-	976	36	-

Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
4a.1.5.12	Control Rod Drive Hydraulic	-	374	5	23	408	-	-	159	968	968	-	-	2,440	-	-	-	-	99,094	5,255	-
4a.1.5.13	Core Spray	-	71	10	48	855	-	-	154	1,138	1,138	-	-	5,109	-	-	-	-	207,487	1,026	-
4a.1.5.14	Core Spray - Insulated	-	131	2	11	198	-	-	64	407	407	-	-	1,184	-	-	-	-	48,081	1,806	-
4a.1.5.15	Demin Water - Insulated - RCA	-	15	0	1	14	-	-	6	36	36	-	-	85	-	-	-	-	3,445	181	-
4a.1.5.16	Demin Water - RCA	-	41	1	2	42	-	-	17	104	104	-	-	253	-	-	-	-	10,278	508	-
4a.1.5.17	Diesel Oil - RCA	-	2	0	0	4	-	-	1	7	7	-	-	23	-	-	-	-	931	25	-
4a.1.5.18	Drywell Atmosphere Cooling - RCA	-	38	1	5	92	-	-	24	159	159	-	-	548	-	-	-	-	22,244	550	-
4a.1.5.19	EDG Emerg Service Water - Insul - RCA	-	0	0	0	0	-	-	0	1	1	-	-	2	-	-	-	-	84	4	-
4a.1.5.20	Electrical - Clean	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	182	-
4a.1.5.21	Emergency Service Water - Insul - RCA	-	21	0	1	23	-	-	9	55	55	-	-	137	-	-	-	-	5,544	281	-
4a.1.5.22	Emergency Service Water - RCA	-	2	0	0	2	-	-	1	5	5	-	-	13	-	-	-	-	512	22	-
4a.1.5.23	GEZIP - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
4a.1.5.24	Generator Physical Design - RCA	-	5	0	0	5	-	-	2	12	12	-	-	31	-	-	-	-	1,250	67	-
4a.1.5.25	H2-O2 Control Analyzing	-	6	0	0	4	-	-	2	12	12	-	-	23	-	-	-	-	948	72	-
4a.1.5.26	H2-O2 Control Analyzing - Insulated	-	6	0	0	4	-	-	2	12	12	-	-	23	-	-	-	-	948	72	-
4a.1.5.27	High Pressure Coolant Injection	-	60	3	12	211	-	-	49	334	334	-	-	1,262	-	-	-	-	51,257	850	-
4a.1.5.28	High Pressure Coolant Injection - Insula	-	198	4	21	379	-	-	110	713	713	-	-	2,266	-	-	-	-	92,018	2,734	-
4a.1.5.29	Hydrogen Cooling	-	8	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	118	-
4a.1.5.30	Hydrogen Cooling - RCA	-	7	0	0	7	-	-	3	17	17	-	-	39	-	-	-	-	1,600	79	-
4a.1.5.31	Hydrogen Seal Oil - RCA	-	17	0	2	32	-	-	9	60	60	-	-	189	-	-	-	-	7,669	212	-
4a.1.5.32	Hydrogen Water Chemistry - RCA	-	24	0	1	23	-	-	10	59	59	-	-	140	-	-	-	-	5,672	304	-
4a.1.5.33	Instrument & Service Air - RCA	-	225	4	17	296	-	-	103	644	644	-	-	1,768	-	-	-	-	71,810	2,733	-
4a.1.5.34	Main Condenser	-	177	4	18	318	-	-	95	613	613	-	-	1,903	-	-	-	-	77,301	2,443	-
4a.1.5.35	Main Steam	-	225	6	28	498	-	-	136	892	892	-	-	2,975	-	-	-	-	120,806	3,122	-
4a.1.5.36	Main Turbine	-	909	63	298	5,335	-	-	1,079	7,684	7,684	-	-	31,885	-	-	-	-	1,294,866	12,952	-
4a.1.5.37	Main Turbine - Insulated	-	193	7	32	579	-	-	141	952	952	-	-	3,460	-	-	-	-	140,506	2,725	-
4a.1.5.38	Miscellaneous	-	38	1	3	51	-	-	18	110	110	-	-	302	-	-	-	-	12,283	556	-
4a.1.5.39	Off Gas Recombiner	-	169	6	27	479	-	-	119	799	799	-	-	2,861	-	-	-	-	116,194	2,387	-
4a.1.5.40	Off Gas Recombiner - Insulated	-	351	5	22	393	-	-	150	921	921	-	-	2,350	-	-	-	-	95,441	4,785	-
4a.1.5.41	Post Accident Sampling	-	23	0	1	16	-	-	8	48	48	-	-	99	-	-	-	-	4,004	306	-
4a.1.5.42	Post Accident Sampling - Insulated	-	15	0	1	11	-	-	6	33	33	-	-	67	-	-	-	-	2,737	190	-
4a.1.5.43	RHR Service Water - Insulated - RCA	-	83	3	14	248	-	-	60	409	409	-	-	1,485	-	-	-	-	60,293	1,125	-
4a.1.5.44	RHR Service Water - RCA	-	4	0	0	6	-	-	2	12	12	-	-	35	-	-	-	-	1,410	57	-
4a.1.5.45	Reactor Feedwater Pump Seal	-	50	1	3	55	-	-	21	130	130	-	-	327	-	-	-	-	13,295	687	-
4a.1.5.46	Residual Heat Removal	-	226	58	147	2,110	514	-	529	3,584	3,584	-	-	12,609	1,519	-	-	-	609,174	3,282	-
4a.1.5.47	Residual Heat Removal - Insulated	-	500	39	74	851	464	-	384	2,312	2,312	-	-	5,084	1,374	-	-	-	294,206	7,027	-
4a.1.5.48	Rx Core Isolation Cooling	-	43	1	3	61	-	-	21	129	129	-	-	364	-	-	-	-	14,781	609	-
4a.1.5.49	Rx Core Isolation Cooling - Insulated	-	97	1	5	94	-	-	39	237	237	-	-	563	-	-	-	-	22,843	1,315	-
4a.1.5.50	Rx Recirculation	-	53	5	4	16	52	-	30	161	161	-	-	96	152	-	-	-	13,794	691	-
4a.1.5.51	Snubbers	-	151	1	5	84	-	-	51	292	292	-	-	502	-	-	-	-	20,395	2,272	-
4a.1.5.52	Standby Liquid Control - Insul - RCA	-	4	0	0	4	-	-	2	9	9	-	-	22	-	-	-	-	904	48	-
4a.1.5.53	Standby Liquid Control - RCA	-	26	1	2	41	-	-	13	83	83	-	-	245	-	-	-	-	9,969	341	-
4a.1.5.54	Stator Cooling - RCA	-	7	0	1	21	-	-	5	35	35	-	-	126	-	-	-	-	5,135	98	-
4a.1.5.55	Traversing Incore Probe	-	3	0	0	0	2	-	1	7	7	-	-	2	5	-	-	-	379	46	-
4a.1.5	Totals	-	7,490	347	1,370	23,501	1,032	-	5,894	39,634	39,610	-	24	140,459	3,050	-	-	-	5,899,167	104,297	-
4a.1.6	Scaffolding in support of decommissioning	-	2,106	22	12	191	31	-	567	2,929	2,929	-	-	1,030	91	-	-	-	52,111	19,968	-
4a.1	Subtotal Period 4a Activity Costs	211	27,165	12,598	4,132	33,494	39,680	557	40,305	158,142	158,117	-	24	184,963	30,945	1,628	600	1,160	10,452,330	209,462	2,110
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	4	-	7	12	-	28	-	12	63	63	-	-	-	64	-	-	-	3,856	13	-
4a.3.3	Small tool allowance	-	267	-	-	-	-	-	40	307	276	-	31	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	4	267	7	12	-	28	-	52	370	339	-	31	-	64	-	-	-	3,856	13	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	87	-	-	-	-	-	-	22	109	109	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	790	79	869	869	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	2,995	299	3,294	3,294	-	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,871	-	-	-	-	-	468	2,339	2,339	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	2,811	-	-	-	-	-	422	3,232	3,232	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	89	46	-	369	-	108	612	612	-	-	-	4,484	-	-	-	89,676	146	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	1,938	291	2,229	2,229	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	544	54	598	598	-	-	-	-	-	-	-	-	-	-
4a.4.9	Fixed Overhead	-	-	-	-	-	-	2,380	357	2,737	2,737	-	-	-	-	-	-	-	-	-	-
4a.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	477	72	549	549	-	-	-	-	-	-	-	-	-	-
4a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	140	21	162	162	-	-	-	-	-	-	-	-	-	-

Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 4a Period-Dependent Costs (continued)																					
4a.4.12	Remedial Actions Surveys	-	-	-	-	-	-	1,258	189	1,447	1,447	-	-	-	-	-	-	-	-	-	-
4a.4.13	Security Staff Cost	-	-	-	-	-	-	4,988	748	5,736	5,736	-	-	-	-	-	-	-	-	-	73,014
4a.4.14	DOC Staff Cost	-	-	-	-	-	-	14,604	2,191	16,795	16,795	-	-	-	-	-	-	-	-	-	161,214
4a.4.15	Utility Staff Cost	-	-	-	-	-	-	18,891	2,834	21,725	21,725	-	-	-	-	-	-	-	-	-	292,055
4a.4	Subtotal Period 4a Period-Dependent Costs	87	4,682	89	46	-	369	49,006	8,154	62,433	62,433	-	-	-	4,484	-	-	-	89,676	146	526,283
4a.0	TOTAL PERIOD 4a COST	302	32,113	12,694	4,190	33,494	40,078	49,563	48,510	220,944	220,889	-	55	184,963	35,493	1,628	600	1,160	10,545,860	209,621	528,393
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	591	58	103	149	-	2,572	-	986	4,459	4,459	-	-	-	7,653	-	-	-	486,170	906	-
Disposal of Plant Systems																					
4b.1.2.1	ALARA/Radiological	-	16	0	0	8	-	-	5	30	30	-	-	49	-	-	-	-	1,987	247	-
4b.1.2.2	Alternate N2 - RCA	-	16	0	1	16	-	-	7	40	40	-	-	93	-	-	-	-	3,765	185	-
4b.1.2.3	Cranes/Heavy Loads/Rigging - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
4b.1.2.4	Decontamination Projects	-	1	0	0	1	-	-	0	2	2	-	-	3	-	-	-	-	125	15	-
4b.1.2.5	Electrical - Contaminated	-	400	5	23	421	-	-	167	1,016	1,016	-	-	2,514	-	-	-	-	102,112	5,633	-
4b.1.2.6	Electrical - Contaminated Fuel Pool	-	42	1	2	42	-	-	17	105	105	-	-	253	-	-	-	-	10,272	592	-
4b.1.2.7	Electrical - Decontam. Fuel Pool Area	-	297	5	23	411	-	-	140	876	876	-	-	2,457	-	-	-	-	99,783	4,090	-
4b.1.2.8	Electrical - Decontaminated	-	2,698	48	218	3,906	-	-	1,298	8,167	8,167	-	-	23,344	-	-	-	-	948,013	37,107	-
4b.1.2.9	Fire - RCA	-	101	1	6	103	-	-	42	253	253	-	-	614	-	-	-	-	24,917	1,324	-
4b.1.2.10	Fire - RCA - Fuel Pool Area	-	11	0	1	10	-	-	4	26	26	-	-	62	-	-	-	-	2,499	143	-
4b.1.2.11	Fuel Pool Cooling & Cleanup	-	387	20	33	343	241	-	216	1,241	1,241	-	-	2,051	712	-	-	-	128,918	5,363	-
4b.1.2.12	Fuel Pool Cooling & Cleanup - Insulated	-	37	2	3	22	24	-	19	107	107	-	-	130	71	-	-	-	9,830	514	-
4b.1.2.13	HVAC Ductwork	-	276	6	26	469	-	-	144	921	921	-	-	2,805	-	-	-	-	113,913	3,539	-
4b.1.2.14	HVAC Ductwork - Fuel Pool Area	-	31	1	3	52	-	-	16	102	102	-	-	312	-	-	-	-	12,657	393	-
4b.1.2.15	HVAC/Chilled Water - RCA	-	324	6	26	461	-	-	155	971	971	-	-	2,752	-	-	-	-	111,779	3,985	-
4b.1.2.16	HVAC/Chilled Water - RCA Fuel Pool Area	-	33	0	2	37	-	-	14	87	87	-	-	223	-	-	-	-	9,072	397	-
4b.1.2.17	Heating & Ventilation	-	433	13	59	1,060	-	-	277	1,842	1,842	-	-	6,334	-	-	-	-	257,243	6,340	-
4b.1.2.18	Heating Boiler - Insulated - RCA	-	3	0	0	4	-	-	1	9	9	-	-	26	-	-	-	-	1,058	35	-
4b.1.2.19	Instrument & Service Air-RCA-Fuel Pool	-	29	1	2	45	-	-	14	91	91	-	-	267	-	-	-	-	10,841	357	-
4b.1.2.20	Liquid Radwaste	-	621	31	57	703	311	-	350	2,072	2,072	-	-	4,203	915	-	-	-	229,422	8,550	-
4b.1.2.21	Makeup Demin - RCA	-	103	3	14	246	-	-	65	431	431	-	-	1,471	-	-	-	-	59,747	1,412	-
4b.1.2.22	Non-Essential Diesel Generator - RCA	-	27	3	13	238	-	-	45	327	327	-	-	1,424	-	-	-	-	57,832	395	-
4b.1.2.23	Off Gas Holdup	-	310	7	34	607	-	-	174	1,133	1,133	-	-	3,629	-	-	-	-	147,355	4,256	-
4b.1.2.24	Primary Containment	-	411	16	77	1,389	-	-	324	2,218	2,218	-	-	8,302	-	-	-	-	337,148	5,729	-
4b.1.2.25	Process Radiation Monitors	-	41	0	2	36	-	-	16	95	95	-	-	213	-	-	-	-	8,667	577	-
4b.1.2.26	Rx Bldg Closed Clng Water - Insul - RCA	-	114	2	9	163	-	-	54	343	343	-	-	977	-	-	-	-	39,675	1,484	-
4b.1.2.27	Rx Bldg Closed Clng Water - RCA	-	184	15	66	1,187	-	-	235	1,687	1,687	-	-	7,093	-	-	-	-	288,031	2,489	-
4b.1.2.28	Rx Component Handling Equip	-	127	11	24	291	139	-	115	708	708	-	-	1,737	415	-	-	-	96,901	1,839	-
4b.1.2.29	Rx Pressure Vessel	-	43	5	5	27	57	-	30	167	167	-	-	161	169	-	-	-	17,375	578	-
4b.1.2.30	Rx Water Cleanup	-	239	16	15	47	214	-	124	655	655	-	-	278	630	-	-	-	51,819	3,264	-
4b.1.2.31	Secondary Containment	-	112	3	13	229	-	-	65	421	421	-	-	1,372	-	-	-	-	55,702	1,569	-
4b.1.2.32	Service & Seal Water - Insulated - RCA	-	120	2	11	197	-	-	62	392	392	-	-	1,180	-	-	-	-	47,917	1,565	-
4b.1.2.33	Service & Seal Water - RCA	-	159	4	17	303	-	-	88	570	570	-	-	1,809	-	-	-	-	73,453	2,016	-
4b.1.2.34	Service Air Blower - RCA	-	15	0	2	34	-	-	9	62	62	-	-	206	-	-	-	-	8,364	206	-
4b.1.2.35	Solid Radwaste	-	446	21	45	567	223	-	261	1,563	1,563	-	-	3,390	659	-	-	-	179,772	6,270	-
4b.1.2.36	Structures & Buildings	-	70	1	4	80	-	-	30	185	185	-	-	477	-	-	-	-	19,351	1,005	-
4b.1.2.37	Wells & Domestic Water	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	144	-
4b.1.2.38	Wells & Domestic Water - RCA	-	52	1	3	57	-	-	22	136	136	-	-	342	-	-	-	-	13,874	633	-
4b.1.2	Totals	-	8,342	249	841	13,829	1,210	-	4,613	29,085	29,073	-	11	82,654	3,571	-	-	-	3,585,374	114,290	-
4b.1.3	Scaffolding in support of decommissioning	-	3,159	33	19	286	46	-	850	4,394	4,394	-	-	1,545	136	-	-	-	78,166	29,953	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor Building	4,668	2,596	178	516	8,044	1,181	-	4,580	21,764	21,764	-	-	48,077	7,014	-	-	-	2,317,670	100,718	-
4b.1.4.2	Admin	96	5	0	3	-	15	-	53	172	172	-	-	-	145	-	-	-	6,840	1,421	-
4b.1.4.3	HPCI Room	26	25	1	3	20	14	-	26	115	115	-	-	118	125	-	-	-	10,759	703	-
4b.1.4.4	Hot Shop	15	4	0	2	-	11	-	11	43	43	-	-	-	103	-	-	-	4,860	254	-
4b.1.4.5	LLRW Storage & Shipping	52	22	2	8	5	45	-	45	179	179	-	-	31	433	-	-	-	21,708	1,003	-
4b.1.4.6	Offgas Stack	336	241	7	23	225	82	-	286	1,199	1,199	-	-	1,343	669	-	-	-	87,045	7,924	-
4b.1.4.7	Offgas Storage & Compressor	36	15	1	6	4	33	-	32	128	128	-	-	25	316	-	-	-	15,948	696	-
4b.1.4.8	Radwaste	109	54	3	17	29	96	-	100	410	410	-	-	172	910	-	-	-	49,943	2,229	-
4b.1.4.9	Radwaste Material Storage Warehouse	57	21	2	9	-	52	-	48	189	189	-	-	-	495	-	-	-	23,400	1,062	-
4b.1.4.10	Recombiner	24	22	1	5	33	24	-	30	140	140	-	-	199	216	-	-	-	18,405	616	-

Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Decontamination of Site Buildings (continued)																					
4b.1.4.11	Turbine	638	314	21	104	215	564	-	588	2,444	2,444	-	-	1,283	5,299	-	-	-	303,150	12,856	-
4b.1.4.12	Turbine Building Addition	53	19	1	8	-	45	-	44	169	169	-	-	-	434	-	-	-	20,478	968	-
4b.1.4.13	Reactor (Post Fuel)	849	2,325	172	913	329	5,301	-	2,535	12,425	12,425	-	-	1,969	50,605	-	-	-	2,471,778	40,860	-
4b.1.4	Totals	6,960	5,663	390	1,617	8,904	7,465	-	8,379	39,378	39,378	-	-	53,216	66,764	-	-	-	5,351,984	171,309	-
4b.1.5	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
4b.1.6	Receive NRC approval of termination plan									a											
4b.1	Subtotal Period 4b Activity Costs	7,551	17,223	776	2,626	23,019	11,293	526	14,907	77,921	77,910	-	11	137,414	78,124	-	-	-	9,501,694	316,457	4,096
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
4b.2.2	Excavation of Underground Services	-	1,972	-	-	-	-	376	550	2,898	2,898	-	-	-	-	-	-	-	-	12,493	-
4b.2.3	Operational Equipment	-	-	23	92	1,211	-	-	198	1,524	1,524	-	-	11,760	-	-	-	-	294,000	32	-
4b.2.4	License Termination ISFSI	-	57	188	987	-	5,925	3,118	2,569	12,844	12,844	-	-	-	21,949	-	-	-	2,633,402	10,339	14,785
4b.2	Subtotal Period 4b Additional Costs	-	2,029	211	1,079	1,211	5,925	4,952	3,753	19,161	19,161	-	-	11,760	21,949	-	-	-	2,927,402	22,864	27,265
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	12	-	22	39	-	88	-	36	196	196	-	-	-	202	-	-	-	12,097	39	-
4b.3.3	Small tool allowance	-	397	-	-	-	-	-	60	457	457	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	130	82	1,112	178	-	237	1,739	1,739	-	-	6,000	529	-	-	-	303,608	147	-
4b.3	Subtotal Period 4b Collateral Costs	12	397	152	121	1,112	266	-	332	2,392	2,392	-	-	6,000	731	-	-	-	315,705	186	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,701	-	-	-	-	-	-	425	2,126	2,126	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	1,434	143	1,577	1,577	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	5,202	520	5,722	5,722	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	3,107	-	-	-	-	-	777	3,884	3,884	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	5,239	-	-	-	-	-	786	6,024	6,024	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	117	60	-	486	-	142	805	805	-	-	-	5,892	-	-	-	117,848	192	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,777	417	3,194	3,194	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	986	99	1,085	1,085	-	-	-	-	-	-	-	-	-	-
4b.4.9	Fixed Overhead	-	-	-	-	-	-	4,319	648	4,967	4,967	-	-	-	-	-	-	-	-	-	-
4b.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	866	130	996	996	-	-	-	-	-	-	-	-	-	-
4b.4.11	Railroad Track Maintenance	-	-	-	-	-	-	255	38	293	293	-	-	-	-	-	-	-	-	-	-
4b.4.12	Remedial Actions Surveys	-	-	-	-	-	-	2,283	343	2,626	2,626	-	-	-	-	-	-	-	-	-	-
4b.4.13	Security Staff Cost	-	-	-	-	-	-	9,052	1,358	10,409	10,409	-	-	-	-	-	-	-	-	-	132,493
4b.4.14	DOC Staff Cost	-	-	-	-	-	-	25,916	3,887	29,803	29,803	-	-	-	-	-	-	-	-	-	284,065
4b.4.15	Utility Staff Cost	-	-	-	-	-	-	32,416	4,862	37,278	37,278	-	-	-	-	-	-	-	-	-	500,294
4b.4	Subtotal Period 4b Period-Dependent Costs	1,701	8,346	117	60	-	486	85,506	14,575	110,790	110,790	-	-	-	5,892	-	-	-	117,848	192	916,853
4b.0	TOTAL PERIOD 4b COST	9,264	27,996	1,255	3,886	25,343	17,969	90,984	33,567	210,264	210,253	-	11	155,174	106,697	-	-	-	12,862,650	339,700	948,214
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
Period 4f Period-Dependent Costs																					
4f.4.2	Property taxes	-	-	-	-	-	-	1,796	180	1,975	1,975	-	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	705	-	-	-	-	-	176	881	881	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	7	4	-	29	-	8	48	48	-	-	-	351	-	-	-	7,025	11	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	274	41	315	315	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC Fees	-	-	-	-	-	-	426	43	468	468	-	-	-	-	-	-	-	-	-	-
4f.4.7	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
4f.4.8	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
4f.4.9	Security Staff Cost	-	-	-	-	-	-	1,360	204	1,564	1,564	-	-	-	-	-	-	-	-	-	18,805

Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 4f Period-Dependent Costs (continued)																					
4f.4.10	DOC Staff Cost	-	-	-	-	-	-	5,393	809	6,201	6,201	-	-	-	-	-	-	-	-	-	57,200
4f.4.11	Utility Staff Cost	-	-	-	-	-	-	5,275	791	6,066	6,066	-	-	-	-	-	-	-	-	-	74,438
4f.4	Subtotal Period 4f Period-Dependent Costs	-	705	7	4	-	29	16,214	2,506	19,463	19,463	-	-	-	351	-	-	-	7,025	11	150,444
4f.0	TOTAL PERIOD 4f COST	-	705	7	4	-	29	24,563	4,821	30,128	30,128	-	-	-	351	-	-	-	7,025	95,059	156,684
PERIOD 4 TOTALS		9,566	60,813	13,956	8,079	58,837	58,076	165,111	86,898	461,337	461,270	-	66	340,138	142,540	1,628	600	1,160	23,415,530	644,379	1,633,290
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor Building	-	1,971	-	-	-	-	-	296	2,267	-	-	2,267	-	-	-	-	-	-	13,911	-
5b.1.1.2	Condensate Tanks Foundation	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	50	-
5b.1.1.3	Discharge Retention Basin	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	25	-
5b.1.1.4	HPCI Room	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	97	-
5b.1.1.5	Hot Shop	-	16	-	-	-	-	-	2	19	-	-	19	-	-	-	-	-	-	177	-
5b.1.1.6	Hydrogen & Oxygen Storage	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	19	-
5b.1.1.7	LLRW Storage & Shipping	-	83	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	662	-
5b.1.1.8	MSIV	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	42	-
5b.1.1.9	Misc Structures 2017	-	1,410	-	-	-	-	-	212	1,622	-	-	1,622	-	-	-	-	-	-	13,042	-
5b.1.1.10	Offgas Stack	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	544	-
5b.1.1.11	Offgas Storage & Compressor	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	199	-
5b.1.1.12	Radwaste	-	228	-	-	-	-	-	34	262	-	-	262	-	-	-	-	-	-	1,220	-
5b.1.1.13	Recombiner	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	713	-
5b.1.1.14	Security Barrier	-	186	-	-	-	-	-	28	214	-	-	214	-	-	-	-	-	-	933	-
5b.1.1.15	Structures Greater than 3' Below Grade	-	2,461	-	-	-	-	-	369	2,830	-	-	2,830	-	-	-	-	-	-	12,649	-
5b.1.1.16	Tank Farm	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	21	-
5b.1.1.17	Turbine	-	1,259	-	-	-	-	-	189	1,448	-	-	1,448	-	-	-	-	-	-	13,036	-
5b.1.1.18	Turbine Building Addition	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	618	-
5b.1.1.19	Turbine Pedestal	-	182	-	-	-	-	-	27	209	-	-	209	-	-	-	-	-	-	926	-
5b.1.1	Totals	-	8,169	-	-	-	-	-	1,225	9,394	-	-	9,394	-	-	-	-	-	-	58,885	-
Site Closeout Activities																					
5b.1.2	Grade & landscape site	-	896	-	-	-	-	-	134	1,031	-	-	1,031	-	-	-	-	-	-	1,841	-
5b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	9,065	-	-	-	-	200	1,390	10,655	231	-	10,425	-	-	-	-	-	-	60,726	1,560
Period 5b Additional Costs																					
5b.2.1	Clean Concrete Disposal	-	3,322	-	-	-	-	13	500	3,835	-	-	3,835	-	-	-	-	-	-	12	-
5b.2.2	Intake Structure Cofferdam	-	335	-	-	-	-	-	50	385	-	-	385	-	-	-	-	-	-	2,584	-
5b.2.3	Construction Debris	-	-	-	-	-	-	1,170	176	1,346	-	-	1,346	-	-	-	-	-	-	-	-
5b.2.4	Backfill	-	5,583	-	-	-	-	-	837	6,421	-	-	6,421	-	-	-	-	-	-	5,422	-
5b.2.5	Discharge Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
5b.2.6	Demolition and Site Restoration of ISFSI	-	1,486	-	-	-	-	233	258	1,977	-	-	1,977	-	-	-	-	-	-	6,957	160
5b.2	Subtotal Period 5b Additional Costs	-	11,168	-	-	-	-	1,416	1,888	14,472	-	-	14,472	-	-	-	-	-	-	18,527	160
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	121	-	-	-	-	-	18	139	-	-	139	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	121	-	-	-	-	-	18	139	-	-	139	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.2	Property taxes	-	-	-	-	-	-	4,602	460	5,062	-	-	5,062	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	5,842	-	-	-	-	-	876	6,719	-	-	6,719	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	315	47	362	-	-	362	-	-	-	-	-	-	-	-
5b.4.5	Fixed Overhead	-	-	-	-	-	-	1,122	168	1,290	-	-	1,290	-	-	-	-	-	-	-	-
5b.4.6	Railroad Track Maintenance	-	-	-	-	-	-	217	33	249	-	-	249	-	-	-	-	-	-	-	-
5b.4.7	Security Staff Cost	-	-	-	-	-	-	3,131	470	3,601	-	-	3,601	-	-	-	-	-	-	-	43,287
5b.4.8	DOC Staff Cost	-	-	-	-	-	-	11,729	1,759	13,489	-	-	13,489	-	-	-	-	-	-	-	122,646
5b.4.9	Utility Staff Cost	-	-	-	-	-	-	4,931	740	5,671	-	-	5,671	-	-	-	-	-	-	-	70,341
5b.4	Subtotal Period 5b Period-Dependent Costs	-	5,842	-	-	-	-	26,047	4,553	36,443	-	-	36,443	-	-	-	-	-	-	-	236,274
5b.0	TOTAL PERIOD 5b COST	-	26,196	-	-	-	-	27,664	7,849	61,709	231	-	61,478	-	-	-	-	-	-	79,253	237,994

Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 5 TOTALS		-	26,196	-	-	-	-	27,664	7,849	61,709	231	-	61,478	-	-	-	-	-	-	79,253	237,994
TOTAL COST TO DECOMMISSION		21,259	100,203	14,399	8,640	58,852	59,775	1,282,791	255,109	1,801,028	1,258,686	479,749	62,593	340,180	153,105	1,628	600	1,160	23,725,930	876,199	9,098,058

TOTAL COST TO DECOMMISSION WITH 16.5% CONTINGENCY:	**$1,801,028**	**thousands of 2020 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 69.89% OR:	**$1,258,686**	**thousands of 2020 dollars**
SPENT FUEL MANAGEMENT COST IS 26.64% OR:	**$479,749**	**thousands of 2020 dollars**
NON-NUCLEAR DEMOLITION COST IS 3.48% OR:	**$62,593**	**thousands of 2020 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**155,332**	**Cubic Feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,160**	**Cubic Feet**
TOTAL SCRAP METAL REMOVED:	**23,123**	**Tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**876,199**	**Man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX H

DETAILED COST ANALYSIS

SCENARIO 6: SAFSTOR with 60 Year DFS

Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	415	124	539	539	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	193	29	222	222	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	632	95	727	727	-	-	-	-	-	-	-	-	-	4,920
1a.1.16.2	Plant systems	-	-	-	-	-	-	536	80	616	616	-	-	-	-	-	-	-	-	-	4,167
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
1a.1.16.4	Waste management	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.16	Total	-	-	-	-	-	-	2,083	312	2,395	2,395	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	152	23	175	175	-	-	-	-	-	-	-	-	-	1,183
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1a.1.17	Total	-	-	-	-	-	-	306	46	352	352	-	-	-	-	-	-	-	-	-	2,383
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	13	2	15	15	-	-	-	-	-	-	-	-	-	100
1a.1.19	Drain/de-energize non-cont. systems									a											
1a.1.20	Drain & dry NSSS									a											
1a.1.21	Drain/de-energize contaminated systems									a											
1a.1.22	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	5,027	816	5,844	5,844	-	-	-	-	-	-	-	-	-	35,890
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,323	198	1,522	-	1,522	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	9,892	1,484	11,376	11,376	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	11,215	1,682	12,897	11,376	1,522	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,328	233	2,561	2,561	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,570	357	3,927	3,927	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	6	-	50	-	15	83	83	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	892	89	981	981	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,428	343	3,770	-	3,770	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	845	127	971	-	971	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	16,372	2,456	18,827	18,827	-	-	-	-	-	-	-	-	-	245,440
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	27,285	4,093	31,378	31,378	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	6	-	50	59,389	8,679	69,502	64,632	4,870	-	-	610	-	-	-	12,190	20	667,680
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	6	-	50	75,631	11,177	88,244	81,852	6,392	-	-	610	-	-	-	12,190	20	703,570

Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor Building	5,155	-	-	-	-	-	-	2,577	7,732	7,732	-	-	-	-	-	-	-	-	70,157	-
1b.1.1.2	Admin	106	-	-	-	-	-	-	53	159	159	-	-	-	-	-	-	-	-	1,526	-
1b.1.1.3	HPCI Room	28	-	-	-	-	-	-	14	42	42	-	-	-	-	-	-	-	-	391	-
1b.1.1.4	Hot Shop	16	-	-	-	-	-	-	8	24	24	-	-	-	-	-	-	-	-	234	-
1b.1.1.5	LLRW Storage & Shipping	54	-	-	-	-	-	-	27	82	82	-	-	-	-	-	-	-	-	788	-
1b.1.1.6	Offgas Stack	362	-	-	-	-	-	-	181	542	542	-	-	-	-	-	-	-	-	5,112	-
1b.1.1.7	Offgas Storage & Compressor	38	-	-	-	-	-	-	19	57	57	-	-	-	-	-	-	-	-	550	-
1b.1.1.8	Radwaste	114	-	-	-	-	-	-	57	171	171	-	-	-	-	-	-	-	-	1,647	-
1b.1.1.9	Radwaste Material Storage Warehouse	60	-	-	-	-	-	-	30	90	90	-	-	-	-	-	-	-	-	864	-
1b.1.1.10	Recombiner	25	-	-	-	-	-	-	13	38	38	-	-	-	-	-	-	-	-	363	-
1b.1.1.11	Turbine	664	-	-	-	-	-	-	332	996	996	-	-	-	-	-	-	-	-	9,600	-
1b.1.1.12	Turbine Building Addition	55	-	-	-	-	-	-	27	82	82	-	-	-	-	-	-	-	-	793	-
1b.1.1.13	Reactor (Post Fuel)	924	-	-	-	-	-	-	462	1,386	1,386	-	-	-	-	-	-	-	-	12,653	-
1b.1.1	Totals	7,601	-	-	-	-	-	-	3,800	11,401	11,401	-	-	-	-	-	-	-	-	104,679	-
1b.1	Subtotal Period 1b Activity Costs	7,601	-	-	-	-	-	-	3,800	11,401	11,401	-	-	-	-	-	-	-	-	104,679	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	220	-	146	259	-	589	-	310	1,523	1,523	-	-	-	1,352	-	-	-	81,127	264	-
1b.3.4	Small tool allowance	-	130	-	-	-	-	-	20	150	150	-	-	-	-	-	-	-	-	-	-
1b.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	196	29	225	-	225	-	-	-	-	-	-	-	-	-
1b.3.6	Retention and Severance	-	-	-	-	-	-	3,601	540	4,141	4,141	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,275	130	146	259	-	589	3,796	1,058	7,252	7,027	225	-	-	1,352	-	-	-	81,127	264	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,562	-	-	-	-	-	-	391	1,953	1,953	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	580	58	638	638	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	890	89	979	979	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	750	-	-	-	-	-	187	937	937	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	12	6	-	48	-	14	80	80	-	-	-	588	-	-	-	11,769	19	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	453	68	521	521	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	708	71	779	-	779	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	652	98	750	750	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	4,082	612	4,694	4,694	-	-	-	-	-	-	-	-	-	61,192
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	6,803	1,020	7,823	7,823	-	-	-	-	-	-	-	-	-	105,271
1b.4	Subtotal Period 1b Period-Dependent Costs	1,562	938	12	6	-	48	14,599	2,693	19,858	18,805	1,053	-	-	588	-	-	-	11,769	19	166,463
1b.0	TOTAL PERIOD 1b COST	10,438	1,068	157	265	-	637	31,070	9,453	53,088	51,810	1,278	-	-	1,941	-	-	-	92,896	104,962	166,463
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	527	-	-	-	-	-	79	606	606	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	54	-	-	-	-	-	8	62	62	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	12,801	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	75	11	86	86	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	581	-	-	-	-	808	318	1,707	1,707	-	-	-	-	-	-	-	-	16,501	583

Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	161	-	107	190	-	433	-	228	1,120	1,120	-	-	-	994	-	-	-	59,653	194	-
1c.3.3	Small tool allowance	-	5	-	-	-	-	-	1	6	6	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	195	29	225	-	225	-	-	-	-	-	-	-	-	-
1c.3.5	Retention and Severance	-	-	-	-	-	-	2,734	410	3,145	3,145	-	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	161	5	107	190	-	433	2,930	668	4,495	4,270	225	-	-	994	-	-	-	59,653	194	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	580	58	638	638	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	888	89	977	977	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	248	-	-	-	-	-	62	310	310	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	2	-	13	-	4	21	21	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	453	68	521	521	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	708	71	779	-	779	-	-	-	-	-	-	-	-	-
1c.4.9	Fixed Overhead	-	-	-	-	-	-	652	98	750	750	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
1c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1c.4.13	Security Staff Cost	-	-	-	-	-	-	4,082	612	4,694	4,694	-	-	-	-	-	-	-	-	-	61,192
1c.4.14	Utility Staff Cost	-	-	-	-	-	-	6,803	1,020	7,823	7,823	-	-	-	-	-	-	-	-	-	105,271
1c.4	Subtotal Period 1c Period-Dependent Costs	-	436	3	2	-	13	14,597	2,166	17,216	16,163	1,053	-	-	152	-	-	-	3,039	5	166,463
1c.0	TOTAL PERIOD 1c COST	161	1,021	110	192	-	446	18,335	3,153	23,418	22,140	1,278	-	-	1,146	-	-	-	62,692	16,700	167,046
PERIOD 1 TOTALS		10,599	3,456	279	463	-	1,133	125,036	23,783	164,750	155,802	8,948	-	-	3,696	-	-	-	167,779	121,681	1,037,079
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	155	23	178	178	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	349	87	437	437	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	504	111	615	615	-	-	-	-	-	-	-	-	-	-
Period 2a Additional Costs																					
2a.2.1	Security Modifications	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	130,915	19,637	150,553	-	150,553	-	-	-	-	-	-	-	-	-
2a.3.2	Retention and Severance	-	-	-	-	-	-	19,427	2,914	22,341	22,341	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	150,342	22,551	172,893	22,341	150,553	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,761	176	1,937	1,937	-	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	8,932	893	9,825	9,825	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	617	-	-	-	-	-	154	771	771	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	11	6	-	47	-	14	79	79	-	-	-	576	-	-	-	11,523	19	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	910	136	1,046	1,046	-	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	610	61	671	671	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	7,110	711	7,821	-	7,821	-	-	-	-	-	-	-	-	-
2a.4.8	Fixed Overhead	-	-	-	-	-	-	5,306	796	6,102	6,102	-	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	2,115	317	2,432	-	2,432	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	280	42	322	-	322	-	-	-	-	-	-	-	-	-
2a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	639	96	735	735	-	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	37,806	5,671	43,477	31,086	12,391	-	-	-	-	-	-	-	-	562,523
2a.4.13	Utility Staff Cost	-	-	-	-	-	-	13,543	2,031	15,574	12,615	2,959	-	-	-	-	-	-	-	-	205,738
2a.4	Subtotal Period 2a Period-Dependent Costs	-	617	11	6	-	47	79,012	11,099	90,793	64,868	25,925	-	-	576	-	-	-	11,523	19	768,261
2a.0	TOTAL PERIOD 2a COST	-	617	11	6	-	47	238,554	35,065	274,301	97,823	176,478	-	-	576	-	-	-	11,523	19	768,261

Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	3,127	469	3,596	3,596	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	7,065	1,766	8,831	8,831	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	10,192	2,235	12,427	12,427	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	73,422	11,013	84,435	-	84,435	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	73,422	11,013	84,435	-	84,435	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	35,606	3,561	39,167	39,167	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	180,613	18,061	198,674	198,674	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	6,047	-	-	-	-	-	1,512	7,559	7,559	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	111	57	-	461	-	135	764	764	-	-	-	5,595	-	-	-	111,903	182	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	9,196	1,379	10,576	10,576	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	11,515	1,152	12,667	12,667	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	7,506	751	8,256	-	8,256	-	-	-	-	-	-	-	-	-
2b.4.8	Fixed Overhead	-	-	-	-	-	-	10,904	1,636	12,540	12,540	-	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	5,666	850	6,516	-	6,516	-	-	-	-	-	-	-	-	-
2b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	6,330	950	7,280	7,280	-	-	-	-	-	-	-	-	-	-
2b.4.11	Security Staff Cost	-	-	-	-	-	-	280,802	42,120	322,922	72,658	250,265	-	-	-	-	-	-	-	-	3,790,775
2b.4.12	Utility Staff Cost	-	-	-	-	-	-	114,547	17,182	131,729	71,924	59,805	-	-	-	-	-	-	-	-	1,684,789
2b.4	Subtotal Period 2b Period-Dependent Costs	-	6,047	111	57	-	461	662,686	89,288	758,650	433,808	324,843	-	-	5,595	-	-	-	111,903	182	5,475,563
2b.0	TOTAL PERIOD 2b COST	-	6,047	111	57	-	461	746,299	102,536	855,512	446,234	409,278	-	-	5,595	-	-	-	111,903	182	5,475,563
PERIOD 2 TOTALS		-	6,664	122	63	-	509	984,854	137,602	1,129,813	544,057	585,756	-	-	6,171	-	-	-	123,426	201	6,243,824
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
3a.1.9	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
3a.1.10	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	947	142	1,089	980	-	109	-	-	-	-	-	-	-	7,370
3a.1.11.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
3a.1.11.3	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
3a.1.11.5	Sacrificial shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
3a.1.11.6	Moisture separators/reheaters	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
3a.1.11.8	Main Turbine	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.9	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
3a.1.11.10	Pressure suppression structure	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
3a.1.11.11	Drywell	-	-	-	-	-	-	206	31	236	236	-	-	-	-	-	-	-	-	-	1,600
3a.1.11.12	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
3a.1.11.13	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.11.14	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
3a.1.11	Total	-	-	-	-	-	-	5,736	860	6,597	6,011	-	586	-	-	-	-	-	-	-	44,633
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400

Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Planning & Site Preparations (continued)																					
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	16,434	2,465	18,899	18,313	-	586	-	-	-	-	-	-	-	81,963
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	5,930	1,779	7,708	7,708	-	-	-	-	-	-	-	-	30,500	10,852
3a.2.2	Mixed & RCRA Waste	-	-	28	29	14	-	-	9	80	80	-	-	43	-	-	-	-	5,253	161	-
3a.2	Subtotal Period 3a Additional Costs	-	-	28	29	14	-	5,930	1,788	7,788	7,788	-	-	43	-	-	-	-	5,253	30,661	10,852
Period 3a Collateral Costs																					
3a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,805	271	2,076	-	2,076	-	-	-	-	-	-	-	-	-
3a.3	Subtotal Period 3a Collateral Costs	-	-	-	-	-	-	1,805	271	2,076	-	2,076	-	-	-	-	-	-	-	-	-
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	703	70	774	442	332	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	3,479	348	3,827	3,241	586	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	538	-	-	-	-	-	135	673	673	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	5	-	42	-	12	70	70	-	-	-	516	-	-	-	10,311	17	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	335	33	368	368	-	-	-	-	-	-	-	-	-	-
3a.4.8	Emergency Planning Fees	-	-	-	-	-	-	148	15	163	-	163	-	-	-	-	-	-	-	-	-
3a.4.9	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
3a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
3a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
3a.4.12	Security Staff Cost	-	-	-	-	-	-	4,690	703	5,393	5,107	286	-	-	-	-	-	-	-	-	69,160
3a.4.13	Utility Staff Cost	-	-	-	-	-	-	16,817	2,523	19,339	18,160	1,180	-	-	-	-	-	-	-	-	260,000
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,291	10	5	-	42	30,842	4,653	36,844	34,169	2,675	-	-	516	-	-	-	10,311	17	329,160
3a.0	TOTAL PERIOD 3a COST	-	1,291	38	34	14	42	55,010	9,177	65,607	60,271	4,751	586	43	516	-	-	-	15,565	30,678	421,975
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	514	77	591	591	-	-	-	-	-	-	-	-	-	4,000
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD housings & NIs	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Removal primary containment	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
3b.1.1.9	Sacrificial shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.10	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
3b.1.1.11	Main Turbine	-	-	-	-	-	-	267	40	307	307	-	-	-	-	-	-	-	-	-	2,080
3b.1.1.12	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
3b.1.1.13	Moisture separators & reheaters	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.14	Radwaste building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1.15	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	4,208	631	4,839	4,376	-	463	-	-	-	-	-	-	-	32,741
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	4,208	631	4,839	4,376	-	463	-	-	-	-	-	-	-	32,741
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
3b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	900	135	1,035	-	1,035	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	1,055	1,200	-	-	-	-	2,164	663	5,082	4,047	1,035	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	39	-	-	-	-	-	-	10	48	48	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	351	35	386	386	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	1,614	161	1,776	1,483	293	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	295	-	-	-	-	-	74	369	369	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-

Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3b Period-Dependent Costs (continued)																					
3b.4.6	Disposal of DAW generated	-	-	6	3	-	24	-	7	40	40	-	-	-	291	-	-	-	5,814	9	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	906	136	1,042	1,042	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	167	17	183	183	-	-	-	-	-	-	-	-	-	-
3b.4.9	Emergency Planning Fees	-	-	-	-	-	-	74	7	81	-	81	-	-	-	-	-	-	-	-	-
3b.4.10	Fixed Overhead	-	-	-	-	-	-	1,305	196	1,500	1,500	-	-	-	-	-	-	-	-	-	-
3b.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
3b.4.12	Railroad Track Maintenance	-	-	-	-	-	-	62	9	72	72	-	-	-	-	-	-	-	-	-	-
3b.4.13	Security Staff Cost	-	-	-	-	-	-	2,338	351	2,689	2,547	143	-	-	-	-	-	-	-	-	34,485
3b.4.14	DOC Staff Cost	-	-	-	-	-	-	5,344	802	6,146	6,146	-	-	-	-	-	-	-	-	-	58,080
3b.4.15	Utility Staff Cost	-	-	-	-	-	-	8,385	1,258	9,643	9,055	588	-	-	-	-	-	-	-	-	129,644
3b.4	Subtotal Period 3b Period-Dependent Costs	39	671	6	3	-	24	20,602	3,127	24,471	23,302	1,169	-	-	291	-	-	-	5,814	9	222,210
3b.0	TOTAL PERIOD 3b COST	1,093	1,871	6	3	-	24	26,974	4,421	34,392	31,725	2,204	463	-	291	-	-	-	5,814	9	254,951
PERIOD 3 TOTALS		1,093	3,162	44	37	14	66	81,984	13,598	99,999	91,995	6,955	1,049	43	806	-	-	-	21,379	30,688	676,925
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Recirculation System Piping & Valves	23	85	27	32	185	264	-	134	750	750	-	-	676	715	-	-	-	94,867	1,594	-
4a.1.1.2	Recirculation Pumps & Motors	8	56	16	37	252	270	-	131	771	771	-	-	568	473	-	-	-	112,200	1,049	-
4a.1.1.3	CRDMs & NIs Removal	41	801	415	98	-	1,130	-	560	3,045	3,045	-	-	-	3,741	-	-	-	213,700	12,506	-
4a.1.1.4	Reactor Vessel Internals	139	6,098	8,236	1,029	-	25,657	278	19,830	61,268	61,268	-	-	-	2,943	1,628	600	-	337,343	22,415	1,055
4a.1.1.5	Vessel & Internals GTCC Disposal	-	-	-	-	-	4,313	-	647	4,960	4,960	-	-	-	-	-	-	1,160	225,765	-	-
4a.1.1.6	Reactor Vessel	-	8,498	1,818	837	-	6,301	278	10,229	27,961	27,961	-	-	-	17,823	-	-	-	1,110,260	22,415	1,055
4a.1.1	Totals	211	15,538	10,512	2,034	438	37,935	557	31,530	98,755	98,755	-	-	1,244	25,695	1,628	600	1,160	2,094,136	59,979	2,110
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	340	1,356	521	6,139	439	-	1,330	10,126	10,126	-	-	24,835	1,383	-	-	-	1,577,959	4,796	-
4a.1.3	Main Condensers	-	1,207	360	194	3,225	244	-	912	6,142	6,142	-	-	17,396	727	-	-	-	828,955	16,823	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor Building	-	332	-	-	-	-	-	50	381	381	-	-	-	-	-	-	-	-	2,217	-
4a.1.4.2	Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	127	-
4a.1.4.3	Turbine	-	127	-	-	-	-	-	19	146	146	-	-	-	-	-	-	-	-	1,254	-
4a.1.4	Totals	-	483	-	-	-	-	-	72	556	556	-	-	-	-	-	-	-	-	3,598	-
Disposal of Plant Systems																					
4a.1.5.1	Automatic Press Relief	-	106	2	10	182	-	-	56	356	356	-	-	1,088	-	-	-	-	44,184	1,468	-
4a.1.5.2	Chemistry Sampling	-	24	0	2	35	-	-	12	73	73	-	-	207	-	-	-	-	8,422	356	-
4a.1.5.3	Chemistry Sampling - Insulated	-	2	0	0	0	-	-	0	2	2	-	-	1	-	-	-	-	61	25	-
4a.1.5.4	Circulating Water - RCA	-	207	14	62	1,114	-	-	230	1,626	1,626	-	-	6,656	-	-	-	-	270,307	2,860	-
4a.1.5.5	Combustible Gas Control - Insul - RCA	-	29	0	2	36	-	-	13	80	80	-	-	212	-	-	-	-	8,617	378	-
4a.1.5.6	Combustible Gas Control - RCA	-	18	1	3	48	-	-	12	81	81	-	-	285	-	-	-	-	11,577	245	-
4a.1.5.7	Condensate & Feedwater	-	888	60	281	5,046	-	-	1,027	7,303	7,303	-	-	30,157	-	-	-	-	1,224,704	12,501	-
4a.1.5.8	Condensate & Feedwater - Insulated	-	444	12	55	980	-	-	267	1,757	1,757	-	-	5,855	-	-	-	-	237,764	6,185	-
4a.1.5.9	Condensate Demin	-	494	9	44	792	-	-	250	1,590	1,590	-	-	4,735	-	-	-	-	192,293	6,784	-
4a.1.5.10	Condensate Storage	-	657	16	77	1,378	-	-	384	2,512	2,512	-	-	8,237	-	-	-	-	334,489	9,265	-
4a.1.5.11	Control Rod Drive	-	3	0	0	4	-	-	1	8	8	-	-	24	-	-	-	-	976	36	-
4a.1.5.12	Control Rod Drive Hydraulic	-	374	5	23	408	-	-	159	968	968	-	-	2,440	-	-	-	-	99,094	5,255	-
4a.1.5.13	Core Spray	-	71	10	48	855	-	-	154	1,138	1,138	-	-	5,109	-	-	-	-	207,487	1,026	-
4a.1.5.14	Core Spray - Insulated	-	131	2	11	198	-	-	64	407	407	-	-	1,184	-	-	-	-	48,081	1,806	-
4a.1.5.15	Demin Water - Insulated - RCA	-	15	0	1	14	-	-	6	36	36	-	-	85	-	-	-	-	3,445	181	-
4a.1.5.16	Demin Water - RCA	-	41	1	2	42	-	-	17	104	104	-	-	253	-	-	-	-	10,278	508	-
4a.1.5.17	Diesel Oil - RCA	-	2	0	0	4	-	-	1	7	7	-	-	23	-	-	-	-	931	25	-
4a.1.5.18	Drywell Atmosphere Cooling - RCA	-	38	1	5	92	-	-	24	159	159	-	-	548	-	-	-	-	22,244	550	-
4a.1.5.19	EDG Emerg Service Water - Insul - RCA	-	0	0	0	0	-	-	0	1	1	-	-	2	-	-	-	-	84	4	-
4a.1.5.20	Electrical - Clean	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	182	-
4a.1.5.21	Emergency Service Water - Insul - RCA	-	21	0	1	23	-	-	9	55	55	-	-	137	-	-	-	-	5,544	281	-
4a.1.5.22	Emergency Service Water - RCA	-	2	0	0	2	-	-	1	5	5	-	-	13	-	-	-	-	512	22	-
4a.1.5.23	GEZIP - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
4a.1.5.24	Generator Physical Design - RCA	-	5	0	0	5	-	-	2	12	12	-	-	31	-	-	-	-	1,250	67	-
4a.1.5.25	H2-O2 Control Analyzing	-	6	0	0	4	-	-	2	12	12	-	-	23	-	-	-	-	948	72	-
4a.1.5.26	H2-O2 Control Analyzing - Insulated	-	6	0	0	4	-	-	2	12	12	-	-	23	-	-	-	-	948	72	-
4a.1.5.27	High Pressure Coolant Injection	-	60	3	12	211	-	-	49	334	334	-	-	1,262	-	-	-	-	51,257	850	-

Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4a.1.5.28	High Pressure Coolant Injection - Insula	-	198	4	21	379	-	-	110	713	713	-	-	2,266	-	-	-	-	92,018	2,734	-
4a.1.5.29	Hydrogen Cooling	-	8	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	118	-
4a.1.5.30	Hydrogen Cooling - RCA	-	7	0	0	7	-	-	3	17	17	-	-	39	-	-	-	-	1,600	79	-
4a.1.5.31	Hydrogen Seal Oil - RCA	-	17	0	2	32	-	-	9	60	60	-	-	189	-	-	-	-	7,669	212	-
4a.1.5.32	Hydrogen Water Chemistry - RCA	-	24	0	1	23	-	-	10	59	59	-	-	140	-	-	-	-	5,672	304	-
4a.1.5.33	Instrument & Service Air - RCA	-	225	4	17	296	-	-	103	644	644	-	-	1,768	-	-	-	-	71,810	2,733	-
4a.1.5.34	Main Condenser	-	177	4	18	318	-	-	95	613	613	-	-	1,903	-	-	-	-	77,301	2,443	-
4a.1.5.35	Main Steam	-	225	6	28	498	-	-	136	892	892	-	-	2,975	-	-	-	-	120,806	3,122	-
4a.1.5.36	Main Turbine	-	909	63	298	5,335	-	-	1,079	7,684	7,684	-	-	31,885	-	-	-	-	1,294,866	12,952	-
4a.1.5.37	Main Turbine - Insulated	-	193	7	32	579	-	-	141	952	952	-	-	3,460	-	-	-	-	140,506	2,725	-
4a.1.5.38	Miscellaneous	-	38	1	3	51	-	-	18	110	110	-	-	302	-	-	-	-	12,283	556	-
4a.1.5.39	Off Gas Recombiner	-	169	6	27	479	-	-	119	799	799	-	-	2,861	-	-	-	-	116,194	2,387	-
4a.1.5.40	Off Gas Recombiner - Insulated	-	351	5	22	393	-	-	150	921	921	-	-	2,350	-	-	-	-	95,441	4,785	-
4a.1.5.41	Post Accident Sampling	-	23	0	1	16	-	-	8	48	48	-	-	99	-	-	-	-	4,004	306	-
4a.1.5.42	Post Accident Sampling - Insulated	-	15	0	1	11	-	-	6	33	33	-	-	67	-	-	-	-	2,737	190	-
4a.1.5.43	RHR Service Water - Insulated - RCA	-	83	3	14	248	-	-	60	409	409	-	-	1,485	-	-	-	-	60,293	1,125	-
4a.1.5.44	RHR Service Water - RCA	-	4	0	0	6	-	-	2	12	12	-	-	35	-	-	-	-	1,410	57	-
4a.1.5.45	Reactor Feedwater Pump Seal	-	50	1	3	55	-	-	21	130	130	-	-	327	-	-	-	-	13,295	687	-
4a.1.5.46	Residual Heat Removal	-	226	58	147	2,110	514	-	529	3,584	3,584	-	-	12,609	1,519	-	-	-	609,174	3,282	-
4a.1.5.47	Residual Heat Removal - Insulated	-	500	39	74	851	464	-	384	2,312	2,312	-	-	5,084	1,374	-	-	-	294,206	7,027	-
4a.1.5.48	Rx Core Isolation Cooling	-	43	1	3	61	-	-	21	129	129	-	-	364	-	-	-	-	14,781	609	-
4a.1.5.49	Rx Core Isolation Cooling - Insulated	-	97	1	5	94	-	-	39	237	237	-	-	563	-	-	-	-	22,843	1,315	-
4a.1.5.50	Rx Recirculation	-	53	5	4	16	52	-	30	161	161	-	-	96	152	-	-	-	13,794	691	-
4a.1.5.51	Snubbers	-	151	1	5	84	-	-	51	292	292	-	-	502	-	-	-	-	20,395	2,272	-
4a.1.5.52	Standby Liquid Control - Insul - RCA	-	4	0	0	4	-	-	2	9	9	-	-	22	-	-	-	-	904	48	-
4a.1.5.53	Standby Liquid Control - RCA	-	26	1	2	41	-	-	13	83	83	-	-	245	-	-	-	-	9,969	341	-
4a.1.5.54	Stator Cooling - RCA	-	7	0	1	21	-	-	5	35	35	-	-	126	-	-	-	-	5,135	98	-
4a.1.5.55	Traversing Incore Probe	-	3	0	0	0	2	-	1	7	7	-	-	2	5	-	-	-	379	46	-
4a.1.5	Totals	-	7,490	347	1,370	23,501	1,032	-	5,894	39,634	39,610	-	24	140,459	3,050	-	-	-	5,899,167	104,297	-
4a.1.6	Scaffolding in support of decommissioning	-	2,106	22	12	191	31	-	567	2,929	2,929	-	-	1,030	91	-	-	-	52,111	19,968	-
4a.1	Subtotal Period 4a Activity Costs	211	27,165	12,598	4,132	33,494	39,680	557	40,305	158,142	158,117	-	24	184,963	30,945	1,628	600	1,160	10,452,330	209,462	2,110
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	4	-	7	12	-	28	-	12	63	63	-	-	-	64	-	-	-	3,856	13	-
4a.3.3	Small tool allowance	-	267	-	-	-	-	-	40	307	276	-	31	-	-	-	-	-	-	-	-
4a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,351	353	2,704	-	2,704	-	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	4	267	7	12	-	28	2,351	404	3,073	339	2,704	31	-	64	-	-	-	3,856	13	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	87	-	-	-	-	-	-	22	109	109	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	790	79	869	869	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	3,594	359	3,953	3,293	660	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,872	-	-	-	-	-	468	2,340	2,340	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	2,811	-	-	-	-	-	422	3,232	3,232	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	89	46	-	370	-	108	612	612	-	-	-	4,485	-	-	-	89,703	146	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	1,938	291	2,229	2,229	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	544	54	598	598	-	-	-	-	-	-	-	-	-	-
4a.4.9	Emergency Planning Fees	-	-	-	-	-	-	167	17	183	-	183	-	-	-	-	-	-	-	-	-
4a.4.10	Fixed Overhead	-	-	-	-	-	-	2,380	357	2,737	2,737	-	-	-	-	-	-	-	-	-	-
4a.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	477	72	549	549	-	-	-	-	-	-	-	-	-	-
4a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	126	19	145	-	145	-	-	-	-	-	-	-	-	-
4a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	140	21	162	162	-	-	-	-	-	-	-	-	-	-
4a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,258	189	1,447	1,447	-	-	-	-	-	-	-	-	-	-
4a.4.15	Security Staff Cost	-	-	-	-	-	-	6,666	1,000	7,666	5,734	1,932	-	-	-	-	-	-	-	-	101,051
4a.4.16	DOC Staff Cost	-	-	-	-	-	-	14,604	2,191	16,795	16,795	-	-	-	-	-	-	-	-	-	161,214
4a.4.17	Utility Staff Cost	-	-	-	-	-	-	19,141	2,871	22,012	20,691	1,321	-	-	-	-	-	-	-	-	294,391
4a.4	Subtotal Period 4a Period-Dependent Costs	87	4,683	89	46	-	370	51,826	8,539	65,639	61,399	4,241	-	-	4,485	-	-	-	89,703	146	556,657
4a.0	TOTAL PERIOD 4a COST	302	32,114	12,694	4,190	33,494	40,078	54,734	49,247	226,854	219,855	6,944	55	184,963	35,494	1,628	600	1,160	10,545,890	209,621	558,767
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	591	58	103	149	-	2,572	-	986	4,459	4,459	-	-	-	7,653	-	-	-	486,170	906	-

Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems																					
4b.1.2.1	ALARA/Radiological	-	16	0	0	8	-	-	5	30	30	-	-	49	-	-	-	-	1,987	247	-
4b.1.2.2	Alternate N2 - RCA	-	16	0	1	16	-	-	7	40	40	-	-	93	-	-	-	-	3,765	185	-
4b.1.2.3	Cranes/Heavy Loads/Rigging - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
4b.1.2.4	Decontamination Projects	-	1	0	0	1	-	-	0	2	2	-	-	3	-	-	-	-	125	15	-
4b.1.2.5	Electrical - Contaminated	-	400	5	23	421	-	-	167	1,016	1,016	-	-	2,514	-	-	-	-	102,112	5,633	-
4b.1.2.6	Electrical - Contaminated Fuel Pool	-	42	1	2	42	-	-	17	105	105	-	-	253	-	-	-	-	10,272	592	-
4b.1.2.7	Electrical - Decontam. Fuel Pool Area	-	297	5	23	411	-	-	140	876	876	-	-	2,457	-	-	-	-	99,783	4,090	-
4b.1.2.8	Electrical - Decontaminated	-	2,698	48	218	3,906	-	-	1,298	8,167	8,167	-	-	23,344	-	-	-	-	948,013	37,107	-
4b.1.2.9	Fire - RCA	-	101	1	6	103	-	-	42	253	253	-	-	614	-	-	-	-	24,917	1,324	-
4b.1.2.10	Fire - RCA - Fuel Pool Area	-	11	0	1	10	-	-	4	26	26	-	-	62	-	-	-	-	2,499	143	-
4b.1.2.11	Fuel Pool Cooling & Cleanup	-	387	20	33	343	241	-	216	1,241	1,241	-	-	2,051	712	-	-	-	128,918	5,363	-
4b.1.2.12	Fuel Pool Cooling & Cleanup - Insulated	-	37	2	3	22	24	-	19	107	107	-	-	130	71	-	-	-	9,830	514	-
4b.1.2.13	HVAC Ductwork	-	276	6	26	469	-	-	144	921	921	-	-	2,805	-	-	-	-	113,913	3,539	-
4b.1.2.14	HVAC Ductwork - Fuel Pool Area	-	31	1	3	52	-	-	16	102	102	-	-	312	-	-	-	-	12,657	393	-
4b.1.2.15	HVAC/Chilled Water - RCA	-	324	6	26	461	-	-	155	971	971	-	-	2,752	-	-	-	-	111,779	3,985	-
4b.1.2.16	HVAC/Chilled Water - RCA Fuel Pool Area	-	33	0	2	37	-	-	14	87	87	-	-	223	-	-	-	-	9,072	397	-
4b.1.2.17	Heating & Ventilation	-	433	13	59	1,060	-	-	277	1,842	1,842	-	-	6,334	-	-	-	-	257,243	6,340	-
4b.1.2.18	Heating Boiler - Insulated - RCA	-	3	0	0	4	-	-	1	9	9	-	-	26	-	-	-	-	1,058	35	-
4b.1.2.19	Instrument & Service Air-RCA-Fuel Pool	-	29	1	2	45	-	-	14	91	91	-	-	267	-	-	-	-	10,841	357	-
4b.1.2.20	Liquid Radwaste	-	621	31	57	703	311	-	350	2,072	2,072	-	-	4,203	915	-	-	-	229,422	8,550	-
4b.1.2.21	Makeup Demin - RCA	-	103	3	14	246	-	-	65	431	431	-	-	1,471	-	-	-	-	59,747	1,412	-
4b.1.2.22	Non-Essential Diesel Generator - RCA	-	27	3	13	238	-	-	45	327	327	-	-	1,424	-	-	-	-	57,832	395	-
4b.1.2.23	Off Gas Holdup	-	310	7	34	607	-	-	174	1,133	1,133	-	-	3,629	-	-	-	-	147,355	4,256	-
4b.1.2.24	Primary Containment	-	411	16	77	1,389	-	-	324	2,218	2,218	-	-	8,302	-	-	-	-	337,148	5,729	-
4b.1.2.25	Process Radiation Monitors	-	41	0	2	36	-	-	16	95	95	-	-	213	-	-	-	-	8,667	577	-
4b.1.2.26	Rx Bldg Closed Clng Water - Insul - RCA	-	114	2	9	163	-	-	54	343	343	-	-	977	-	-	-	-	39,675	1,484	-
4b.1.2.27	Rx Bldg Closed Clng Water - RCA	-	184	15	66	1,187	-	-	235	1,687	1,687	-	-	7,093	-	-	-	-	288,031	2,489	-
4b.1.2.28	Rx Component Handling Equip	-	127	11	24	291	139	-	115	708	708	-	-	1,737	415	-	-	-	96,901	1,839	-
4b.1.2.29	Rx Pressure Vessel	-	43	5	5	27	57	-	30	167	167	-	-	161	169	-	-	-	17,375	578	-
4b.1.2.30	Rx Water Cleanup	-	239	16	15	47	214	-	124	655	655	-	-	278	630	-	-	-	51,819	3,264	-
4b.1.2.31	Secondary Containment	-	112	3	13	229	-	-	65	421	421	-	-	1,372	-	-	-	-	55,702	1,569	-
4b.1.2.32	Service & Seal Water - Insulated - RCA	-	120	2	11	197	-	-	62	392	392	-	-	1,180	-	-	-	-	47,917	1,565	-
4b.1.2.33	Service & Seal Water - RCA	-	159	4	17	303	-	-	88	570	570	-	-	1,809	-	-	-	-	73,453	2,016	-
4b.1.2.34	Service Air Blower - RCA	-	15	0	2	34	-	-	9	62	62	-	-	206	-	-	-	-	8,364	206	-
4b.1.2.35	Solid Radwaste	-	446	21	45	567	223	-	261	1,563	1,563	-	-	3,390	659	-	-	-	179,772	6,270	-
4b.1.2.36	Structures & Buildings	-	70	1	4	80	-	-	30	185	185	-	-	477	-	-	-	-	19,351	1,005	-
4b.1.2.37	Wells & Domestic Water	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	144	-
4b.1.2.38	Wells & Domestic Water - RCA	-	52	1	3	57	-	-	22	136	136	-	-	342	-	-	-	-	13,874	633	-
4b.1.2	Totals	-	8,342	249	841	13,829	1,210	-	4,613	29,085	29,073	-	11	82,654	3,571	-	-	-	3,585,374	114,290	-
4b.1.3	Scaffolding in support of decommissioning	-	3,159	33	19	286	46	-	850	4,394	4,394	-	-	1,545	136	-	-	-	78,166	29,953	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor Building	4,668	2,596	178	516	8,044	1,181	-	4,580	21,764	21,764	-	-	48,077	7,014	-	-	-	2,317,670	100,718	-
4b.1.4.2	Admin	96	5	0	3	-	15	-	53	172	172	-	-	-	145	-	-	-	6,840	1,421	-
4b.1.4.3	HPCI Room	26	25	1	3	20	14	-	26	115	115	-	-	118	125	-	-	-	10,759	703	-
4b.1.4.4	Hot Shop	15	4	0	2	-	11	-	11	43	43	-	-	-	103	-	-	-	4,860	254	-
4b.1.4.5	LLRW Storage & Shipping	52	22	2	8	5	45	-	45	179	179	-	-	31	433	-	-	-	21,708	1,003	-
4b.1.4.6	Offgas Stack	336	241	7	23	225	82	-	286	1,199	1,199	-	-	1,343	669	-	-	-	87,045	7,924	-
4b.1.4.7	Offgas Storage & Compressor	36	15	1	6	4	33	-	32	128	128	-	-	25	316	-	-	-	15,948	696	-
4b.1.4.8	Radwaste	109	54	3	17	29	96	-	100	410	410	-	-	172	910	-	-	-	49,943	2,229	-
4b.1.4.9	Radwaste Material Storage Warehouse	57	21	2	9	-	52	-	48	189	189	-	-	-	495	-	-	-	23,400	1,062	-
4b.1.4.10	Recombiner	24	22	1	5	33	24	-	30	140	140	-	-	199	216	-	-	-	18,405	616	-
4b.1.4.11	Turbine	638	314	21	104	215	564	-	588	2,444	2,444	-	-	1,283	5,299	-	-	-	303,150	12,856	-
4b.1.4.12	Turbine Building Addition	53	19	1	8	-	45	-	44	169	169	-	-	-	434	-	-	-	20,478	968	-
4b.1.4.13	Reactor (Post Fuel)	849	2,325	172	913	329	5,301	-	2,535	12,425	12,425	-	-	1,969	50,605	-	-	-	2,471,778	40,860	-
4b.1.4	Totals	6,960	5,663	390	1,617	8,904	7,465	-	8,379	39,378	39,378	-	-	53,216	66,764	-	-	-	5,351,984	171,309	-
4b.1.5	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
4b.1.6	Receive NRC approval of termination plan									a											
4b.1	Subtotal Period 4b Activity Costs	7,551	17,223	776	2,626	23,019	11,293	526	14,907	77,921	77,910	-	11	137,414	78,124	-	-	-	9,501,694	316,457	4,096
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
4b.2.2	Excavation of Underground Services	-	1,972	-	-	-	-	376	550	2,898	2,898	-	-	-	-	-	-	-	-	12,493	-
4b.2.3	Operational Equipment	-	-	23	92	1,211	-	-	198	1,524	1,524	-	-	11,760	-	-	-	-	294,000	32	-

Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
4b.2	Subtotal Period 4b Additional Costs	-	1,972	23	92	1,211	-	1,835	1,185	6,317	6,317	-	-	11,760	-	-	-	-	294,000	12,525	12,480
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	12	-	22	39	-	88	-	36	196	196	-	-	-	202	-	-	-	12,097	39	-
4b.3.3	Small tool allowance	-	397	-	-	-	-	-	60	456	456	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	130	82	1,112	178	-	237	1,739	1,739	-	-	6,000	529	-	-	-	303,608	147	-
4b.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	6,214	932	7,147	-	7,147	-	-	-	-	-	-	-	-	-
4b.3	Subtotal Period 4b Collateral Costs	12	397	152	121	1,112	266	6,214	1,264	9,538	2,392	7,147	-	6,000	731	-	-	-	315,705	186	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,701	-	-	-	-	-	-	425	2,126	2,126	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	1,434	143	1,577	1,577	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	6,289	629	6,917	5,721	1,197	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	3,050	-	-	-	-	-	763	3,813	3,813	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	5,239	-	-	-	-	-	786	6,024	6,024	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	117	60	-	486	-	142	805	805	-	-	-	5,895	-	-	-	117,897	192	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,777	417	3,194	3,194	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	986	99	1,085	1,085	-	-	-	-	-	-	-	-	-	-
4b.4.9	Emergency Planning Fees	-	-	-	-	-	-	302	30	332	-	332	-	-	-	-	-	-	-	-	-
4b.4.10	Fixed Overhead	-	-	-	-	-	-	4,319	648	4,967	4,967	-	-	-	-	-	-	-	-	-	-
4b.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	866	130	996	996	-	-	-	-	-	-	-	-	-	-
4b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	228	34	262	-	262	-	-	-	-	-	-	-	-	-
4b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	255	38	293	293	-	-	-	-	-	-	-	-	-	-
4b.4.14	Remedial Actions Surveys	-	-	-	-	-	-	2,283	343	2,626	2,626	-	-	-	-	-	-	-	-	-	-
4b.4.15	Security Staff Cost	-	-	-	-	-	-	12,097	1,815	13,912	10,406	3,506	-	-	-	-	-	-	-	-	183,371
4b.4.16	DOC Staff Cost	-	-	-	-	-	-	25,916	3,887	29,803	29,803	-	-	-	-	-	-	-	-	-	284,065
4b.4.17	Utility Staff Cost	-	-	-	-	-	-	32,869	4,930	37,799	35,380	2,419	-	-	-	-	-	-	-	-	504,534
4b.4	Subtotal Period 4b Period-Dependent Costs	1,701	8,289	117	60	-	486	90,622	15,259	116,533	108,817	7,716	-	-	5,895	-	-	-	117,897	192	971,970
4b.0	TOTAL PERIOD 4b COST	9,264	27,881	1,067	2,898	25,343	12,044	99,197	32,614	210,310	195,435	14,863	11	155,174	84,750	-	-	-	10,229,300	329,361	988,546
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
4f.2.2	License Termination ISFSI	-	57	188	987	-	5,925	3,118	2,569	12,844	12,844	-	-	-	21,949	-	-	-	2,633,402	10,339	14,785
4f.2	Subtotal Period 4f Additional Costs	-	57	188	987	-	5,925	10,037	4,645	21,839	21,839	-	-	-	21,949	-	-	-	2,633,402	105,387	21,025
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
4f.3.2	Small tool allowance	-	0	-	-	-	-	-	0	1	1	-	-	-	-	-	-	-	-	-	-
4f.3.3	Spent Fuel Capital and Transfer	-	-	-	-	-	-	846	127	972	-	972	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	0	-	-	-	-	2,110	317	2,427	1,454	972	-	-	-	-	-	-	-	-	-
Period 4f Period-Dependent Costs																					
4f.4.1	Insurance	-	-	-	-	-	-	530	53	583	-	583	-	-	-	-	-	-	-	-	-
4f.4.2	Property taxes	-	-	-	-	-	-	2,198	220	2,417	1,975	442	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	766	-	-	-	-	-	192	958	958	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	7	4	-	29	-	9	48	48	-	-	-	355	-	-	-	7,097	12	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	274	41	315	315	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC Fees	-	-	-	-	-	-	426	43	468	468	-	-	-	-	-	-	-	-	-	-
4f.4.7	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
4f.4.8	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
4f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
4f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
4f.4.11	Security Staff Cost	-	-	-	-	-	-	3,463	519	3,982	1,565	2,417	-	-	-	-	-	-	-	-	50,932
4f.4.12	DOC Staff Cost	-	-	-	-	-	-	5,393	809	6,201	6,201	-	-	-	-	-	-	-	-	-	57,200
4f.4.13	Utility Staff Cost	-	-	-	-	-	-	5,762	864	6,626	5,738	888	-	-	-	-	-	-	-	-	80,707
4f.4	Subtotal Period 4f Period-Dependent Costs	-	766	7	4	-	29	19,931	3,027	23,764	19,213	4,550	-	-	355	-	-	-	7,097	12	188,838
4f.0	TOTAL PERIOD 4f COST	-	824	195	991	-	5,954	32,244	8,037	48,245	42,722	5,523	-	-	22,304	-	-	-	2,640,499	105,398	209,863
PERIOD 4 TOTALS		9,566	60,820	13,956	8,079	58,837	58,077	186,175	89,899	485,409	458,013	27,330	66	340,138	142,548	1,628	600	1,160	23,415,680	644,380	1,757,176

Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor Building	-	1,971	-	-	-	-	-	296	2,267	-	-	2,267	-	-	-	-	-	-	13,911	-
5b.1.1.2	Condensate Tanks Foundation	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	50	-
5b.1.1.3	Discharge Retention Basin	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	25	-
5b.1.1.4	HPCI Room	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	97	-
5b.1.1.5	Hot Shop	-	16	-	-	-	-	-	2	19	-	-	19	-	-	-	-	-	-	177	-
5b.1.1.6	Hydrogen & Oxygen Storage	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	19	-
5b.1.1.7	LLRW Storage & Shipping	-	83	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	662	-
5b.1.1.8	MSIV	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	42	-
5b.1.1.9	Misc Structures 2017	-	1,410	-	-	-	-	-	212	1,622	-	-	1,622	-	-	-	-	-	-	13,042	-
5b.1.1.10	Offgas Stack	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	544	-
5b.1.1.11	Offgas Storage & Compressor	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	199	-
5b.1.1.12	Radwaste	-	228	-	-	-	-	-	34	262	-	-	262	-	-	-	-	-	-	1,220	-
5b.1.1.13	Recombiner	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	713	-
5b.1.1.14	Security Barrier	-	186	-	-	-	-	-	28	214	-	-	214	-	-	-	-	-	-	933	-
5b.1.1.15	Structures Greater than 3' Below Grade	-	2,461	-	-	-	-	-	369	2,830	-	-	2,830	-	-	-	-	-	-	12,649	-
5b.1.1.16	Tank Farm	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	21	-
5b.1.1.17	Turbine	-	1,259	-	-	-	-	-	189	1,448	-	-	1,448	-	-	-	-	-	-	13,036	-
5b.1.1.18	Turbine Building Addition	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	618	-
5b.1.1.19	Turbine Pedestal	-	182	-	-	-	-	-	27	209	-	-	209	-	-	-	-	-	-	926	-
5b.1.1	Totals	-	8,169	-	-	-	-	-	1,225	9,394	-	-	9,394	-	-	-	-	-	-	58,885	-
Site Closeout Activities																					
5b.1.2	Grade & landscape site	-	896	-	-	-	-	-	134	1,031	-	-	1,031	-	-	-	-	-	-	1,841	-
5b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	9,065	-	-	-	-	200	1,390	10,655	231	-	10,425	-	-	-	-	-	-	60,726	1,560
Period 5b Additional Costs																					
5b.2.1	Clean Concrete Disposal	-	3,322	-	-	-	-	13	500	3,835	-	-	3,835	-	-	-	-	-	-	12	-
5b.2.2	Intake Structure Cofferdam	-	335	-	-	-	-	-	50	385	-	-	385	-	-	-	-	-	-	2,584	-
5b.2.3	Construction Debris	-	-	-	-	-	-	1,170	176	1,346	-	-	1,346	-	-	-	-	-	-	-	-
5b.2.4	Backfill	-	5,583	-	-	-	-	-	837	6,421	-	-	6,421	-	-	-	-	-	-	5,422	-
5b.2.5	Discharge Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
5b.2.6	Demolition and Site Restoration of ISFSI	-	1,486	-	-	-	-	233	258	1,977	-	-	1,977	-	-	-	-	-	-	6,957	160
5b.2	Subtotal Period 5b Additional Costs	-	11,168	-	-	-	-	1,416	1,888	14,472	-	-	14,472	-	-	-	-	-	-	18,527	160
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	121	-	-	-	-	-	18	139	-	-	139	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	121	-	-	-	-	-	18	139	-	-	139	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	4,770	477	5,247	-	-	5,247	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	5,842	-	-	-	-	-	876	6,719	-	-	6,719	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	315	47	362	-	-	362	-	-	-	-	-	-	-	-
5b.4.5	Emergency Planning Fees	-	-	-	-	-	-	47	5	51	-	51	-	-	-	-	-	-	-	-	-
5b.4.6	Fixed Overhead	-	-	-	-	-	-	1,122	168	1,290	-	-	1,290	-	-	-	-	-	-	-	-
5b.4.7	Railroad Track Maintenance	-	-	-	-	-	-	217	33	249	-	-	249	-	-	-	-	-	-	-	-
5b.4.8	Security Staff Cost	-	-	-	-	-	-	3,131	470	3,601	-	-	3,601	-	-	-	-	-	-	-	43,287
5b.4.9	DOC Staff Cost	-	-	-	-	-	-	11,729	1,759	13,489	-	-	13,489	-	-	-	-	-	-	-	122,646
5b.4.10	Utility Staff Cost	-	-	-	-	-	-	4,931	740	5,671	-	-	5,671	-	-	-	-	-	-	-	70,341
5b.4	Subtotal Period 5b Period-Dependent Costs	-	5,842	-	-	-	-	26,262	4,575	36,679	-	51	36,628	-	-	-	-	-	-	-	236,274
5b.0	TOTAL PERIOD 5b COST	-	26,196	-	-	-	-	27,879	7,870	61,945	231	51	61,663	-	-	-	-	-	-	79,253	237,994
PERIOD 5 TOTALS		-	26,196	-	-	-	-	27,879	7,870	61,945	231	51	61,663	-	-	-	-	-	-	79,253	237,994
TOTAL COST TO DECOMMISSION		21,259	100,298	14,401	8,642	58,852	59,785	1,405,928	272,752	1,941,915	1,250,098	629,040	62,778	340,180	153,222	1,628	600	1,160	23,728,260	876,203	9,952,997

Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
TOTAL COST TO DECOMMISSION WITH 16.34% CONTINGENCY:					**$1,941,915**	**thousands of 2020 dollars**															
TOTAL NRC LICENSE TERMINATION COST IS 64.37% OR:					**$1,250,098**	**thousands of 2020 dollars**															
SPENT FUEL MANAGEMENT COST IS 32.39% OR:					**$629,040**	**thousands of 2020 dollars**															
NON-NUCLEAR DEMOLITION COST IS 3.23% OR:					**$62,778**	**thousands of 2020 dollars**															
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):					**155,449**	**Cubic Feet**															
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:					**1,160**	**Cubic Feet**															
TOTAL SCRAP METAL REMOVED:					**23,123**	**Tons**															
TOTAL CRAFT LABOR REQUIREMENTS:					**876,203**	**Man-hours**															

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX I

DETAILED COST ANALYSIS

SCENARIO 7: SAFSTOR with 100 Year DFS

Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	415	124	539	539	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	193	29	222	222	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.16	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.17	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.18.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	632	95	727	727	-	-	-	-	-	-	-	-	-	4,920
1a.1.18.2	Plant systems	-	-	-	-	-	-	536	80	616	616	-	-	-	-	-	-	-	-	-	4,167
1a.1.18.3	Plant structures and buildings	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
1a.1.18.4	Waste management	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.18.5	Facility and site dormancy	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.18	Total	-	-	-	-	-	-	2,083	312	2,395	2,395	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.19.1	Plant systems	-	-	-	-	-	-	152	23	175	175	-	-	-	-	-	-	-	-	-	1,183
1a.1.19.2	Facility closeout & dormancy	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1a.1.19	Total	-	-	-	-	-	-	306	46	352	352	-	-	-	-	-	-	-	-	-	2,383
1a.1.20	Procure vacuum drying system	-	-	-	-	-	-	13	2	15	15	-	-	-	-	-	-	-	-	-	100
1a.1.21	Drain/de-energize non-cont. systems									a											
1a.1.22	Drain & dry NSSS									a											
1a.1.23	Drain/de-energize contaminated systems									a											
1a.1.24	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	6,120	980	7,100	7,100	-	-	-	-	-	-	-	-	-	44,390
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,323	198	1,522	-	1,522	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	9,892	1,484	11,376	11,376	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	11,215	1,682	12,897	11,376	1,522	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,328	233	2,561	2,561	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,570	357	3,927	3,927	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	6	-	50	-	15	83	83	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	892	89	981	981	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,428	343	3,770	-	3,770	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	845	127	971	-	971	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	16,372	2,456	18,827	18,827	-	-	-	-	-	-	-	-	-	245,440
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	27,285	4,093	31,378	31,378	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	6	-	50	59,389	8,679	69,502	64,632	4,870	-	-	610	-	-	-	12,190	20	667,680
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	6	-	50	76,724	11,341	89,500	83,108	6,392	-	-	610	-	-	-	12,190	20	712,070

Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor Building	5,155	-	-	-	-	-	-	2,577	7,732	7,732	-	-	-	-	-	-	-	-	70,157	-
1b.1.1.2	Admin	95	-	-	-	-	-	-	48	143	143	-	-	-	-	-	-	-	-	1,357	-
1b.1.1.3	HPCI Room	25	-	-	-	-	-	-	13	38	38	-	-	-	-	-	-	-	-	350	-
1b.1.1.4	Hot Shop	15	-	-	-	-	-	-	7	22	22	-	-	-	-	-	-	-	-	208	-
1b.1.1.5	LLRW Storage & Shipping	49	-	-	-	-	-	-	25	74	74	-	-	-	-	-	-	-	-	705	-
1b.1.1.6	Offgas Stack	326	-	-	-	-	-	-	163	489	489	-	-	-	-	-	-	-	-	4,575	-
1b.1.1.7	Offgas Storage & Compressor	34	-	-	-	-	-	-	17	51	51	-	-	-	-	-	-	-	-	488	-
1b.1.1.8	Radwaste	103	-	-	-	-	-	-	51	154	154	-	-	-	-	-	-	-	-	1,473	-
1b.1.1.9	Radwaste Material Storage Warehouse	54	-	-	-	-	-	-	27	81	81	-	-	-	-	-	-	-	-	768	-
1b.1.1.10	Recombiner	23	-	-	-	-	-	-	11	34	34	-	-	-	-	-	-	-	-	323	-
1b.1.1.11	Turbine	600	-	-	-	-	-	-	300	900	900	-	-	-	-	-	-	-	-	8,583	-
1b.1.1.12	Turbine Building Addition	50	-	-	-	-	-	-	25	74	74	-	-	-	-	-	-	-	-	709	-
1b.1.1.13	Reactor (Post Fuel)	830	-	-	-	-	-	-	415	1,245	1,245	-	-	-	-	-	-	-	-	11,337	-
1b.1.1	Totals	7,359	-	-	-	-	-	-	3,679	11,038	11,038	-	-	-	-	-	-	-	-	101,033	-
1b.1	Subtotal Period 1b Activity Costs	7,359	-	-	-	-	-	-	3,679	11,038	11,038	-	-	-	-	-	-	-	-	101,033	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	220	-	145	258	-	588	-	310	1,522	1,522	-	-	-	1,351	-	-	-	81,042	263	-
1b.3.4	Small tool allowance	-	126	-	-	-	-	-	19	145	145	-	-	-	-	-	-	-	-	-	-
1b.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	196	29	225	-	225	-	-	-	-	-	-	-	-	-
1b.3.6	Retention and Severance	-	-	-	-	-	-	3,601	540	4,141	4,141	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,274	126	145	258	-	588	3,796	1,057	7,246	7,021	225	-	-	1,351	-	-	-	81,042	263	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,562	-	-	-	-	-	-	391	1,953	1,953	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	580	58	638	638	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	890	89	979	979	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	729	-	-	-	-	-	182	911	911	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	11	6	-	46	-	13	76	76	-	-	-	555	-	-	-	11,092	18	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	453	68	521	521	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	708	71	779	-	779	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	652	98	750	750	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	4,082	612	4,694	4,694	-	-	-	-	-	-	-	-	-	61,192
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	6,803	1,020	7,823	7,823	-	-	-	-	-	-	-	-	-	105,271
1b.4	Subtotal Period 1b Period-Dependent Costs	1,562	917	11	6	-	46	14,599	2,687	19,828	18,775	1,053	-	-	555	-	-	-	11,092	18	166,463
1b.0	TOTAL PERIOD 1b COST	10,195	1,043	156	264	-	634	31,070	9,325	52,688	51,410	1,278	-	-	1,905	-	-	-	92,135	101,314	166,463
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	527	-	-	-	-	-	79	606	606	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	54	-	-	-	-	-	8	62	62	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	12,801	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	75	11	86	86	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	581	-	-	-	-	808	318	1,707	1,707	-	-	-	-	-	-	-	-	16,501	583
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	161	-	107	190	-	433	-	228	1,120	1,120	-	-	-	994	-	-	-	59,653	194	-

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Monticello Nuclear Generating Plant
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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1c Collateral Costs (continued)																					
1c.3.3	Small tool allowance	-	5	-	-	-	-	-	1	6	6	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,539	381	2,920	-	2,920	-	-	-	-	-	-	-	-	-
1c.3.5	Retention and Severance	-	-	-	-	-	-	2,734	410	3,145	3,145	-	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	161	5	107	190	-	433	5,273	1,020	7,190	4,270	2,920	-	-	994	-	-	-	59,653	194	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	580	58	638	638	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	888	89	977	977	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	248	-	-	-	-	-	62	310	310	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	2	-	13	-	4	21	21	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	453	68	521	521	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	708	71	779	-	779	-	-	-	-	-	-	-	-	-
1c.4.9	Fixed Overhead	-	-	-	-	-	-	652	98	750	750	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
1c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1c.4.13	Security Staff Cost	-	-	-	-	-	-	4,082	612	4,694	4,694	-	-	-	-	-	-	-	-	-	61,192
1c.4.14	Utility Staff Cost	-	-	-	-	-	-	6,803	1,020	7,823	7,823	-	-	-	-	-	-	-	-	-	105,271
1c.4	Subtotal Period 1c Period-Dependent Costs	-	436	3	2	-	13	14,597	2,166	17,216	16,163	1,053	-	-	152	-	-	-	3,039	5	166,463
1c.0	TOTAL PERIOD 1c COST	161	1,021	110	192	-	446	20,678	3,505	26,113	22,140	3,973	-	-	1,146	-	-	-	62,692	16,700	167,046
PERIOD 1 TOTALS		10,357	3,431	278	462	-	1,130	128,472	24,170	168,301	156,658	11,643	-	-	3,661	-	-	-	167,017	118,034	1,045,579
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	155	23	178	178	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	349	87	437	437	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	504	111	615	615	-	-	-	-	-	-	-	-	-	-
Period 2a Additional Costs																					
2a.2.1	Security Modifications	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	141,374	21,206	162,580	-	162,580	-	-	-	-	-	-	-	-	-
2a.3.2	Retention and Severance	-	-	-	-	-	-	19,427	2,914	22,341	22,341	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	160,801	24,120	184,921	22,341	162,580	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,761	176	1,937	1,937	-	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	8,932	893	9,825	9,825	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	617	-	-	-	-	-	154	771	771	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	11	6	-	47	-	14	79	79	-	-	-	576	-	-	-	11,523	19	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	910	136	1,046	1,046	-	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	610	61	671	671	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	7,110	711	7,821	-	7,821	-	-	-	-	-	-	-	-	-
2a.4.8	Fixed Overhead	-	-	-	-	-	-	5,306	796	6,102	6,102	-	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	2,115	317	2,432	-	2,432	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	280	42	322	-	322	-	-	-	-	-	-	-	-	-
2a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	639	96	735	735	-	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	37,806	5,671	43,477	31,086	12,391	-	-	-	-	-	-	-	-	562,523
2a.4.13	Utility Staff Cost	-	-	-	-	-	-	13,543	2,031	15,574	12,615	2,959	-	-	-	-	-	-	-	-	205,738
2a.4	Subtotal Period 2a Period-Dependent Costs	-	617	11	6	-	47	79,012	11,099	90,793	64,868	25,925	-	-	576	-	-	-	11,523	19	768,261
2a.0	TOTAL PERIOD 2a COST	-	617	11	6	-	47	249,013	36,634	286,328	97,823	188,505	-	-	576	-	-	-	11,523	19	768,261

Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	3,127	469	3,596	3,596	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	7,065	1,766	8,831	8,831	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	10,192	2,235	12,427	12,427	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	366,775	55,016	421,791	-	421,791	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	366,775	55,016	421,791	-	421,791	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	35,606	3,561	39,167	39,167	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	180,613	18,061	198,674	198,674	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	6,047	-	-	-	-	-	1,512	7,559	7,559	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	111	57	-	461	-	135	764	764	-	-	-	5,595	-	-	-	111,903	182	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	9,196	1,379	10,576	10,576	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	11,515	1,152	12,667	12,667	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	7,506	751	8,256	-	8,256	-	-	-	-	-	-	-	-	-
2b.4.8	Fixed Overhead	-	-	-	-	-	-	10,904	1,636	12,540	12,540	-	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	5,666	850	6,516	-	6,516	-	-	-	-	-	-	-	-	-
2b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	6,330	950	7,280	7,280	-	-	-	-	-	-	-	-	-	-
2b.4.11	Security Staff Cost	-	-	-	-	-	-	280,802	42,120	322,922	72,658	250,265	-	-	-	-	-	-	-	-	3,790,775
2b.4.12	Utility Staff Cost	-	-	-	-	-	-	114,547	17,182	131,729	71,924	59,805	-	-	-	-	-	-	-	-	1,684,789
2b.4	Subtotal Period 2b Period-Dependent Costs	-	6,047	111	57	-	461	662,686	89,288	758,650	433,808	324,843	-	-	5,595	-	-	-	111,903	182	5,475,563
2b.0	TOTAL PERIOD 2b COST	-	6,047	111	57	-	461	1,039,652	146,539	1,192,868	446,234	746,634	-	-	5,595	-	-	-	111,903	182	5,475,563
PERIOD 2 TOTALS		-	6,664	122	63	-	509	1,288,665	183,173	1,479,196	544,057	935,139	-	-	6,171	-	-	-	123,426	201	6,243,824
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
3a.1.9.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	947	142	1,089	980	-	109	-	-	-	-	-	-	-	7,370
3a.1.9.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
3a.1.9.3	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
3a.1.9.4	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
3a.1.9.5	Sacrificial shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
3a.1.9.6	Moisture separators/reheaters	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3a.1.9.7	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
3a.1.9.8	Main Turbine	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
3a.1.9.9	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
3a.1.9.10	Pressure suppression structure	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
3a.1.9.11	Drywell	-	-	-	-	-	-	206	31	236	236	-	-	-	-	-	-	-	-	-	1,600
3a.1.9.12	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
3a.1.9.13	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.9.14	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
3a.1.9	Total	-	-	-	-	-	-	5,736	860	6,597	6,011	-	586	-	-	-	-	-	-	-	44,633
Planning & Site Preparations																					
3a.1.10	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
3a.1.11	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
3a.1.12	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
3a.1.13	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
3a.1.14	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230

Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	15,341	2,301	17,643	17,057	-	586	-	-	-	-	-	-	-	73,463
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	5,930	1,779	7,708	7,708	-	-	-	-	-	-	-	-	30,500	10,852
3a.2.2	Mixed & RCRA Waste	-	-	28	29	14	-	-	9	80	80	-	-	43	-	-	-	-	5,253	161	-
3a.2	Subtotal Period 3a Additional Costs	-	-	28	29	14	-	5,930	1,788	7,788	7,788	-	-	43	-	-	-	-	5,253	30,661	10,852
Period 3a Collateral Costs																					
3a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	5,693	854	6,547	-	6,547	-	-	-	-	-	-	-	-	-
3a.3	Subtotal Period 3a Collateral Costs	-	-	-	-	-	-	5,693	854	6,547	-	6,547	-	-	-	-	-	-	-	-	-
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	703	70	774	442	332	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	3,479	348	3,827	3,241	586	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	538	-	-	-	-	-	135	673	673	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	5	-	42	-	12	70	70	-	-	-	516	-	-	-	10,311	17	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC ISFSI Fees	-	-	-	-	-	-	51	5	56	-	56	-	-	-	-	-	-	-	-	-
3a.4.8	NRC Fees	-	-	-	-	-	-	335	33	368	368	-	-	-	-	-	-	-	-	-	-
3a.4.9	Emergency Planning Fees	-	-	-	-	-	-	148	15	163	-	163	-	-	-	-	-	-	-	-	-
3a.4.10	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
3a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
3a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
3a.4.13	Security Staff Cost	-	-	-	-	-	-	4,690	703	5,393	5,107	286	-	-	-	-	-	-	-	-	69,160
3a.4.14	Utility Staff Cost	-	-	-	-	-	-	16,817	2,523	19,339	18,160	1,180	-	-	-	-	-	-	-	-	260,000
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,291	10	5	-	42	30,893	4,658	36,900	34,169	2,731	-	-	516	-	-	-	10,311	17	329,160
3a.0	TOTAL PERIOD 3a COST	-	1,291	38	34	14	42	57,857	9,601	68,878	59,014	9,278	586	43	516	-	-	-	15,565	30,678	413,475
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	514	77	591	591	-	-	-	-	-	-	-	-	-	4,000
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD housings & NIs	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Removal primary containment	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
3b.1.1.9	Sacrificial shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.10	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
3b.1.1.11	Main Turbine	-	-	-	-	-	-	267	40	307	307	-	-	-	-	-	-	-	-	-	2,080
3b.1.1.12	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
3b.1.1.13	Moisture separators & reheaters	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.14	Radwaste building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1.15	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	4,208	631	4,839	4,376	-	463	-	-	-	-	-	-	-	32,741
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	4,208	631	4,839	4,376	-	463	-	-	-	-	-	-	-	32,741
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
3b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,839	426	3,265	-	3,265	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	1,055	1,200	-	-	-	-	4,103	954	7,311	4,047	3,265	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	39	-	-	-	-	-	-	10	48	48	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	351	35	386	386	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	1,614	161	1,776	1,483	293	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	295	-	-	-	-	-	74	369	369	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	6	3	-	24	-	7	40	40	-	-	-	291	-	-	-	5,814	9	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	906	136	1,042	1,042	-	-	-	-	-	-	-	-	-	-

Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3b Period-Dependent Costs (continued)																					
3b.4.8	NRC ISFSI Fees	-	-	-	-	-	-	25	3	28	-	28	-	-	-	-	-	-	-	-	-
3b.4.9	NRC Fees	-	-	-	-	-	-	167	17	183	183	-	-	-	-	-	-	-	-	-	-
3b.4.10	Emergency Planning Fees	-	-	-	-	-	-	74	7	81	-	81	-	-	-	-	-	-	-	-	-
3b.4.11	Fixed Overhead	-	-	-	-	-	-	1,305	196	1,500	1,500	-	-	-	-	-	-	-	-	-	-
3b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
3b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	62	9	72	72	-	-	-	-	-	-	-	-	-	-
3b.4.14	Security Staff Cost	-	-	-	-	-	-	2,338	351	2,689	2,547	143	-	-	-	-	-	-	-	-	34,485
3b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,344	802	6,146	6,146	-	-	-	-	-	-	-	-	-	58,080
3b.4.16	Utility Staff Cost	-	-	-	-	-	-	8,385	1,258	9,643	9,055	588	-	-	-	-	-	-	-	-	129,644
3b.4	Subtotal Period 3b Period-Dependent Costs	39	671	6	3	-	24	20,628	3,129	24,499	23,302	1,197	-	-	291	-	-	-	5,814	9	222,210
3b.0	TOTAL PERIOD 3b COST	1,093	1,871	6	3	-	24	28,938	4,714	36,649	31,725	4,462	463	-	291	-	-	-	5,814	9	254,951
PERIOD 3 TOTALS		1,093	3,162	44	37	14	66	86,795	14,316	105,528	90,739	13,740	1,049	43	806	-	-	-	21,379	30,688	668,425
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Recirculation System Piping & Valves	23	85	27	32	185	264	-	134	750	750	-	-	676	715	-	-	-	94,867	1,594	-
4a.1.1.2	Recirculation Pumps & Motors	8	56	16	37	252	270	-	131	771	771	-	-	568	473	-	-	-	112,200	1,049	-
4a.1.1.3	CRDMs & NIs Removal	41	801	415	98	-	1,130	-	560	3,045	3,045	-	-	-	3,741	-	-	-	213,700	12,506	-
4a.1.1.4	Reactor Vessel Internals	139	6,098	11,330	1,029	-	25,657	278	20,603	65,135	65,135	-	-	-	2,943	1,628	600	-	337,343	22,415	1,055
4a.1.1.5	Reactor Vessel	-	8,498	1,818	837	-	6,301	278	10,229	27,961	27,961	-	-	-	17,823	-	-	-	1,110,260	22,415	1,055
4a.1.1	Totals	211	15,538	13,605	2,034	438	33,622	557	31,657	97,662	97,662	-	-	1,244	25,695	1,628	600	-	1,868,371	59,979	2,110
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	340	1,356	521	6,139	439	-	1,330	10,126	10,126	-	-	24,835	1,383	-	-	-	1,577,959	4,796	-
4a.1.3	Main Condensers	-	1,207	360	194	3,225	244	-	912	6,142	6,142	-	-	17,396	727	-	-	-	828,955	16,823	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor Building	-	332	-	-	-	-	-	50	381	381	-	-	-	-	-	-	-	-	2,217	-
4a.1.4.2	Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	127	-
4a.1.4.3	Turbine	-	127	-	-	-	-	-	19	146	146	-	-	-	-	-	-	-	-	1,254	-
4a.1.4	Totals	-	483	-	-	-	-	-	72	556	556	-	-	-	-	-	-	-	-	3,598	-
Disposal of Plant Systems																					
4a.1.5.1	Automatic Press Relief	-	106	2	10	182	-	-	56	356	356	-	-	1,088	-	-	-	-	44,184	1,468	-
4a.1.5.2	Chemistry Sampling	-	24	0	2	35	-	-	12	73	73	-	-	207	-	-	-	-	8,422	356	-
4a.1.5.3	Chemistry Sampling - Insulated	-	2	0	0	0	-	-	0	2	2	-	-	1	-	-	-	-	61	25	-
4a.1.5.4	Circulating Water - RCA	-	207	14	62	1,114	-	-	230	1,626	1,626	-	-	6,656	-	-	-	-	270,307	2,860	-
4a.1.5.5	Combustible Gas Control - Insul - RCA	-	29	0	2	36	-	-	13	80	80	-	-	212	-	-	-	-	8,617	378	-
4a.1.5.6	Combustible Gas Control - RCA	-	18	1	3	48	-	-	12	81	81	-	-	285	-	-	-	-	11,577	245	-
4a.1.5.7	Condensate & Feedwater	-	888	60	281	5,046	-	-	1,027	7,303	7,303	-	-	30,157	-	-	-	-	1,224,704	12,501	-
4a.1.5.8	Condensate & Feedwater - Insulated	-	444	12	55	980	-	-	267	1,757	1,757	-	-	5,855	-	-	-	-	237,764	6,185	-
4a.1.5.9	Condensate Demin	-	494	9	44	792	-	-	250	1,590	1,590	-	-	4,735	-	-	-	-	192,293	6,784	-
4a.1.5.10	Condensate Storage	-	657	16	77	1,378	-	-	384	2,512	2,512	-	-	8,237	-	-	-	-	334,489	9,265	-
4a.1.5.11	Control Rod Drive	-	3	0	0	4	-	-	1	8	8	-	-	24	-	-	-	-	976	36	-
4a.1.5.12	Control Rod Drive Hydraulic	-	374	5	23	408	-	-	159	968	968	-	-	2,440	-	-	-	-	99,094	5,255	-
4a.1.5.13	Core Spray	-	71	10	48	855	-	-	154	1,138	1,138	-	-	5,109	-	-	-	-	207,487	1,026	-
4a.1.5.14	Core Spray - Insulated	-	131	2	11	198	-	-	64	407	407	-	-	1,184	-	-	-	-	48,081	1,806	-
4a.1.5.15	Demin Water - Insulated - RCA	-	15	0	1	14	-	-	6	36	36	-	-	85	-	-	-	-	3,445	181	-
4a.1.5.16	Demin Water - RCA	-	41	1	2	42	-	-	17	104	104	-	-	253	-	-	-	-	10,278	508	-
4a.1.5.17	Diesel Oil - RCA	-	2	0	0	4	-	-	1	7	7	-	-	23	-	-	-	-	931	25	-
4a.1.5.18	Drywell Atmosphere Cooling - RCA	-	38	1	5	92	-	-	24	159	159	-	-	548	-	-	-	-	22,244	550	-
4a.1.5.19	EDG Emerg Service Water - Insul - RCA	-	0	0	0	0	-	-	0	1	1	-	-	2	-	-	-	-	84	4	-
4a.1.5.20	Electrical - Clean	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	182	-
4a.1.5.21	Emergency Service Water - Insul - RCA	-	21	0	1	23	-	-	9	55	55	-	-	137	-	-	-	-	5,544	281	-
4a.1.5.22	Emergency Service Water - RCA	-	2	0	0	2	-	-	1	5	5	-	-	13	-	-	-	-	512	22	-
4a.1.5.23	GEZIP - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
4a.1.5.24	Generator Physical Design - RCA	-	5	0	0	5	-	-	2	12	12	-	-	31	-	-	-	-	1,250	67	-
4a.1.5.25	H2-O2 Control Analyzing	-	6	0	0	4	-	-	2	12	12	-	-	23	-	-	-	-	948	72	-
4a.1.5.26	H2-O2 Control Analyzing - Insulated	-	6	0	0	4	-	-	2	12	12	-	-	23	-	-	-	-	948	72	-
4a.1.5.27	High Pressure Coolant Injection	-	60	3	12	211	-	-	49	334	334	-	-	1,262	-	-	-	-	51,257	850	-
4a.1.5.28	High Pressure Coolant Injection - Insula	-	198	4	21	379	-	-	110	713	713	-	-	2,266	-	-	-	-	92,018	2,734	-
4a.1.5.29	Hydrogen Cooling	-	8	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	118	-

Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4a.1.5.30	Hydrogen Cooling - RCA	-	7	0	0	7	-	-	3	17	17	-	-	39	-	-	-	-	1,600	79	-
4a.1.5.31	Hydrogen Seal Oil - RCA	-	17	0	2	32	-	-	9	60	60	-	-	189	-	-	-	-	7,669	212	-
4a.1.5.32	Hydrogen Water Chemistry - RCA	-	24	0	1	23	-	-	10	59	59	-	-	140	-	-	-	-	5,672	304	-
4a.1.5.33	Instrument & Service Air - RCA	-	225	4	17	296	-	-	103	644	644	-	-	1,768	-	-	-	-	71,810	2,733	-
4a.1.5.34	Main Condenser	-	177	4	18	318	-	-	95	613	613	-	-	1,903	-	-	-	-	77,301	2,443	-
4a.1.5.35	Main Steam	-	225	6	28	498	-	-	136	892	892	-	-	2,975	-	-	-	-	120,806	3,122	-
4a.1.5.36	Main Turbine	-	909	63	298	5,335	-	-	1,079	7,684	7,684	-	-	31,885	-	-	-	-	1,294,866	12,952	-
4a.1.5.37	Main Turbine - Insulated	-	193	7	32	579	-	-	141	952	952	-	-	3,460	-	-	-	-	140,506	2,725	-
4a.1.5.38	Miscellaneous	-	38	1	3	51	-	-	18	110	110	-	-	302	-	-	-	-	12,283	556	-
4a.1.5.39	Off Gas Recombiner	-	169	6	27	479	-	-	119	799	799	-	-	2,861	-	-	-	-	116,194	2,387	-
4a.1.5.40	Off Gas Recombiner - Insulated	-	351	5	22	393	-	-	150	921	921	-	-	2,350	-	-	-	-	95,441	4,785	-
4a.1.5.41	Post Accident Sampling	-	23	0	1	16	-	-	8	48	48	-	-	99	-	-	-	-	4,004	306	-
4a.1.5.42	Post Accident Sampling - Insulated	-	15	0	1	11	-	-	6	33	33	-	-	67	-	-	-	-	2,737	190	-
4a.1.5.43	RHR Service Water - Insulated - RCA	-	83	3	14	248	-	-	60	409	409	-	-	1,485	-	-	-	-	60,293	1,125	-
4a.1.5.44	RHR Service Water - RCA	-	4	0	0	6	-	-	2	12	12	-	-	35	-	-	-	-	1,410	57	-
4a.1.5.45	Reactor Feedwater Pump Seal	-	50	1	3	55	-	-	21	130	130	-	-	327	-	-	-	-	13,295	687	-
4a.1.5.46	Residual Heat Removal	-	226	58	147	2,110	514	-	529	3,584	3,584	-	-	12,609	1,519	-	-	-	609,174	3,282	-
4a.1.5.47	Residual Heat Removal - Insulated	-	500	39	74	851	464	-	384	2,312	2,312	-	-	5,084	1,374	-	-	-	294,206	7,027	-
4a.1.5.48	Rx Core Isolation Cooling	-	43	1	3	61	-	-	21	129	129	-	-	364	-	-	-	-	14,781	609	-
4a.1.5.49	Rx Core Isolation Cooling - Insulated	-	97	1	5	94	-	-	39	237	237	-	-	563	-	-	-	-	22,843	1,315	-
4a.1.5.50	Rx Recirculation	-	53	5	4	16	52	-	30	161	161	-	-	96	152	-	-	-	13,794	691	-
4a.1.5.51	Snubbers	-	151	1	5	84	-	-	51	292	292	-	-	502	-	-	-	-	20,395	2,272	-
4a.1.5.52	Standby Liquid Control - Insul - RCA	-	4	0	0	4	-	-	2	9	9	-	-	22	-	-	-	-	904	48	-
4a.1.5.53	Standby Liquid Control - RCA	-	26	1	2	41	-	-	13	83	83	-	-	245	-	-	-	-	9,969	341	-
4a.1.5.54	Stator Cooling - RCA	-	7	0	1	21	-	-	5	35	35	-	-	126	-	-	-	-	5,135	98	-
4a.1.5.55	Traversing Incore Probe	-	3	0	0	0	2	-	1	7	7	-	-	2	5	-	-	-	379	46	-
4a.1.5	Totals	-	7,490	347	1,370	23,501	1,032	-	5,894	39,634	39,610	-	24	140,459	3,050	-	-	-	5,899,167	104,297	-
4a.1.6	Scaffolding in support of decommissioning	-	2,106	22	12	191	31	-	567	2,929	2,929	-	-	1,030	91	-	-	-	52,111	19,968	-
4a.1	Subtotal Period 4a Activity Costs	211	27,165	15,691	4,132	33,494	35,367	557	40,431	157,048	157,024	-	24	184,963	30,945	1,628	600	-	10,226,560	209,462	2,110
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	4	-	7	12	-	28	-	12	63	63	-	-	-	64	-	-	-	3,856	13	-
4a.3.3	Small tool allowance	-	267	-	-	-	-	-	40	307	276	-	31	-	-	-	-	-	-	-	-
4a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	6,395	959	7,355	-	7,355	-	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	4	267	7	12	-	28	6,395	1,011	7,724	339	7,355	31	-	64	-	-	-	3,856	13	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	87	-	-	-	-	-	-	22	109	109	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	790	79	869	869	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	3,594	359	3,953	3,293	660	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,872	-	-	-	-	-	468	2,340	2,340	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	2,811	-	-	-	-	-	422	3,232	3,232	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	89	46	-	370	-	108	612	612	-	-	-	4,485	-	-	-	89,703	146	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	1,938	291	2,229	2,229	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC ISFSI Fees	-	-	-	-	-	-	57	6	63	-	63	-	-	-	-	-	-	-	-	-
4a.4.9	NRC Fees	-	-	-	-	-	-	544	54	598	598	-	-	-	-	-	-	-	-	-	-
4a.4.10	Emergency Planning Fees	-	-	-	-	-	-	167	17	183	-	183	-	-	-	-	-	-	-	-	-
4a.4.11	Fixed Overhead	-	-	-	-	-	-	2,380	357	2,737	2,737	-	-	-	-	-	-	-	-	-	-
4a.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	477	72	549	549	-	-	-	-	-	-	-	-	-	-
4a.4.13	ISFSI Operating Costs	-	-	-	-	-	-	126	19	145	-	145	-	-	-	-	-	-	-	-	-
4a.4.14	Railroad Track Maintenance	-	-	-	-	-	-	140	21	162	162	-	-	-	-	-	-	-	-	-	-
4a.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,258	189	1,447	1,447	-	-	-	-	-	-	-	-	-	-
4a.4.16	Security Staff Cost	-	-	-	-	-	-	6,666	1,000	7,666	5,734	1,932	-	-	-	-	-	-	-	-	101,051
4a.4.17	DOC Staff Cost	-	-	-	-	-	-	14,604	2,191	16,795	16,795	-	-	-	-	-	-	-	-	-	161,214
4a.4.18	Utility Staff Cost	-	-	-	-	-	-	19,141	2,871	22,012	20,691	1,321	-	-	-	-	-	-	-	-	294,391
4a.4	Subtotal Period 4a Period-Dependent Costs	87	4,683	89	46	-	370	51,884	8,545	65,702	61,399	4,304	-	-	4,485	-	-	-	89,703	146	556,657
4a.0	TOTAL PERIOD 4a COST	302	32,114	15,787	4,190	33,494	35,765	58,836	49,986	230,475	218,761	11,658	55	184,963	35,494	1,628	600	-	10,320,120	209,621	558,767
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	591	58	103	149	-	2,572	-	986	4,459	4,459	-	-	-	7,653	-	-	-	486,170	906	-

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Monticello Nuclear Generating Plant
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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems																					
4b.1.2.1	ALARA/Radiological	-	16	0	0	8	-	-	5	30	30	-	-	49	-	-	-	-	1,987	247	-
4b.1.2.2	Alternate N2 - RCA	-	16	0	1	16	-	-	7	40	40	-	-	93	-	-	-	-	3,765	185	-
4b.1.2.3	Cranes/Heavy Loads/Rigging - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
4b.1.2.4	Decontamination Projects	-	1	0	0	1	-	-	0	2	2	-	-	3	-	-	-	-	125	15	-
4b.1.2.5	Electrical - Contaminated	-	400	5	23	421	-	-	167	1,016	1,016	-	-	2,514	-	-	-	-	102,112	5,633	-
4b.1.2.6	Electrical - Contaminated Fuel Pool	-	42	1	2	42	-	-	17	105	105	-	-	253	-	-	-	-	10,272	592	-
4b.1.2.7	Electrical - Decontam. Fuel Pool Area	-	297	5	23	411	-	-	140	876	876	-	-	2,457	-	-	-	-	99,783	4,090	-
4b.1.2.8	Electrical - Decontaminated	-	2,698	48	218	3,906	-	-	1,298	8,167	8,167	-	-	23,344	-	-	-	-	948,013	37,107	-
4b.1.2.9	Fire - RCA	-	101	1	6	103	-	-	42	253	253	-	-	614	-	-	-	-	24,917	1,324	-
4b.1.2.10	Fire - RCA - Fuel Pool Area	-	11	0	1	10	-	-	4	26	26	-	-	62	-	-	-	-	2,499	143	-
4b.1.2.11	Fuel Pool Cooling & Cleanup	-	387	20	33	343	241	-	216	1,241	1,241	-	-	2,051	712	-	-	-	128,918	5,363	-
4b.1.2.12	Fuel Pool Cooling & Cleanup - Insulated	-	37	2	3	22	24	-	19	107	107	-	-	130	71	-	-	-	9,830	514	-
4b.1.2.13	HVAC Ductwork	-	276	6	26	469	-	-	144	921	921	-	-	2,805	-	-	-	-	113,913	3,539	-
4b.1.2.14	HVAC Ductwork - Fuel Pool Area	-	31	1	3	52	-	-	16	102	102	-	-	312	-	-	-	-	12,657	393	-
4b.1.2.15	HVAC/Chilled Water - RCA	-	324	6	26	461	-	-	155	971	971	-	-	2,752	-	-	-	-	111,779	3,985	-
4b.1.2.16	HVAC/Chilled Water - RCA Fuel Pool Area	-	33	0	2	37	-	-	14	87	87	-	-	223	-	-	-	-	9,072	397	-
4b.1.2.17	Heating & Ventilation	-	433	13	59	1,060	-	-	277	1,842	1,842	-	-	6,334	-	-	-	-	257,243	6,340	-
4b.1.2.18	Heating Boiler - Insulated - RCA	-	3	0	0	4	-	-	1	9	9	-	-	26	-	-	-	-	1,058	35	-
4b.1.2.19	Instrument & Service Air-RCA-Fuel Pool	-	29	1	2	45	-	-	14	91	91	-	-	267	-	-	-	-	10,841	357	-
4b.1.2.20	Liquid Radwaste	-	621	31	57	703	311	-	350	2,072	2,072	-	-	4,203	915	-	-	-	229,422	8,550	-
4b.1.2.21	Makeup Demin - RCA	-	103	3	14	246	-	-	65	431	431	-	-	1,471	-	-	-	-	59,747	1,412	-
4b.1.2.22	Non-Essential Diesel Generator - RCA	-	27	3	13	238	-	-	45	327	327	-	-	1,424	-	-	-	-	57,832	395	-
4b.1.2.23	Off Gas Holdup	-	310	7	34	607	-	-	174	1,133	1,133	-	-	3,629	-	-	-	-	147,355	4,256	-
4b.1.2.24	Primary Containment	-	411	16	77	1,389	-	-	324	2,218	2,218	-	-	8,302	-	-	-	-	337,148	5,729	-
4b.1.2.25	Process Radiation Monitors	-	41	0	2	36	-	-	16	95	95	-	-	213	-	-	-	-	8,667	577	-
4b.1.2.26	Rx Bldg Closed Clng Water - Insul - RCA	-	114	2	9	163	-	-	54	343	343	-	-	977	-	-	-	-	39,675	1,484	-
4b.1.2.27	Rx Bldg Closed Clng Water - RCA	-	184	15	66	1,187	-	-	235	1,687	1,687	-	-	7,093	-	-	-	-	288,031	2,489	-
4b.1.2.28	Rx Component Handling Equip	-	127	11	24	291	139	-	115	708	708	-	-	1,737	415	-	-	-	96,901	1,839	-
4b.1.2.29	Rx Pressure Vessel	-	43	5	5	27	57	-	30	167	167	-	-	161	169	-	-	-	17,375	578	-
4b.1.2.30	Rx Water Cleanup	-	239	16	15	47	214	-	124	655	655	-	-	278	630	-	-	-	51,819	3,264	-
4b.1.2.31	Secondary Containment	-	112	3	13	229	-	-	65	421	421	-	-	1,372	-	-	-	-	55,702	1,569	-
4b.1.2.32	Service & Seal Water - Insulated - RCA	-	120	2	11	197	-	-	62	392	392	-	-	1,180	-	-	-	-	47,917	1,565	-
4b.1.2.33	Service & Seal Water - RCA	-	159	4	17	303	-	-	88	570	570	-	-	1,809	-	-	-	-	73,453	2,016	-
4b.1.2.34	Service Air Blower - RCA	-	15	0	2	34	-	-	9	62	62	-	-	206	-	-	-	-	8,364	206	-
4b.1.2.35	Solid Radwaste	-	446	21	45	567	223	-	261	1,563	1,563	-	-	3,390	659	-	-	-	179,772	6,270	-
4b.1.2.36	Structures & Buildings	-	70	1	4	80	-	-	30	185	185	-	-	477	-	-	-	-	19,351	1,005	-
4b.1.2.37	Wells & Domestic Water	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	144	-
4b.1.2.38	Wells & Domestic Water - RCA	-	52	1	3	57	-	-	22	136	136	-	-	342	-	-	-	-	13,874	633	-
4b.1.2	Totals	-	8,342	249	841	13,829	1,210	-	4,613	29,085	29,073	-	11	82,654	3,571	-	-	-	3,585,374	114,290	-
4b.1.3	Scaffolding in support of decommissioning	-	3,159	33	19	286	46	-	850	4,394	4,394	-	-	1,545	136	-	-	-	78,166	29,953	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor Building	4,668	2,596	178	516	8,044	1,181	-	4,580	21,764	21,764	-	-	48,077	7,014	-	-	-	2,317,670	100,718	-
4b.1.4.2	Admin	96	5	0	3	-	15	-	53	172	172	-	-	-	145	-	-	-	6,840	1,421	-
4b.1.4.3	HPCI Room	26	25	1	3	20	14	-	26	115	115	-	-	118	125	-	-	-	10,759	703	-
4b.1.4.4	Hot Shop	15	4	0	2	-	11	-	11	43	43	-	-	-	103	-	-	-	4,860	254	-
4b.1.4.5	LLRW Storage & Shipping	52	22	2	8	5	45	-	45	179	179	-	-	31	433	-	-	-	21,708	1,003	-
4b.1.4.6	Offgas Stack	336	241	7	23	225	82	-	286	1,199	1,199	-	-	1,343	669	-	-	-	87,045	7,924	-
4b.1.4.7	Offgas Storage & Compressor	36	15	1	6	4	33	-	32	128	128	-	-	25	316	-	-	-	15,948	696	-
4b.1.4.8	Radwaste	109	54	3	17	29	96	-	100	410	410	-	-	172	910	-	-	-	49,943	2,229	-
4b.1.4.9	Radwaste Material Storage Warehouse	57	21	2	9	-	52	-	48	189	189	-	-	-	495	-	-	-	23,400	1,062	-
4b.1.4.10	Recombiner	24	22	1	5	33	24	-	30	140	140	-	-	199	216	-	-	-	18,405	616	-
4b.1.4.11	Turbine	638	314	21	104	215	564	-	588	2,444	2,444	-	-	1,283	5,299	-	-	-	303,150	12,856	-
4b.1.4.12	Turbine Building Addition	53	19	1	8	-	45	-	44	169	169	-	-	-	434	-	-	-	20,478	968	-
4b.1.4.13	Reactor (Post Fuel)	849	2,325	172	913	329	5,301	-	2,535	12,425	12,425	-	-	1,969	50,605	-	-	-	2,471,778	40,860	-
4b.1.4	Totals	6,960	5,663	390	1,617	8,904	7,465	-	8,379	39,378	39,378	-	-	53,216	66,764	-	-	-	5,351,984	171,309	-
4b.1.5	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
4b.1.6	Receive NRC approval of termination plan									a											
4b.1	Subtotal Period 4b Activity Costs	7,551	17,223	776	2,626	23,019	11,293	526	14,907	77,921	77,910	-	11	137,414	78,124	-	-	-	9,501,694	316,457	4,096
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
4b.2.2	Excavation of Underground Services	-	1,972	-	-	-	-	376	550	2,898	2,898	-	-	-	-	-	-	-	-	12,493	-
4b.2.3	Operational Equipment	-	-	23	92	1,211	-	-	198	1,524	1,524	-	-	11,760	-	-	-	-	294,000	32	-

Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
4b.2	Subtotal Period 4b Additional Costs	-	1,972	23	92	1,211	-	1,835	1,185	6,317	6,317	-	-	11,760	-	-	-	-	294,000	12,525	12,480
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	12	-	22	39	-	88	-	36	196	196	-	-	-	202	-	-	-	12,097	39	-
4b.3.3	Small tool allowance	-	397	-	-	-	-	-	60	456	456	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	130	82	1,112	178	-	237	1,739	1,739	-	-	6,000	529	-	-	-	303,608	147	-
4b.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	14,092	2,114	16,206	-	16,206	-	-	-	-	-	-	-	-	-
4b.3	Subtotal Period 4b Collateral Costs	12	397	152	121	1,112	266	14,092	2,446	18,597	2,392	16,206	-	6,000	731	-	-	-	315,705	186	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,701	-	-	-	-	-	-	425	2,126	2,126	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	1,434	143	1,577	1,577	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	6,289	629	6,917	5,721	1,197	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	3,050	-	-	-	-	-	763	3,813	3,813	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	5,239	-	-	-	-	-	786	6,024	6,024	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	117	60	-	486	-	142	805	805	-	-	-	5,895	-	-	-	117,897	192	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,777	417	3,194	3,194	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC ISFSI Fees	-	-	-	-	-	-	104	10	114	-	114	-	-	-	-	-	-	-	-	-
4b.4.9	NRC Fees	-	-	-	-	-	-	986	99	1,085	1,085	-	-	-	-	-	-	-	-	-	-
4b.4.10	Emergency Planning Fees	-	-	-	-	-	-	302	30	332	-	332	-	-	-	-	-	-	-	-	-
4b.4.11	Fixed Overhead	-	-	-	-	-	-	4,319	648	4,967	4,967	-	-	-	-	-	-	-	-	-	-
4b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	866	130	996	996	-	-	-	-	-	-	-	-	-	-
4b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	228	34	262	-	262	-	-	-	-	-	-	-	-	-
4b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	255	38	293	293	-	-	-	-	-	-	-	-	-	-
4b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	2,283	343	2,626	2,626	-	-	-	-	-	-	-	-	-	-
4b.4.16	Security Staff Cost	-	-	-	-	-	-	12,097	1,815	13,912	3,826	10,086	-	-	-	-	-	-	-	-	183,371
4b.4.17	DOC Staff Cost	-	-	-	-	-	-	25,916	3,887	29,803	29,803	-	-	-	-	-	-	-	-	-	284,065
4b.4.18	Utility Staff Cost	-	-	-	-	-	-	32,869	4,930	37,799	35,380	2,419	-	-	-	-	-	-	-	-	504,534
4b.4	Subtotal Period 4b Period-Dependent Costs	1,701	8,289	117	60	-	486	90,726	15,269	116,648	102,236	14,411	-	-	5,895	-	-	-	117,897	192	971,970
4b.0	TOTAL PERIOD 4b COST	9,264	27,881	1,067	2,898	25,343	12,044	107,179	33,806	219,483	188,855	30,617	11	155,174	84,750	-	-	-	10,229,300	329,361	988,546
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
4f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	4,289	643	4,933	-	4,933	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	5,553	833	6,386	1,454	4,933	-	-	-	-	-	-	-	-	-
Period 4f Period-Dependent Costs																					
4f.4.1	Insurance	-	-	-	-	-	-	530	53	583	-	583	-	-	-	-	-	-	-	-	-
4f.4.2	Property taxes	-	-	-	-	-	-	2,198	220	2,417	1,975	442	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	708	-	-	-	-	-	177	884	884	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	7	4	-	29	-	9	48	48	-	-	-	355	-	-	-	7,097	12	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	274	41	315	315	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC ISFSI Fees	-	-	-	-	-	-	38	4	42	-	42	-	-	-	-	-	-	-	-	-
4f.4.7	NRC Fees	-	-	-	-	-	-	426	43	468	468	-	-	-	-	-	-	-	-	-	-
4f.4.8	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
4f.4.9	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
4f.4.10	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
4f.4.11	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
4f.4.12	Security Staff Cost	-	-	-	-	-	-	3,463	519	3,982	1,565	2,417	-	-	-	-	-	-	-	-	50,932
4f.4.13	DOC Staff Cost	-	-	-	-	-	-	5,393	809	6,201	6,201	-	-	-	-	-	-	-	-	-	57,200
4f.4.14	Utility Staff Cost	-	-	-	-	-	-	5,762	864	6,626	5,738	888	-	-	-	-	-	-	-	-	80,707
4f.4	Subtotal Period 4f Period-Dependent Costs	-	708	7	4	-	29	19,969	3,016	23,732	19,140	4,593	-	-	355	-	-	-	7,097	12	188,838
4f.0	TOTAL PERIOD 4f COST	-	708	7	4	-	29	32,608	5,974	39,330	29,805	9,526	-	-	355	-	-	-	7,097	95,059	195,078
PERIOD 4 TOTALS		9,566	60,703	16,861	7,092	58,837	47,839	198,623	89,767	489,288	437,421	51,801	66	340,138	120,599	1,628	600	-	20,556,510	634,041	1,742,391

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Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor Building	-	1,971	-	-	-	-	-	296	2,267	-	-	2,267	-	-	-	-	-	-	13,911	-
5b.1.1.2	Condensate Tanks Foundation	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	50	-
5b.1.1.3	Discharge Retention Basin	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	25	-
5b.1.1.4	HPCI Room	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	97	-
5b.1.1.5	Hot Shop	-	16	-	-	-	-	-	2	19	-	-	19	-	-	-	-	-	-	177	-
5b.1.1.6	Hydrogen & Oxygen Storage	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	19	-
5b.1.1.7	LLRW Storage & Shipping	-	83	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	662	-
5b.1.1.8	MSIV	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	42	-
5b.1.1.9	Misc Structures 2017	-	1,410	-	-	-	-	-	212	1,622	-	-	1,622	-	-	-	-	-	-	13,042	-
5b.1.1.10	Offgas Stack	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	544	-
5b.1.1.11	Offgas Storage & Compressor	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	199	-
5b.1.1.12	Radwaste	-	228	-	-	-	-	-	34	262	-	-	262	-	-	-	-	-	-	1,220	-
5b.1.1.13	Recombiner	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	713	-
5b.1.1.14	Security Barrier	-	186	-	-	-	-	-	28	214	-	-	214	-	-	-	-	-	-	933	-
5b.1.1.15	Structures Greater than 3' Below Grade	-	2,461	-	-	-	-	-	369	2,830	-	-	2,830	-	-	-	-	-	-	12,649	-
5b.1.1.16	Tank Farm	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	21	-
5b.1.1.17	Turbine	-	1,259	-	-	-	-	-	189	1,448	-	-	1,448	-	-	-	-	-	-	13,036	-
5b.1.1.18	Turbine Building Addition	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	618	-
5b.1.1.19	Turbine Pedestal	-	182	-	-	-	-	-	27	209	-	-	209	-	-	-	-	-	-	926	-
5b.1.1	Totals	-	8,169	-	-	-	-	-	1,225	9,394	-	-	9,394	-	-	-	-	-	-	58,885	-
Site Closeout Activities																					
5b.1.2	Grade & landscape site	-	896	-	-	-	-	-	134	1,031	-	-	1,031	-	-	-	-	-	-	1,841	-
5b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	9,065	-	-	-	-	200	1,390	10,655	231	-	10,425	-	-	-	-	-	-	60,726	1,560
Period 5b Additional Costs																					
5b.2.1	Clean Concrete Disposal	-	3,322	-	-	-	-	13	500	3,835	-	-	3,835	-	-	-	-	-	-	12	-
5b.2.2	Intake Structure Cofferdam	-	335	-	-	-	-	-	50	385	-	-	385	-	-	-	-	-	-	2,584	-
5b.2.3	Construction Debris	-	-	-	-	-	-	1,170	176	1,346	-	-	1,346	-	-	-	-	-	-	-	-
5b.2.4	Backfill	-	5,583	-	-	-	-	-	837	6,421	-	-	6,421	-	-	-	-	-	-	5,422	-
5b.2.5	Discharge Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
5b.2.6	Disposition of Original MPC Canisters	-	55	185	954	-	5,641	-	1,709	8,544	8,544	-	-	-	21,097	-	-	-	2,505,700	337	-
5b.2	Subtotal Period 5b Additional Costs	-	9,737	185	954	-	5,641	1,183	3,339	21,039	8,544	-	12,495	-	21,097	-	-	-	2,505,700	11,907	-
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	111	-	-	-	-	-	17	127	-	-	127	-	-	-	-	-	-	-	-
5b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	10,914	1,637	12,551	-	12,551	-	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	111	-	-	-	-	10,914	1,654	12,678	-	12,551	127	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	1,220	122	1,342	-	1,342	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	4,534	453	4,988	-	-	4,988	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	5,842	-	-	-	-	-	876	6,719	-	-	6,719	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	315	47	362	-	362	-	-	-	-	-	-	-	-	-
5b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	414	41	456	-	456	-	-	-	-	-	-	-	-	-
5b.4.6	Emergency Planning Fees	-	-	-	-	-	-	257	26	283	-	283	-	-	-	-	-	-	-	-	-
5b.4.7	Fixed Overhead	-	-	-	-	-	-	1,122	168	1,290	0	860	429	-	-	-	-	-	-	-	-
5b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	194	29	223	-	223	-	-	-	-	-	-	-	-	-
5b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	217	33	249	0	150	100	-	-	-	-	-	-	-	-
5b.4.10	Security Staff Cost	-	-	-	-	-	-	7,971	1,196	9,167	0	8,580	587	-	-	-	-	-	-	-	117,235
5b.4.11	DOC Staff Cost	-	-	-	-	-	-	11,729	1,759	13,489	-	-	13,489	-	-	-	-	-	-	-	122,646
5b.4.12	Utility Staff Cost	-	-	-	-	-	-	7,148	1,072	8,220	-	2,129	6,091	-	-	-	-	-	-	-	101,904
5b.4	Subtotal Period 5b Period-Dependent Costs	-	5,842	-	-	-	-	35,122	5,823	46,787	0	14,385	32,402	-	-	-	-	-	-	-	341,785
5b.0	TOTAL PERIOD 5b COST	-	24,755	185	954	-	5,641	47,419	12,205	91,160	8,775	26,936	55,449	-	21,097	-	-	-	2,505,700	72,633	343,345
PERIOD 5c - Fuel Storage Operations/Shipping																					
Period 5c Direct Decommissioning Activities																					
Period 5c Collateral Costs																					
5c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	142,259	21,339	163,598	-	163,598	-	-	-	-	-	-	-	-	-

Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
5c.3	Subtotal Period 5c Collateral Costs	-	-	-	-	-	-	142,259	21,339	163,598	-	163,598	-	-	-	-	-	-	-	-	-
Period 5c Period-Dependent Costs																					
5c.4.1	Insurance	-	-	-	-	-	-	27,126	2,713	29,838	-	29,838	-	-	-	-	-	-	-	-	-
5c.4.2	Property taxes	-	-	-	-	-	-	35,797	3,580	39,376	-	39,376	-	-	-	-	-	-	-	-	-
5c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	9,215	922	10,137	-	10,137	-	-	-	-	-	-	-	-	-
5c.4.5	Emergency Planning Fees	-	-	-	-	-	-	5,718	572	6,290	-	6,290	-	-	-	-	-	-	-	-	-
5c.4.6	Fixed Overhead	-	-	-	-	-	-	8,307	1,246	9,553	-	9,553	-	-	-	-	-	-	-	-	-
5c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	4,317	648	4,964	-	4,964	-	-	-	-	-	-	-	-	-
5c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	4,823	723	5,546	-	5,546	-	-	-	-	-	-	-	-	-
5c.4.9	Security Staff Cost	-	-	-	-	-	-	150,854	22,628	173,482	-	173,482	-	-	-	-	-	-	-	-	2,165,930
5c.4.10	DOC Staff Cost	-	-	-	-	-	-	11,823	1,773	13,597	-	13,597	-	-	-	-	-	-	-	-	80,220
5c.4.11	Utility Staff Cost	-	-	-	-	-	-	73,686	11,053	84,739	-	84,739	-	-	-	-	-	-	-	-	1,062,910
5c.4	Subtotal Period 5c Period-Dependent Costs	-	-	-	-	-	-	331,665	45,857	377,522	-	377,522	-	-	-	-	-	-	-	-	3,309,059
5c.0	TOTAL PERIOD 5c COST	-	-	-	-	-	-	473,925	67,196	541,121	-	541,121	-	-	-	-	-	-	-	-	3,309,059
PERIOD 5d - GTCC shipping																					
Period 5d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
5d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
5d.1.1	Totals	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
5d.1	Subtotal Period 5d Activity Costs	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
Period 5d Collateral Costs																					
5d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
5d.3	Subtotal Period 5d Collateral Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
Period 5d Period-Dependent Costs																					
5d.4.1	Insurance	-	-	-	-	-	-	27	3	30	30	-	-	-	-	-	-	-	-	-	-
5d.4.2	Property taxes	-	-	-	-	-	-	35	3	38	38	-	-	-	-	-	-	-	-	-	-
5d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8	1	9	-	9	-	-	-	-	-	-	-	-	-
5d.4.5	Emergency Planning Fees	-	-	-	-	-	-	6	1	6	-	6	-	-	-	-	-	-	-	-	-
5d.4.6	Fixed Overhead	-	-	-	-	-	-	8	1	10	10	-	-	-	-	-	-	-	-	-	-
5d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	-
5d.4.8	Security Staff Cost	-	-	-	-	-	-	150	23	173	173	-	-	-	-	-	-	-	-	-	2,154
5d.4.9	Utility Staff Cost	-	-	-	-	-	-	39	6	45	45	-	-	-	-	-	-	-	-	-	539
5d.4	Subtotal Period 5d Period-Dependent Costs	-	-	-	-	-	-	278	38	316	301	15	-	-	-	-	-	-	-	-	2,693
5d.0	TOTAL PERIOD 5d COST	-	-	1,083	-	-	4,313	306	960	6,661	6,615	47	-	-	-	-	-	1,160	225,765	-	2,693
PERIOD 5e - ISFSI Decontamination																					
Period 5e Direct Decommissioning Activities																					
Period 5e Additional Costs																					
5e.2.1	License Termination ISFSI	-	0	3	33	-	283	2,086	602	3,008	3,008	-	-	-	848	-	-	-	131,507	10,502	2,225
5e.2	Subtotal Period 5e Additional Costs	-	0	3	33	-	283	2,086	602	3,008	3,008	-	-	-	848	-	-	-	131,507	10,502	2,225
Period 5e Period-Dependent Costs																					
5e.4.1	Insurance	-	-	-	-	-	-	118	30	148	148	-	-	-	-	-	-	-	-	-	-
5e.4.2	Property taxes	-	-	-	-	-	-	248	62	310	310	-	-	-	-	-	-	-	-	-	-
5e.4.3	Plant energy budget	-	-	-	-	-	-	12	3	15	15	-	-	-	-	-	-	-	-	-	-
5e.4.4	Fixed Overhead	-	-	-	-	-	-	71	18	89	89	-	-	-	-	-	-	-	-	-	-
5e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	41	10	52	52	-	-	-	-	-	-	-	-	-	-
5e.4.6	Security Staff Cost	-	-	-	-	-	-	352	88	440	440	-	-	-	-	-	-	-	-	-	4,999
5e.4.7	Utility Staff Cost	-	-	-	-	-	-	261	65	326	326	-	-	-	-	-	-	-	-	-	3,792
5e.4	Subtotal Period 5e Period-Dependent Costs	-	-	-	-	-	-	1,104	276	1,380	1,380	-	-	-	-	-	-	-	-	-	8,792
5e.0	TOTAL PERIOD 5e COST	-	0	3	33	-	283	3,190	877	4,387	4,387	-	-	-	848	-	-	-	131,507	10,502	11,017

Monticello Nuclear Generating Plant
Decommissioning Cost Analysis

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Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 5f - ISFSI Site Restoration																					
Period 5f Direct Decommissioning Activities																					
Period 5f Additional Costs																					
5f.2.1	Demolition and Site Restoration of ISFSI	-	1,564	-	-	-	-	256	273	2,093	-	-	2,093	-	-	-	-	-	-	7,309	160
5f.2	Subtotal Period 5f Additional Costs	-	1,564	-	-	-	-	256	273	2,093	-	-	2,093	-	-	-	-	-	-	7,309	160
Period 5f Collateral Costs																					
5f.3.1	Small tool allowance	-	11	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	-	-
5f.3	Subtotal Period 5f Collateral Costs	-	11	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	-	-
Period 5f Period-Dependent Costs																					
5f.4.2	Property taxes	-	-	-	-	-	-	127	13	140	-	-	140	-	-	-	-	-	-	-	-
5f.4.3	Heavy equipment rental	-	118	-	-	-	-	-	18	136	-	-	136	-	-	-	-	-	-	-	-
5f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	7	-	-	7	-	-	-	-	-	-	-	-
5f.4.5	Fixed Overhead	-	-	-	-	-	-	37	5	42	-	-	42	-	-	-	-	-	-	-	-
5f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	21	3	24	-	-	24	-	-	-	-	-	-	-	-
5f.4.7	Security Staff Cost	-	-	-	-	-	-	180	27	207	-	-	207	-	-	-	-	-	-	-	2,562
5f.4.8	Utility Staff Cost	-	-	-	-	-	-	111	17	128	-	-	128	-	-	-	-	-	-	-	1,590
5f.4	Subtotal Period 5f Period-Dependent Costs	-	118	-	-	-	-	482	84	685	-	-	685	-	-	-	-	-	-	-	4,151
5f.0	TOTAL PERIOD 5f COST	-	1,693	-	-	-	-	738	358	2,790	-	-	2,790	-	-	-	-	-	-	7,309	4,311
PERIOD 5 TOTALS		-	26,448	1,271	987	-	10,238	525,577	81,597	646,118	19,776	568,103	58,239	-	21,944	-	-	1,160	2,862,972	90,444	3,670,425
TOTAL COST TO DECOMMISSION		21,016	100,409	18,576	8,641	58,852	59,781	2,228,133	393,023	2,888,431	1,248,652	1,580,426	59,354	340,180	153,182	1,628	600	1,160	23,731,310	873,407	13,370,640

TOTAL COST TO DECOMMISSION WITH 15.75% CONTINGENCY:	**$2,888,431**	**thousands of 2020 dollars**	
TOTAL NRC LICENSE TERMINATION COST IS 43.23% OR:	**$1,248,652**	**thousands of 2020 dollars**	
SPENT FUEL MANAGEMENT COST IS 54.72% OR:	**$1,580,426**	**thousands of 2020 dollars**	
NON-NUCLEAR DEMOLITION COST IS 2.05% OR:	**$59,354**	**thousands of 2020 dollars**	
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**155,409**	**Cubic Feet**	
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,160**	**Cubic Feet**	
TOTAL SCRAP METAL REMOVED:	**23,123**	**Tons**	
TOTAL CRAFT LABOR REQUIREMENTS:	**873,407**	**Man-hours**	

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX J

DETAILED COST ANALYSIS

SCENARIO 8: SAFSTOR with 200 Year DFS

Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	415	124	539	539	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	193	29	222	222	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.16	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.17	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.18.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	632	95	727	727	-	-	-	-	-	-	-	-	-	4,920
1a.1.18.2	Plant systems	-	-	-	-	-	-	536	80	616	616	-	-	-	-	-	-	-	-	-	4,167
1a.1.18.3	Plant structures and buildings	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
1a.1.18.4	Waste management	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.18.5	Facility and site dormancy	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.18	Total	-	-	-	-	-	-	2,083	312	2,395	2,395	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.19.1	Plant systems	-	-	-	-	-	-	152	23	175	175	-	-	-	-	-	-	-	-	-	1,183
1a.1.19.2	Facility closeout & dormancy	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1a.1.19	Total	-	-	-	-	-	-	306	46	352	352	-	-	-	-	-	-	-	-	-	2,383
1a.1.20	Procure vacuum drying system	-	-	-	-	-	-	13	2	15	15	-	-	-	-	-	-	-	-	-	100
1a.1.21	Drain/de-energize non-cont. systems									a											
1a.1.22	Drain & dry NSSS									a											
1a.1.23	Drain/de-energize contaminated systems									a											
1a.1.24	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	6,120	980	7,100	7,100	-	-	-	-	-	-	-	-	-	44,390
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,323	198	1,522	-	1,522	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	9,892	1,484	11,376	11,376	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	11,215	1,682	12,897	11,376	1,522	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,328	233	2,561	2,561	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,570	357	3,927	3,927	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	6	-	50	-	15	83	83	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	892	89	981	981	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,428	343	3,770	-	3,770	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	845	127	971	-	971	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	16,372	2,456	18,827	18,827	-	-	-	-	-	-	-	-	-	245,440
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	27,285	4,093	31,378	31,378	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	6	-	50	59,389	8,679	69,502	64,632	4,870	-	-	610	-	-	-	12,190	20	667,680
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	6	-	50	76,724	11,341	89,500	83,108	6,392	-	-	610	-	-	-	12,190	20	712,070

Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor Building	5,155	-	-	-	-	-	-	2,577	7,732	7,732	-	-	-	-	-	-	-	-	70,157	-
1b.1.1.2	Admin	95	-	-	-	-	-	-	48	143	143	-	-	-	-	-	-	-	-	1,357	-
1b.1.1.3	HPCI Room	25	-	-	-	-	-	-	13	38	38	-	-	-	-	-	-	-	-	350	-
1b.1.1.4	Hot Shop	15	-	-	-	-	-	-	7	22	22	-	-	-	-	-	-	-	-	208	-
1b.1.1.5	LLRW Storage & Shipping	49	-	-	-	-	-	-	25	74	74	-	-	-	-	-	-	-	-	705	-
1b.1.1.6	Offgas Stack	326	-	-	-	-	-	-	163	489	489	-	-	-	-	-	-	-	-	4,575	-
1b.1.1.7	Offgas Storage & Compressor	34	-	-	-	-	-	-	17	51	51	-	-	-	-	-	-	-	-	488	-
1b.1.1.8	Radwaste	103	-	-	-	-	-	-	51	154	154	-	-	-	-	-	-	-	-	1,473	-
1b.1.1.9	Radwaste Material Storage Warehouse	54	-	-	-	-	-	-	27	81	81	-	-	-	-	-	-	-	-	768	-
1b.1.1.10	Recombiner	23	-	-	-	-	-	-	11	34	34	-	-	-	-	-	-	-	-	323	-
1b.1.1.11	Turbine	600	-	-	-	-	-	-	300	900	900	-	-	-	-	-	-	-	-	8,583	-
1b.1.1.12	Turbine Building Addition	50	-	-	-	-	-	-	25	74	74	-	-	-	-	-	-	-	-	709	-
1b.1.1.13	Reactor (Post Fuel)	830	-	-	-	-	-	-	415	1,245	1,245	-	-	-	-	-	-	-	-	11,337	-
1b.1.1	Totals	7,359	-	-	-	-	-	-	3,679	11,038	11,038	-	-	-	-	-	-	-	-	101,033	-
1b.1	Subtotal Period 1b Activity Costs	7,359	-	-	-	-	-	-	3,679	11,038	11,038	-	-	-	-	-	-	-	-	101,033	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	220	-	145	258	-	588	-	310	1,522	1,522	-	-	-	1,351	-	-	-	81,042	263	-
1b.3.4	Small tool allowance	-	126	-	-	-	-	-	19	145	145	-	-	-	-	-	-	-	-	-	-
1b.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	196	29	225	-	225	-	-	-	-	-	-	-	-	-
1b.3.6	Retention and Severance	-	-	-	-	-	-	3,601	540	4,141	4,141	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,274	126	145	258	-	588	3,796	1,057	7,246	7,021	225	-	-	1,351	-	-	-	81,042	263	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,562	-	-	-	-	-	-	391	1,953	1,953	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	580	58	638	638	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	890	89	979	979	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	729	-	-	-	-	-	182	911	911	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	11	6	-	46	-	13	76	76	-	-	-	555	-	-	-	11,092	18	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	453	68	521	521	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	708	71	779	-	779	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	652	98	750	750	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	4,082	612	4,694	4,694	-	-	-	-	-	-	-	-	-	61,192
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	6,803	1,020	7,823	7,823	-	-	-	-	-	-	-	-	-	105,271
1b.4	Subtotal Period 1b Period-Dependent Costs	1,562	917	11	6	-	46	14,599	2,687	19,828	18,775	1,053	-	-	555	-	-	-	11,092	18	166,463
1b.0	TOTAL PERIOD 1b COST	10,195	1,043	156	264	-	634	31,070	9,325	52,688	51,410	1,278	-	-	1,905	-	-	-	92,135	101,314	166,463
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	527	-	-	-	-	-	79	606	606	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	54	-	-	-	-	-	8	62	62	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	12,801	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	75	11	86	86	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	581	-	-	-	-	808	318	1,707	1,707	-	-	-	-	-	-	-	-	16,501	583
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	161	-	107	190	-	433	-	228	1,120	1,120	-	-	-	994	-	-	-	59,653	194	-

Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
1c.3.3	Small tool allowance	-	5	-	-	-	-	-	1	6	6	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,539	381	2,920	-	2,920	-	-	-	-	-	-	-	-	-
1c.3.5	Retention and Severance	-	-	-	-	-	-	2,734	410	3,145	3,145	-	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	161	5	107	190	-	433	5,273	1,020	7,190	4,270	2,920	-	-	994	-	-	-	59,653	194	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	580	58	638	638	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	888	89	977	977	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	248	-	-	-	-	-	62	310	310	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	2	-	13	-	4	21	21	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	453	68	521	521	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	708	71	779	-	779	-	-	-	-	-	-	-	-	-
1c.4.9	Fixed Overhead	-	-	-	-	-	-	652	98	750	750	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
1c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1c.4.13	Security Staff Cost	-	-	-	-	-	-	4,082	612	4,694	4,694	-	-	-	-	-	-	-	-	-	61,192
1c.4.14	Utility Staff Cost	-	-	-	-	-	-	6,803	1,020	7,823	7,823	-	-	-	-	-	-	-	-	-	105,271
1c.4	Subtotal Period 1c Period-Dependent Costs	-	436	3	2	-	13	14,597	2,166	17,216	16,163	1,053	-	-	152	-	-	-	3,039	5	166,463
1c.0	TOTAL PERIOD 1c COST	161	1,021	110	192	-	446	20,678	3,505	26,113	22,140	3,973	-	-	1,146	-	-	-	62,692	16,700	167,046
PERIOD 1 TOTALS		10,357	3,431	278	462	-	1,130	128,472	24,170	168,301	156,658	11,643	-	-	3,661	-	-	-	167,017	118,034	1,045,579
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	155	23	178	178	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	349	87	437	437	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	504	111	615	615	-	-	-	-	-	-	-	-	-	-
Period 2a Additional Costs																					
2a.2.1	Security Modifications	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	141,374	21,206	162,580	-	162,580	-	-	-	-	-	-	-	-	-
2a.3.2	Retention and Severance	-	-	-	-	-	-	19,427	2,914	22,341	22,341	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	160,801	24,120	184,921	22,341	162,580	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,761	176	1,937	1,937	-	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	8,932	893	9,825	9,825	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	617	-	-	-	-	-	154	771	771	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	11	6	-	47	-	14	79	79	-	-	-	576	-	-	-	11,523	19	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	910	136	1,046	1,046	-	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	610	61	671	671	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	7,110	711	7,821	-	7,821	-	-	-	-	-	-	-	-	-
2a.4.8	Fixed Overhead	-	-	-	-	-	-	5,306	796	6,102	6,102	-	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	2,115	317	2,432	-	2,432	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	280	42	322	-	322	-	-	-	-	-	-	-	-	-
2a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	639	96	735	735	-	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	37,806	5,671	43,477	31,086	12,391	-	-	-	-	-	-	-	-	562,523
2a.4.13	Utility Staff Cost	-	-	-	-	-	-	13,543	2,031	15,574	12,615	2,959	-	-	-	-	-	-	-	-	205,738
2a.4	Subtotal Period 2a Period-Dependent Costs	-	617	11	6	-	47	79,012	11,099	90,793	64,868	25,925	-	-	576	-	-	-	11,523	19	768,261
2a.0	TOTAL PERIOD 2a COST	-	617	11	6	-	47	249,013	36,634	286,328	97,823	188,505	-	-	576	-	-	-	11,523	19	768,261
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											

Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2b Direct Decommissioning Activities (continued)																					
2b.1.3	Prepare reports									[a]											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	3,127	469	3,596	3,596	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	7,065	1,766	8,831	8,831	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	10,192	2,235	12,427	12,427	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	366,775	55,016	421,791	-	421,791	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	366,775	55,016	421,791	-	421,791	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	35,606	3,561	39,167	39,167	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	180,613	18,061	198,674	198,674	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	6,047	-	-	-	-	-	1,512	7,559	7,559	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	111	57	-	461	-	135	764	764	-	-	-	5,595	-	-	-	111,903	182	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	9,196	1,379	10,576	10,576	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	11,515	1,152	12,667	12,667	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	7,506	751	8,256	-	8,256	-	-	-	-	-	-	-	-	-
2b.4.8	Fixed Overhead	-	-	-	-	-	-	10,904	1,636	12,540	12,540	-	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	5,666	850	6,516	-	6,516	-	-	-	-	-	-	-	-	-
2b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	6,330	950	7,280	7,280	-	-	-	-	-	-	-	-	-	-
2b.4.11	Security Staff Cost	-	-	-	-	-	-	280,802	42,120	322,922	72,658	250,265	-	-	-	-	-	-	-	-	3,790,775
2b.4.12	Utility Staff Cost	-	-	-	-	-	-	114,547	17,182	131,729	71,924	59,805	-	-	-	-	-	-	-	-	1,684,789
2b.4	Subtotal Period 2b Period-Dependent Costs	-	6,047	111	57	-	461	662,686	89,288	758,650	433,808	324,843	-	-	5,595	-	-	-	111,903	182	5,475,563
2b.0	TOTAL PERIOD 2b COST	-	6,047	111	57	-	461	1,039,652	146,539	1,192,868	446,234	746,634	-	-	5,595	-	-	-	111,903	182	5,475,563
PERIOD 2 TOTALS		-	6,664	122	63	-	509	1,288,665	183,173	1,479,196	544,057	935,139	-	-	6,171	-	-	-	123,426	201	6,243,824
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									[a]											
3a.1.4	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
3a.1.9.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	947	142	1,089	980	-	109	-	-	-	-	-	-	-	7,370
3a.1.9.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
3a.1.9.3	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
3a.1.9.4	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
3a.1.9.5	Sacrificial shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
3a.1.9.6	Moisture separators/reheaters	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3a.1.9.7	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
3a.1.9.8	Main Turbine	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
3a.1.9.9	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
3a.1.9.10	Pressure suppression structure	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
3a.1.9.11	Drywell	-	-	-	-	-	-	206	31	236	236	-	-	-	-	-	-	-	-	-	1,600
3a.1.9.12	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
3a.1.9.13	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.9.14	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
3a.1.9	Total	-	-	-	-	-	-	5,736	860	6,597	6,011	-	586	-	-	-	-	-	-	-	44,633
Planning & Site Preparations																					
3a.1.10	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
3a.1.11	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
3a.1.12	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
3a.1.13	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
3a.1.14	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	15,341	2,301	17,643	17,057	-	586	-	-	-	-	-	-	-	73,463
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	5,930	1,779	7,708	7,708	-	-	-	-	-	-	-	-	30,500	10,852

Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3a Additional Costs (continued)																					
3a.2.2	Mixed & RCRA Waste	-	-	28	29	14	-	-	9	80	80	-	-	43	-	-	-	-	5,253	161	-
3a.2	Subtotal Period 3a Additional Costs	-	-	28	29	14	-	5,930	1,788	7,788	7,788	-	-	43	-	-	-	-	5,253	30,661	10,852
Period 3a Collateral Costs																					
3a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	5,693	854	6,547	-	6,547	-	-	-	-	-	-	-	-	-
3a.3	Subtotal Period 3a Collateral Costs	-	-	-	-	-	-	5,693	854	6,547	-	6,547	-	-	-	-	-	-	-	-	-
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	703	70	774	442	332	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	3,479	348	3,827	3,241	586	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	538	-	-	-	-	-	135	673	673	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	5	-	42	-	12	70	70	-	-	-	516	-	-	-	10,311	17	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC ISFSI Fees	-	-	-	-	-	-	28	3	31	-	31	-	-	-	-	-	-	-	-	-
3a.4.8	NRC Fees	-	-	-	-	-	-	335	33	368	368	-	-	-	-	-	-	-	-	-	-
3a.4.9	Emergency Planning Fees	-	-	-	-	-	-	148	15	163	-	163	-	-	-	-	-	-	-	-	-
3a.4.10	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
3a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
3a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
3a.4.13	Security Staff Cost	-	-	-	-	-	-	4,690	703	5,393	5,107	286	-	-	-	-	-	-	-	-	69,160
3a.4.14	Utility Staff Cost	-	-	-	-	-	-	16,817	2,523	19,339	18,160	1,180	-	-	-	-	-	-	-	-	260,000
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,291	10	5	-	42	30,870	4,656	36,875	34,169	2,706	-	-	516	-	-	-	10,311	17	329,160
3a.0	TOTAL PERIOD 3a COST	-	1,291	38	34	14	42	57,834	9,599	68,853	59,014	9,253	586	43	516	-	-	-	15,565	30,678	413,475
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	514	77	591	591	-	-	-	-	-	-	-	-	-	4,000
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD housings & NIs	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Removal primary containment	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
3b.1.1.9	Sacrificial shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.10	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
3b.1.1.11	Main Turbine	-	-	-	-	-	-	267	40	307	307	-	-	-	-	-	-	-	-	-	2,080
3b.1.1.12	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
3b.1.1.13	Moisture separators & reheaters	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
3b.1.1.14	Radwaste building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1.15	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	4,208	631	4,839	4,376	-	463	-	-	-	-	-	-	-	32,741
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	4,208	631	4,839	4,376	-	463	-	-	-	-	-	-	-	32,741
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
3b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,839	426	3,265	-	3,265	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	1,055	1,200	-	-	-	-	4,103	954	7,311	4,047	3,265	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	39	-	-	-	-	-	-	10	48	48	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	351	35	386	386	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	1,614	161	1,776	1,483	293	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	295	-	-	-	-	-	74	369	369	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	6	3	-	24	-	7	40	40	-	-	-	291	-	-	-	5,814	9	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	906	136	1,042	1,042	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC ISFSI Fees	-	-	-	-	-	-	14	1	15	-	15	-	-	-	-	-	-	-	-	-
3b.4.9	NRC Fees	-	-	-	-	-	-	167	17	183	183	-	-	-	-	-	-	-	-	-	-
3b.4.10	Emergency Planning Fees	-	-	-	-	-	-	74	7	81	-	81	-	-	-	-	-	-	-	-	-

Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3b Period-Dependent Costs (continued)																					
3b.4.11	Fixed Overhead	-	-	-	-	-	-	1,305	196	1,500	1,500	-	-	-	-	-	-	-	-	-	-
3b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
3b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	62	9	72	72	-	-	-	-	-	-	-	-	-	-
3b.4.14	Security Staff Cost	-	-	-	-	-	-	2,338	351	2,689	2,547	143	-	-	-	-	-	-	-	-	34,485
3b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,344	802	6,146	6,146	-	-	-	-	-	-	-	-	-	58,080
3b.4.16	Utility Staff Cost	-	-	-	-	-	-	8,385	1,258	9,643	9,055	588	-	-	-	-	-	-	-	-	129,644
3b.4	Subtotal Period 3b Period-Dependent Costs	39	671	6	3	-	24	20,616	3,128	24,487	23,302	1,185	-	-	291	-	-	-	5,814	9	222,210
3b.0	TOTAL PERIOD 3b COST	1,093	1,871	6	3	-	24	28,927	4,713	36,637	31,725	4,449	463	-	291	-	-	-	5,814	9	254,951
PERIOD 3 TOTALS		1,093	3,162	44	37	14	66	86,761	14,312	105,490	90,739	13,702	1,049	43	806	-	-	-	21,379	30,688	668,425
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Recirculation System Piping & Valves	23	85	27	32	185	264	-	134	750	750	-	-	676	715	-	-	-	94,867	1,594	-
4a.1.1.2	Recirculation Pumps & Motors	8	56	16	37	252	270	-	131	771	771	-	-	568	473	-	-	-	112,200	1,049	-
4a.1.1.3	CRDMs & NIs Removal	41	801	415	98	-	1,130	-	560	3,045	3,045	-	-	-	3,741	-	-	-	213,700	12,506	-
4a.1.1.4	Reactor Vessel Internals	139	6,098	11,330	1,029	-	25,657	278	20,603	65,135	65,135	-	-	-	2,943	1,628	600	-	337,343	22,415	1,055
4a.1.1.5	Reactor Vessel	-	8,498	1,818	837	-	6,301	278	10,229	27,961	27,961	-	-	-	17,823	-	-	-	1,110,260	22,415	1,055
4a.1.1	Totals	211	15,538	13,605	2,034	438	33,622	557	31,657	97,662	97,662	-	-	1,244	25,695	1,628	600	-	1,868,371	59,979	2,110
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	340	1,356	521	6,139	439	-	1,330	10,126	10,126	-	-	24,835	1,383	-	-	-	1,577,959	4,796	-
4a.1.3	Main Condensers	-	1,207	360	194	3,225	244	-	912	6,142	6,142	-	-	17,396	727	-	-	-	828,955	16,823	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor Building	-	332	-	-	-	-	-	50	381	381	-	-	-	-	-	-	-	-	2,217	-
4a.1.4.2	Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	127	-
4a.1.4.3	Turbine	-	127	-	-	-	-	-	19	146	146	-	-	-	-	-	-	-	-	1,254	-
4a.1.4	Totals	-	483	-	-	-	-	-	72	556	556	-	-	-	-	-	-	-	-	3,598	-
Disposal of Plant Systems																					
4a.1.5.1	Automatic Press Relief	-	106	2	10	182	-	-	56	356	356	-	-	1,088	-	-	-	-	44,184	1,468	-
4a.1.5.2	Chemistry Sampling	-	24	0	2	35	-	-	12	73	73	-	-	207	-	-	-	-	8,422	356	-
4a.1.5.3	Chemistry Sampling - Insulated	-	2	0	0	0	-	-	0	2	2	-	-	1	-	-	-	-	61	25	-
4a.1.5.4	Circulating Water - RCA	-	207	14	62	1,114	-	-	230	1,626	1,626	-	-	6,656	-	-	-	-	270,307	2,860	-
4a.1.5.5	Combustible Gas Control - Insul - RCA	-	29	0	2	36	-	-	13	80	80	-	-	212	-	-	-	-	8,617	378	-
4a.1.5.6	Combustible Gas Control - RCA	-	18	1	3	48	-	-	12	81	81	-	-	285	-	-	-	-	11,577	245	-
4a.1.5.7	Condensate & Feedwater	-	888	60	281	5,046	-	-	1,027	7,303	7,303	-	-	30,157	-	-	-	-	1,224,704	12,501	-
4a.1.5.8	Condensate & Feedwater - Insulated	-	444	12	55	980	-	-	267	1,757	1,757	-	-	5,855	-	-	-	-	237,764	6,185	-
4a.1.5.9	Condensate Demin	-	494	9	44	792	-	-	250	1,590	1,590	-	-	4,735	-	-	-	-	192,293	6,784	-
4a.1.5.10	Condensate Storage	-	657	16	77	1,378	-	-	384	2,512	2,512	-	-	8,237	-	-	-	-	334,489	9,265	-
4a.1.5.11	Control Rod Drive	-	3	0	0	4	-	-	1	8	8	-	-	24	-	-	-	-	976	36	-
4a.1.5.12	Control Rod Drive Hydraulic	-	374	5	23	408	-	-	159	968	968	-	-	2,440	-	-	-	-	99,094	5,255	-
4a.1.5.13	Core Spray	-	71	10	48	855	-	-	154	1,138	1,138	-	-	5,109	-	-	-	-	207,487	1,026	-
4a.1.5.14	Core Spray - Insulated	-	131	2	11	198	-	-	64	407	407	-	-	1,184	-	-	-	-	48,081	1,806	-
4a.1.5.15	Demin Water - Insulated - RCA	-	15	0	1	14	-	-	6	36	36	-	-	85	-	-	-	-	3,445	181	-
4a.1.5.16	Demin Water - RCA	-	41	1	2	42	-	-	17	104	104	-	-	253	-	-	-	-	10,278	508	-
4a.1.5.17	Diesel Oil - RCA	-	2	0	0	4	-	-	1	7	7	-	-	23	-	-	-	-	931	25	-
4a.1.5.18	Drywell Atmosphere Cooling - RCA	-	38	1	5	92	-	-	24	159	159	-	-	548	-	-	-	-	22,244	550	-
4a.1.5.19	EDG Emerg Service Water - Insul - RCA	-	0	0	0	0	-	-	0	1	1	-	-	2	-	-	-	-	84	4	-
4a.1.5.20	Electrical - Clean	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	182	-
4a.1.5.21	Emergency Service Water - Insul - RCA	-	21	0	1	23	-	-	9	55	55	-	-	137	-	-	-	-	5,544	281	-
4a.1.5.22	Emergency Service Water - RCA	-	2	0	0	2	-	-	1	5	5	-	-	13	-	-	-	-	512	22	-
4a.1.5.23	GEZIP - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
4a.1.5.24	Generator Physical Design - RCA	-	5	0	0	5	-	-	2	12	12	-	-	31	-	-	-	-	1,250	67	-
4a.1.5.25	H2-O2 Control Analyzing	-	6	0	0	4	-	-	2	12	12	-	-	23	-	-	-	-	948	72	-
4a.1.5.26	H2-O2 Control Analyzing - Insulated	-	6	0	0	4	-	-	2	12	12	-	-	23	-	-	-	-	948	72	-
4a.1.5.27	High Pressure Coolant Injection	-	60	3	12	211	-	-	49	334	334	-	-	1,262	-	-	-	-	51,257	850	-
4a.1.5.28	High Pressure Coolant Injection - Insula	-	198	4	21	379	-	-	110	713	713	-	-	2,266	-	-	-	-	92,018	2,734	-
4a.1.5.29	Hydrogen Cooling	-	8	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	118	-
4a.1.5.30	Hydrogen Cooling - RCA	-	7	0	0	7	-	-	3	17	17	-	-	39	-	-	-	-	1,600	79	-
4a.1.5.31	Hydrogen Seal Oil - RCA	-	17	0	2	32	-	-	9	60	60	-	-	189	-	-	-	-	7,669	212	-
4a.1.5.32	Hydrogen Water Chemistry - RCA	-	24	0	1	23	-	-	10	59	59	-	-	140	-	-	-	-	5,672	304	-

Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4a.1.5.33	Instrument & Service Air - RCA	-	225	4	17	296	-	-	103	644	644	-	-	1,768	-	-	-	-	71,810	2,733	-
4a.1.5.34	Main Condenser	-	177	4	18	318	-	-	95	613	613	-	-	1,903	-	-	-	-	77,301	2,443	-
4a.1.5.35	Main Steam	-	225	6	28	498	-	-	136	892	892	-	-	2,975	-	-	-	-	120,806	3,122	-
4a.1.5.36	Main Turbine	-	909	63	298	5,335	-	-	1,079	7,684	7,684	-	-	31,885	-	-	-	-	1,294,866	12,952	-
4a.1.5.37	Main Turbine - Insulated	-	193	7	32	579	-	-	141	952	952	-	-	3,460	-	-	-	-	140,506	2,725	-
4a.1.5.38	Miscellaneous	-	38	1	3	51	-	-	18	110	110	-	-	302	-	-	-	-	12,283	556	-
4a.1.5.39	Off Gas Recombiner	-	169	6	27	479	-	-	119	799	799	-	-	2,861	-	-	-	-	116,194	2,387	-
4a.1.5.40	Off Gas Recombiner - Insulated	-	351	5	22	393	-	-	150	921	921	-	-	2,350	-	-	-	-	95,441	4,785	-
4a.1.5.41	Post Accident Sampling	-	23	0	1	16	-	-	8	48	48	-	-	99	-	-	-	-	4,004	306	-
4a.1.5.42	Post Accident Sampling - Insulated	-	15	0	1	11	-	-	6	33	33	-	-	67	-	-	-	-	2,737	190	-
4a.1.5.43	RHR Service Water - Insulated - RCA	-	83	3	14	248	-	-	60	409	409	-	-	1,485	-	-	-	-	60,293	1,125	-
4a.1.5.44	RHR Service Water - RCA	-	4	0	0	6	-	-	2	12	12	-	-	35	-	-	-	-	1,410	57	-
4a.1.5.45	Reactor Feedwater Pump Seal	-	50	1	3	55	-	-	21	130	130	-	-	327	-	-	-	-	13,295	687	-
4a.1.5.46	Residual Heat Removal	-	226	58	147	2,110	514	-	529	3,584	3,584	-	-	12,609	1,519	-	-	-	609,174	3,282	-
4a.1.5.47	Residual Heat Removal - Insulated	-	500	39	74	851	464	-	384	2,312	2,312	-	-	5,084	1,374	-	-	-	294,206	7,027	-
4a.1.5.48	Rx Core Isolation Cooling	-	43	1	3	61	-	-	21	129	129	-	-	364	-	-	-	-	14,781	609	-
4a.1.5.49	Rx Core Isolation Cooling - Insulated	-	97	1	5	94	-	-	39	237	237	-	-	563	-	-	-	-	22,843	1,315	-
4a.1.5.50	Rx Recirculation	-	53	5	4	16	52	-	30	161	161	-	-	96	152	-	-	-	13,794	691	-
4a.1.5.51	Snubbers	-	151	1	5	84	-	-	51	292	292	-	-	502	-	-	-	-	20,395	2,272	-
4a.1.5.52	Standby Liquid Control - Insul - RCA	-	4	0	0	4	-	-	2	9	9	-	-	22	-	-	-	-	904	48	-
4a.1.5.53	Standby Liquid Control - RCA	-	26	1	2	41	-	-	13	83	83	-	-	245	-	-	-	-	9,969	341	-
4a.1.5.54	Stator Cooling - RCA	-	7	0	1	21	-	-	5	35	35	-	-	126	-	-	-	-	5,135	98	-
4a.1.5.55	Traversing Incore Probe	-	3	0	0	0	2	-	1	7	7	-	-	2	5	-	-	-	379	46	-
4a.1.5	Totals	-	7,490	347	1,370	23,501	1,032	-	5,894	39,634	39,610	-	24	140,459	3,050	-	-	-	5,899,167	104,297	-
4a.1.6	Scaffolding in support of decommissioning	-	2,106	22	12	191	31	-	567	2,929	2,929	-	-	1,030	91	-	-	-	52,111	19,968	-
4a.1	Subtotal Period 4a Activity Costs	211	27,165	15,691	4,132	33,494	35,367	557	40,431	157,048	157,024	-	24	184,963	30,945	1,628	600	-	10,226,560	209,462	2,110
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	4	-	7	12	-	28	-	12	63	63	-	-	-	64	-	-	-	3,856	13	-
4a.3.3	Small tool allowance	-	267	-	-	-	-	-	40	307	276	-	31	-	-	-	-	-	-	-	-
4a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	6,395	959	7,355	-	7,355	-	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	4	267	7	12	-	28	6,395	1,011	7,724	339	7,355	31	-	64	-	-	-	3,856	13	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	87	-	-	-	-	-	-	22	109	109	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	790	79	869	869	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	3,594	359	3,953	3,293	660	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,872	-	-	-	-	-	468	2,340	2,340	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	2,811	-	-	-	-	-	422	3,232	3,232	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	89	46	-	370	-	108	612	612	-	-	-	4,485	-	-	-	89,703	146	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	1,938	291	2,229	2,229	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC ISFSI Fees	-	-	-	-	-	-	32	3	35	-	35	-	-	-	-	-	-	-	-	-
4a.4.9	NRC Fees	-	-	-	-	-	-	544	54	598	598	-	-	-	-	-	-	-	-	-	-
4a.4.10	Emergency Planning Fees	-	-	-	-	-	-	167	17	183	-	183	-	-	-	-	-	-	-	-	-
4a.4.11	Fixed Overhead	-	-	-	-	-	-	2,380	357	2,737	2,737	-	-	-	-	-	-	-	-	-	-
4a.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	477	72	549	549	-	-	-	-	-	-	-	-	-	-
4a.4.13	ISFSI Operating Costs	-	-	-	-	-	-	126	19	145	-	145	-	-	-	-	-	-	-	-	-
4a.4.14	Railroad Track Maintenance	-	-	-	-	-	-	140	21	162	162	-	-	-	-	-	-	-	-	-	-
4a.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,258	189	1,447	1,447	-	-	-	-	-	-	-	-	-	-
4a.4.16	Security Staff Cost	-	-	-	-	-	-	6,666	1,000	7,666	5,734	1,932	-	-	-	-	-	-	-	-	101,051
4a.4.17	DOC Staff Cost	-	-	-	-	-	-	14,604	2,191	16,795	16,795	-	-	-	-	-	-	-	-	-	161,214
4a.4.18	Utility Staff Cost	-	-	-	-	-	-	19,141	2,871	22,012	20,691	1,321	-	-	-	-	-	-	-	-	294,391
4a.4	Subtotal Period 4a Period-Dependent Costs	87	4,683	89	46	-	370	51,858	8,542	65,674	61,399	4,275	-	-	4,485	-	-	-	89,703	146	556,657
4a.0	TOTAL PERIOD 4a COST	302	32,114	15,787	4,190	33,494	35,765	58,810	49,984	230,446	218,761	11,630	55	184,963	35,494	1,628	600	-	10,320,120	209,621	558,767
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	591	58	103	149	-	2,572	-	986	4,459	4,459	-	-	-	7,653	-	-	-	486,170	906	-
Disposal of Plant Systems																					
4b.1.2.1	ALARA/Radiological	-	16	0	0	8	-	-	5	30	30	-	-	49	-	-	-	-	1,987	247	-
4b.1.2.2	Alternate N2 - RCA	-	16	0	1	16	-	-	7	40	40	-	-	93	-	-	-	-	3,765	185	-
4b.1.2.3	Cranes/Heavy Loads/Rigging - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-

Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4b.1.2.4	Decontamination Projects	-	1	0	0	1	-	-	0	2	2	-	-	3	-	-	-	-	125	15	-
4b.1.2.5	Electrical - Contaminated	-	400	5	23	421	-	-	167	1,016	1,016	-	-	2,514	-	-	-	-	102,112	5,633	-
4b.1.2.6	Electrical - Contaminated Fuel Pool	-	42	1	2	42	-	-	17	105	105	-	-	253	-	-	-	-	10,272	592	-
4b.1.2.7	Electrical - Decontam. Fuel Pool Area	-	297	5	23	411	-	-	140	876	876	-	-	2,457	-	-	-	-	99,783	4,090	-
4b.1.2.8	Electrical - Decontaminated	-	2,698	48	218	3,906	-	-	1,298	8,167	8,167	-	-	23,344	-	-	-	-	948,013	37,107	-
4b.1.2.9	Fire - RCA	-	101	1	6	103	-	-	42	253	253	-	-	614	-	-	-	-	24,917	1,324	-
4b.1.2.10	Fire - RCA - Fuel Pool Area	-	11	0	1	10	-	-	4	26	26	-	-	62	-	-	-	-	2,499	143	-
4b.1.2.11	Fuel Pool Cooling & Cleanup	-	387	20	33	343	241	-	216	1,241	1,241	-	-	2,051	712	-	-	-	128,918	5,363	-
4b.1.2.12	Fuel Pool Cooling & Cleanup - Insulated	-	37	2	3	22	24	-	19	107	107	-	-	130	71	-	-	-	9,830	514	-
4b.1.2.13	HVAC Ductwork	-	276	6	26	469	-	-	144	921	921	-	-	2,805	-	-	-	-	113,913	3,539	-
4b.1.2.14	HVAC Ductwork - Fuel Pool Area	-	31	1	3	52	-	-	16	102	102	-	-	312	-	-	-	-	12,657	393	-
4b.1.2.15	HVAC/Chilled Water - RCA	-	324	6	26	461	-	-	155	971	971	-	-	2,752	-	-	-	-	111,779	3,985	-
4b.1.2.16	HVAC/Chilled Water - RCA Fuel Pool Area	-	33	0	2	37	-	-	14	87	87	-	-	223	-	-	-	-	9,072	397	-
4b.1.2.17	Heating & Ventilation	-	433	13	59	1,060	-	-	277	1,842	1,842	-	-	6,334	-	-	-	-	257,243	6,340	-
4b.1.2.18	Heating Boiler - Insulated - RCA	-	3	0	0	4	-	-	1	9	9	-	-	26	-	-	-	-	1,058	35	-
4b.1.2.19	Instrument & Service Air-RCA-Fuel Pool	-	29	1	2	45	-	-	14	91	91	-	-	267	-	-	-	-	10,841	357	-
4b.1.2.20	Liquid Radwaste	-	621	31	57	703	311	-	350	2,072	2,072	-	-	4,203	915	-	-	-	229,422	8,550	-
4b.1.2.21	Makeup Demin - RCA	-	103	3	14	246	-	-	65	431	431	-	-	1,471	-	-	-	-	59,747	1,412	-
4b.1.2.22	Non-Essential Diesel Generator - RCA	-	27	3	13	238	-	-	45	327	327	-	-	1,424	-	-	-	-	57,832	395	-
4b.1.2.23	Off Gas Holdup	-	310	7	34	607	-	-	174	1,133	1,133	-	-	3,629	-	-	-	-	147,355	4,256	-
4b.1.2.24	Primary Containment	-	411	16	77	1,389	-	-	324	2,218	2,218	-	-	8,302	-	-	-	-	337,148	5,729	-
4b.1.2.25	Process Radiation Monitors	-	41	0	2	36	-	-	16	95	95	-	-	213	-	-	-	-	8,667	577	-
4b.1.2.26	Rx Bldg Closed Clng Water - Insul - RCA	-	114	2	9	163	-	-	54	343	343	-	-	977	-	-	-	-	39,675	1,484	-
4b.1.2.27	Rx Bldg Closed Clng Water - RCA	-	184	15	66	1,187	-	-	235	1,687	1,687	-	-	7,093	-	-	-	-	288,031	2,489	-
4b.1.2.28	Rx Component Handling Equip	-	127	11	24	291	139	-	115	708	708	-	-	1,737	415	-	-	-	96,901	1,839	-
4b.1.2.29	Rx Pressure Vessel	-	43	5	5	27	57	-	30	167	167	-	-	161	169	-	-	-	17,375	578	-
4b.1.2.30	Rx Water Cleanup	-	239	16	15	47	214	-	124	655	655	-	-	278	630	-	-	-	51,819	3,264	-
4b.1.2.31	Secondary Containment	-	112	3	13	229	-	-	65	421	421	-	-	1,372	-	-	-	-	55,702	1,569	-
4b.1.2.32	Service & Seal Water - Insulated - RCA	-	120	2	11	197	-	-	62	392	392	-	-	1,180	-	-	-	-	47,917	1,565	-
4b.1.2.33	Service & Seal Water - RCA	-	159	4	17	303	-	-	88	570	570	-	-	1,809	-	-	-	-	73,453	2,016	-
4b.1.2.34	Service Air Blower - RCA	-	15	0	2	34	-	-	9	62	62	-	-	206	-	-	-	-	8,364	206	-
4b.1.2.35	Solid Radwaste	-	446	21	45	567	223	-	261	1,563	1,563	-	-	3,390	659	-	-	-	179,772	6,270	-
4b.1.2.36	Structures & Buildings	-	70	1	4	80	-	-	30	185	185	-	-	477	-	-	-	-	19,351	1,005	-
4b.1.2.37	Wells & Domestic Water	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	144	-
4b.1.2.38	Wells & Domestic Water - RCA	-	52	1	3	57	-	-	22	136	136	-	-	342	-	-	-	-	13,874	633	-
4b.1.2	Totals	-	8,342	249	841	13,829	1,210	-	4,613	29,085	29,073	-	11	82,654	3,571	-	-	-	3,585,374	114,290	-
4b.1.3	Scaffolding in support of decommissioning	-	3,159	33	19	286	46	-	850	4,394	4,394	-	-	1,545	136	-	-	-	78,166	29,953	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor Building	4,668	2,596	178	516	8,044	1,181	-	4,580	21,764	21,764	-	-	48,077	7,014	-	-	-	2,317,670	100,718	-
4b.1.4.2	Admin	96	5	0	3	-	15	-	53	172	172	-	-	-	145	-	-	-	6,840	1,421	-
4b.1.4.3	HPCI Room	26	25	1	3	20	14	-	26	115	115	-	-	118	125	-	-	-	10,759	703	-
4b.1.4.4	Hot Shop	15	4	0	2	-	11	-	11	43	43	-	-	-	103	-	-	-	4,860	254	-
4b.1.4.5	LLRW Storage & Shipping	52	22	2	8	5	45	-	45	179	179	-	-	31	433	-	-	-	21,708	1,003	-
4b.1.4.6	Offgas Stack	336	241	7	23	225	82	-	286	1,199	1,199	-	-	1,343	669	-	-	-	87,045	7,924	-
4b.1.4.7	Offgas Storage & Compressor	36	15	1	6	4	33	-	32	128	128	-	-	25	316	-	-	-	15,948	696	-
4b.1.4.8	Radwaste	109	54	3	17	29	96	-	100	410	410	-	-	172	910	-	-	-	49,943	2,229	-
4b.1.4.9	Radwaste Material Storage Warehouse	57	21	2	9	-	52	-	48	189	189	-	-	-	495	-	-	-	23,400	1,062	-
4b.1.4.10	Recombiner	24	22	1	5	33	24	-	30	140	140	-	-	199	216	-	-	-	18,405	616	-
4b.1.4.11	Turbine	638	314	21	104	215	564	-	588	2,444	2,444	-	-	1,283	5,299	-	-	-	303,150	12,856	-
4b.1.4.12	Turbine Building Addition	53	19	1	8	-	45	-	44	169	169	-	-	-	434	-	-	-	20,478	968	-
4b.1.4.13	Reactor (Post Fuel)	849	2,325	172	913	329	5,301	-	2,535	12,425	12,425	-	-	1,969	50,605	-	-	-	2,471,778	40,860	-
4b.1.4	Totals	6,960	5,663	390	1,617	8,904	7,465	-	8,379	39,378	39,378	-	-	53,216	66,764	-	-	-	5,351,984	171,309	-
4b.1.5	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
4b.1.6	Receive NRC approval of termination plan									a											
4b.1	Subtotal Period 4b Activity Costs	7,551	17,223	776	2,626	23,019	11,293	526	14,907	77,921	77,910	-	11	137,414	78,124	-	-	-	9,501,694	316,457	4,096
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
4b.2.2	Excavation of Underground Services	-	1,972	-	-	-	-	376	550	2,898	2,898	-	-	-	-	-	-	-	-	12,493	-
4b.2.3	Operational Equipment	-	-	23	92	1,211	-	-	198	1,524	1,524	-	-	11,760	-	-	-	-	294,000	32	-
4b.2	Subtotal Period 4b Additional Costs	-	1,972	23	92	1,211	-	1,835	1,185	6,317	6,317	-	-	11,760	-	-	-	-	294,000	12,525	12,480

Table J
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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	12	-	22	39	-	88	-	36	196	196	-	-	-	202	-	-	-	12,097	39	-
4b.3.3	Small tool allowance	-	397	-	-	-	-	-	60	456	456	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	130	82	1,112	178	-	237	1,739	1,739	-	-	6,000	529	-	-	-	303,608	147	-
4b.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	14,092	2,114	16,206	-	16,206	-	-	-	-	-	-	-	-	-
4b.3	Subtotal Period 4b Collateral Costs	12	397	152	121	1,112	266	14,092	2,446	18,597	2,392	16,206	-	6,000	731	-	-	-	315,705	186	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,701	-	-	-	-	-	-	425	2,126	2,126	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	1,434	143	1,577	1,577	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	6,289	629	6,917	5,721	1,197	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	3,050	-	-	-	-	-	763	3,813	3,813	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	5,239	-	-	-	-	-	786	6,024	6,024	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	117	60	-	486	-	142	805	805	-	-	-	5,895	-	-	-	117,897	192	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,777	417	3,194	3,194	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC ISFSI Fees	-	-	-	-	-	-	57	6	63	-	63	-	-	-	-	-	-	-	-	-
4b.4.9	NRC Fees	-	-	-	-	-	-	986	99	1,085	1,085	-	-	-	-	-	-	-	-	-	-
4b.4.10	Emergency Planning Fees	-	-	-	-	-	-	302	30	332	-	332	-	-	-	-	-	-	-	-	-
4b.4.11	Fixed Overhead	-	-	-	-	-	-	4,319	648	4,967	4,967	-	-	-	-	-	-	-	-	-	-
4b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	866	130	996	996	-	-	-	-	-	-	-	-	-	-
4b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	228	34	262	-	262	-	-	-	-	-	-	-	-	-
4b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	255	38	293	293	-	-	-	-	-	-	-	-	-	-
4b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	2,283	343	2,626	2,626	-	-	-	-	-	-	-	-	-	-
4b.4.16	Security Staff Cost	-	-	-	-	-	-	12,097	1,815	13,912	3,826	10,086	-	-	-	-	-	-	-	-	183,371
4b.4.17	DOC Staff Cost	-	-	-	-	-	-	25,916	3,887	29,803	29,803	-	-	-	-	-	-	-	-	-	284,065
4b.4.18	Utility Staff Cost	-	-	-	-	-	-	32,869	4,930	37,799	35,380	2,419	-	-	-	-	-	-	-	-	504,534
4b.4	Subtotal Period 4b Period-Dependent Costs	1,701	8,289	117	60	-	486	90,679	15,264	116,596	102,236	14,360	-	-	5,895	-	-	-	117,897	192	971,970
4b.0	TOTAL PERIOD 4b COST	9,264	27,881	1,067	2,898	25,343	12,044	107,132	33,802	219,432	188,855	30,565	11	155,174	84,750	-	-	-	10,229,300	329,361	988,546
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
4f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	4,289	643	4,933	-	4,933	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	5,553	833	6,386	1,454	4,933	-	-	-	-	-	-	-	-	-
Period 4f Period-Dependent Costs																					
4f.4.1	Insurance	-	-	-	-	-	-	530	53	583	-	583	-	-	-	-	-	-	-	-	-
4f.4.2	Property taxes	-	-	-	-	-	-	2,198	220	2,417	1,975	442	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	708	-	-	-	-	-	177	884	884	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	7	4	-	29	-	9	48	48	-	-	-	355	-	-	-	7,097	12	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	274	41	315	315	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC ISFSI Fees	-	-	-	-	-	-	21	2	23	-	23	-	-	-	-	-	-	-	-	-
4f.4.7	NRC Fees	-	-	-	-	-	-	426	43	468	468	-	-	-	-	-	-	-	-	-	-
4f.4.8	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
4f.4.9	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
4f.4.10	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
4f.4.11	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
4f.4.12	Security Staff Cost	-	-	-	-	-	-	3,463	519	3,982	1,565	2,417	-	-	-	-	-	-	-	-	50,932
4f.4.13	DOC Staff Cost	-	-	-	-	-	-	5,393	809	6,201	6,201	-	-	-	-	-	-	-	-	-	57,200
4f.4.14	Utility Staff Cost	-	-	-	-	-	-	5,762	864	6,626	5,738	888	-	-	-	-	-	-	-	-	80,707
4f.4	Subtotal Period 4f Period-Dependent Costs	-	708	7	4	-	29	19,952	3,014	23,713	19,140	4,574	-	-	355	-	-	-	7,097	12	188,838
4f.0	TOTAL PERIOD 4f COST	-	708	7	4	-	29	32,591	5,973	39,311	29,805	9,507	-	-	355	-	-	-	7,097	95,059	195,078
PERIOD 4 TOTALS		9,566	60,703	16,861	7,092	58,837	47,839	198,533	89,758	489,189	437,421	51,702	66	340,138	120,599	1,628	600	-	20,556,510	634,041	1,742,391

Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor Building	-	1,971	-	-	-	-	-	296	2,267	-	-	2,267	-	-	-	-	-	-	13,911	-
5b.1.1.2	Condensate Tanks Foundation	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	50	-
5b.1.1.3	Discharge Retention Basin	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	25	-
5b.1.1.4	HPCI Room	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	97	-
5b.1.1.5	Hot Shop	-	16	-	-	-	-	-	2	19	-	-	19	-	-	-	-	-	-	177	-
5b.1.1.6	Hydrogen & Oxygen Storage	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	19	-
5b.1.1.7	LLRW Storage & Shipping	-	83	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	662	-
5b.1.1.8	MSIV	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	42	-
5b.1.1.9	Misc Structures 2017	-	1,410	-	-	-	-	-	212	1,622	-	-	1,622	-	-	-	-	-	-	13,042	-
5b.1.1.10	Offgas Stack	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	544	-
5b.1.1.11	Offgas Storage & Compressor	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	199	-
5b.1.1.12	Radwaste	-	228	-	-	-	-	-	34	262	-	-	262	-	-	-	-	-	-	1,220	-
5b.1.1.13	Recombiner	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	713	-
5b.1.1.14	Security Barrier	-	186	-	-	-	-	-	28	214	-	-	214	-	-	-	-	-	-	933	-
5b.1.1.15	Structures Greater than 3' Below Grade	-	2,461	-	-	-	-	-	369	2,830	-	-	2,830	-	-	-	-	-	-	12,649	-
5b.1.1.16	Tank Farm	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	21	-
5b.1.1.17	Turbine	-	1,259	-	-	-	-	-	189	1,448	-	-	1,448	-	-	-	-	-	-	13,036	-
5b.1.1.18	Turbine Building Addition	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	618	-
5b.1.1.19	Turbine Pedestal	-	182	-	-	-	-	-	27	209	-	-	209	-	-	-	-	-	-	926	-
5b.1.1	Totals	-	8,169	-	-	-	-	-	1,225	9,394	-	-	9,394	-	-	-	-	-	-	58,885	-
Site Closeout Activities																					
5b.1.2	Grade & landscape site	-	896	-	-	-	-	-	134	1,031	-	-	1,031	-	-	-	-	-	-	1,841	-
5b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	9,065	-	-	-	-	200	1,390	10,655	231	-	10,425	-	-	-	-	-	-	60,726	1,560
Period 5b Additional Costs																					
5b.2.1	Clean Concrete Disposal	-	3,322	-	-	-	-	13	500	3,835	-	-	3,835	-	-	-	-	-	-	12	-
5b.2.2	Intake Structure Cofferdam	-	335	-	-	-	-	-	50	385	-	-	385	-	-	-	-	-	-	2,584	-
5b.2.3	Construction Debris	-	-	-	-	-	-	1,170	176	1,346	-	-	1,346	-	-	-	-	-	-	-	-
5b.2.4	Backfill	-	5,583	-	-	-	-	-	837	6,421	-	-	6,421	-	-	-	-	-	-	5,422	-
5b.2.5	Discharge Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
5b.2.6	Disposition of Original MPC Canisters	-	55	185	954	-	5,641	-	1,709	8,544	8,544	-	-	-	21,097	-	-	-	2,505,700	337	-
5b.2	Subtotal Period 5b Additional Costs	-	9,737	185	954	-	5,641	1,183	3,339	21,039	8,544	-	12,495	-	21,097	-	-	-	2,505,700	11,907	-
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	111	-	-	-	-	-	17	127	-	-	127	-	-	-	-	-	-	-	-
5b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	9,867	1,480	11,347	-	11,347	-	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	111	-	-	-	-	9,867	1,497	11,475	-	11,347	127	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	1,220	122	1,342	-	1,342	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	4,534	453	4,988	-	-	4,988	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	5,842	-	-	-	-	-	876	6,719	-	-	6,719	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	315	47	362	-	362	-	-	-	-	-	-	-	-	-
5b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	375	37	412	-	412	-	-	-	-	-	-	-	-	-
5b.4.6	Emergency Planning Fees	-	-	-	-	-	-	257	26	283	-	283	-	-	-	-	-	-	-	-	-
5b.4.7	Fixed Overhead	-	-	-	-	-	-	1,122	168	1,290	0	860	429	-	-	-	-	-	-	-	-
5b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	194	29	223	-	223	-	-	-	-	-	-	-	-	-
5b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	217	33	249	0	150	100	-	-	-	-	-	-	-	-
5b.4.10	Security Staff Cost	-	-	-	-	-	-	7,971	1,196	9,167	0	8,580	587	-	-	-	-	-	-	-	117,235
5b.4.11	DOC Staff Cost	-	-	-	-	-	-	11,729	1,759	13,489	-	-	13,489	-	-	-	-	-	-	-	122,646
5b.4.12	Utility Staff Cost	-	-	-	-	-	-	7,148	1,072	8,220	82	2,047	6,091	-	-	-	-	-	-	-	101,904
5b.4	Subtotal Period 5b Period-Dependent Costs	-	5,842	-	-	-	-	35,082	5,819	46,744	82	14,259	32,402	-	-	-	-	-	-	-	341,785
5b.0	TOTAL PERIOD 5b COST	-	24,755	185	954	-	5,641	46,332	12,044	89,912	8,857	25,606	55,449	-	21,097	-	-	-	2,505,700	72,633	343,345
PERIOD 5c - Fuel Storage Operations/Shipping																					
Period 5c Direct Decommissioning Activities																					
Period 5c Collateral Costs																					
5c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,042,659	156,399	1,199,058	-	1,199,058	-	-	-	-	-	-	-	-	-

Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
5c.3	Subtotal Period 5c Collateral Costs	-	-	-	-	-	-	1,042,659	156,399	1,199,058	-	1,199,058	-	-	-	-	-	-	-	-	-
Period 5c Period-Dependent Costs																					
5c.4.1	Insurance	-	-	-	-	-	-	97,505	9,751	107,256	-	107,256	-	-	-	-	-	-	-	-	-
5c.4.2	Property taxes	-	-	-	-	-	-	126,660	12,666	139,326	-	139,326	-	-	-	-	-	-	-	-	-
5c.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	29,939	2,994	32,933	-	32,933	-	-	-	-	-	-	-	-	-
5c.4.5	Emergency Planning Fees	-	-	-	-	-	-	20,554	2,055	22,610	-	22,610	-	-	-	-	-	-	-	-	-
5c.4.6	Fixed Overhead	-	-	-	-	-	-	29,861	4,479	34,340	-	34,340	-	-	-	-	-	-	-	-	-
5c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	15,517	2,328	17,845	-	17,845	-	-	-	-	-	-	-	-	-
5c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	17,335	2,600	19,935	-	19,935	-	-	-	-	-	-	-	-	-
5c.4.9	Security Staff Cost	-	-	-	-	-	-	542,257	81,339	623,596	-	623,596	-	-	-	-	-	-	-	-	7,785,623
5c.4.10	DOC Staff Cost	-	-	-	-	-	-	42,500	6,375	48,875	-	48,875	-	-	-	-	-	-	-	-	288,356
5c.4.11	Utility Staff Cost	-	-	-	-	-	-	264,872	39,731	304,603	-	304,603	-	-	-	-	-	-	-	-	3,820,722
5c.4	Subtotal Period 5c Period-Dependent Costs	-	-	-	-	-	-	1,187,001	164,317	1,351,318	-	1,351,318	-	-	-	-	-	-	-	-	11,894,700
5c.0	TOTAL PERIOD 5c COST	-	-	-	-	-	-	2,229,660	320,716	2,550,376	-	2,550,376	-	-	-	-	-	-	-	-	11,894,700
PERIOD 5d - GTCC shipping																					
Period 5d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
5d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
5d.1.1	Totals	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
5d.1	Subtotal Period 5d Activity Costs	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
Period 5d Collateral Costs																					
5d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
5d.3	Subtotal Period 5d Collateral Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
Period 5d Period-Dependent Costs																					
5d.4.1	Insurance	-	-	-	-	-	-	27	3	30	30	-	-	-	-	-	-	-	-	-	-
5d.4.2	Property taxes	-	-	-	-	-	-	35	3	38	38	-	-	-	-	-	-	-	-	-	-
5d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8	1	9	-	9	-	-	-	-	-	-	-	-	-
5d.4.5	Emergency Planning Fees	-	-	-	-	-	-	6	1	6	-	6	-	-	-	-	-	-	-	-	-
5d.4.6	Fixed Overhead	-	-	-	-	-	-	8	1	10	10	-	-	-	-	-	-	-	-	-	-
5d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	-
5d.4.8	Security Staff Cost	-	-	-	-	-	-	150	23	173	173	-	-	-	-	-	-	-	-	-	2,154
5d.4.9	Utility Staff Cost	-	-	-	-	-	-	39	6	45	45	-	-	-	-	-	-	-	-	-	539
5d.4	Subtotal Period 5d Period-Dependent Costs	-	-	-	-	-	-	278	38	316	301	15	-	-	-	-	-	-	-	-	2,693
5d.0	TOTAL PERIOD 5d COST	-	-	1,083	-	-	4,313	306	960	6,661	6,615	47	-	-	-	-	-	1,160	225,765	-	2,693
PERIOD 5e - ISFSI Decontamination																					
Period 5e Direct Decommissioning Activities																					
Period 5e Additional Costs																					
5e.2.1	License Termination ISFSI	-	0	3	33	-	283	2,086	602	3,008	3,008	-	-	-	848	-	-	-	131,507	10,502	2,225
5e.2	Subtotal Period 5e Additional Costs	-	0	3	33	-	283	2,086	602	3,008	3,008	-	-	-	848	-	-	-	131,507	10,502	2,225
Period 5e Period-Dependent Costs																					
5e.4.1	Insurance	-	-	-	-	-	-	118	30	148	148	-	-	-	-	-	-	-	-	-	-
5e.4.2	Property taxes	-	-	-	-	-	-	248	62	310	310	-	-	-	-	-	-	-	-	-	-
5e.4.3	Plant energy budget	-	-	-	-	-	-	12	3	15	15	-	-	-	-	-	-	-	-	-	-
5e.4.4	Fixed Overhead	-	-	-	-	-	-	71	18	89	89	-	-	-	-	-	-	-	-	-	-
5e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	41	10	52	52	-	-	-	-	-	-	-	-	-	-
5e.4.6	Security Staff Cost	-	-	-	-	-	-	352	88	440	440	-	-	-	-	-	-	-	-	-	4,999
5e.4.7	Utility Staff Cost	-	-	-	-	-	-	261	65	326	326	-	-	-	-	-	-	-	-	-	3,792
5e.4	Subtotal Period 5e Period-Dependent Costs	-	-	-	-	-	-	1,104	276	1,380	1,380	-	-	-	-	-	-	-	-	-	8,792
5e.0	TOTAL PERIOD 5e COST	-	0	3	33	-	283	3,190	877	4,387	4,387	-	-	-	848	-	-	-	131,507	10,502	11,017

Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 5f - ISFSI Site Restoration																					
Period 5f Direct Decommissioning Activities																					
Period 5f Additional Costs																					
5f.2.1	Demolition and Site Restoration of ISFSI	-	1,564	-	-	-	-	256	273	2,093	-	-	2,093	-	-	-	-	-	-	7,309	160
5f.2	Subtotal Period 5f Additional Costs	-	1,564	-	-	-	-	256	273	2,093	-	-	2,093	-	-	-	-	-	-	7,309	160
Period 5f Collateral Costs																					
5f.3.1	Small tool allowance	-	11	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	-	-
5f.3	Subtotal Period 5f Collateral Costs	-	11	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	-	-
Period 5f Period-Dependent Costs																					
5f.4.2	Property taxes	-	-	-	-	-	-	127	13	140	-	-	140	-	-	-	-	-	-	-	-
5f.4.3	Heavy equipment rental	-	118	-	-	-	-	-	18	136	-	-	136	-	-	-	-	-	-	-	-
5f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	7	-	-	7	-	-	-	-	-	-	-	-
5f.4.5	Fixed Overhead	-	-	-	-	-	-	37	5	42	-	-	42	-	-	-	-	-	-	-	-
5f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	21	3	24	-	-	24	-	-	-	-	-	-	-	-
5f.4.7	Security Staff Cost	-	-	-	-	-	-	180	27	207	-	-	207	-	-	-	-	-	-	-	2,562
5f.4.8	Utility Staff Cost	-	-	-	-	-	-	111	17	128	-	-	128	-	-	-	-	-	-	-	1,590
5f.4	Subtotal Period 5f Period-Dependent Costs	-	118	-	-	-	-	482	84	685	-	-	685	-	-	-	-	-	-	-	4,151
5f.0	TOTAL PERIOD 5f COST	-	1,693	-	-	-	-	738	358	2,790	-	-	2,790	-	-	-	-	-	-	7,309	4,311
PERIOD 5 TOTALS		-	26,448	1,271	987	-	10,238	2,280,226	334,956	2,654,126	19,859	2,576,029	58,239	-	21,944	-	-	1,160	2,862,972	90,444	12,256,070
TOTAL COST TO DECOMMISSION		21,016	100,409	18,576	8,641	58,852	59,781	3,982,657	646,370	4,896,303	1,248,734	3,588,215	59,354	340,180	153,182	1,628	600	1,160	23,731,310	873,407	21,956,280

TOTAL COST TO DECOMMISSION WITH 15.21% CONTINGENCY:	**$4,896,303**	**thousands of 2020 dollars**	
TOTAL NRC LICENSE TERMINATION COST IS 25.5% OR:	**$1,248,734**	**thousands of 2020 dollars**	
SPENT FUEL MANAGEMENT COST IS 73.28% OR:	**$3,588,215**	**thousands of 2020 dollars**	
NON-NUCLEAR DEMOLITION COST IS 1.21% OR:	**$59,354**	**thousands of 2020 dollars**	
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**155,409**	**Cubic Feet**	
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,160**	**Cubic Feet**	
TOTAL SCRAP METAL REMOVED:	**23,123**	**Tons**	
TOTAL CRAFT LABOR REQUIREMENTS:	**873,407**	**Man-hours**	

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX K

ISFSI DECOMMISSIONING

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Monticello Nuclear Generating Plant – Scenarios 1, 2, 5 and 6 .....K-2

Monticello Nuclear Generating Plant – Scenarios 3, 4, 7 and 8 .....K-3

Table K-1
Monticello Nuclear Generating Plant
ISFSI Decommissioning Cost Estimate
Scenarios 1, 2, 5, and 6
(thousands of 2020 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	LLRW Disposal Costs	Other Costs	Total Costs	Burial Volume Class A (cubic feet)	Craft Manhours	Oversight and Contractor Manhours
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	217	217	-	-	1,048
Decontamination (activated disposition)	57	188	987	5,925	-	7,157	21,949	366	-
License Termination (radiological surveys)	-	-	-	-	1,327	1,327	-	9,973	-
Subtotal	**57**	**188**	**987**	**5,925**	**1,544**	**8,701**	**21,949**	**10,339**	**1,048**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	469	469	-	-	1,153
Insurance	-	-	-	-	118	118	-	-	-
Property taxes	-	-	-	-	249	249	-	-	-
Plant energy budget	-	-	-	-	12	12	-	-	-
Fixed Overhead	-	-	-	-	71	71	-	-	-
Railroad Track Maintenance	-	-	-	-	41	41	-	-	-
Security Staff Cost	-	-	-	-	352	352	-	-	3,792
Utility Staff Cost	-	-	-	-	261	261	-	-	8,792
Subtotal	-	-	-	-	**1,574**	**1,574**	-	-	**13,737**
Total (w/o contingency)	**57**	**188**	**987**	**5,925**	**3,118**	**10,275**	**21,949**	**10,339**	**14,785**
Total (w/25% contingency)	**71**	**235**	**1,234**	**7,406**	**3,897**	**12,844**			

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)

Table K-2
Monticello Nuclear Generating Plant
ISFSI Decommissioning Cost Estimate
Scenarios 3, 4, 7, and 8
(thousands of 2020 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	LLRW Disposal Costs	Other Costs	Total Costs	Burial Volume Class A (cubic feet)	Craft Manhours	Oversight and Contractor Manhours
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	228	228	-	-	1,072
Decontamination (activated disposition)	0	3	33	283	-	320	848	29	-
License Termination (radiological surveys)	-	-	-	-	1,388	1,388	-	10,473	-
Subtotal	**0**	**3**	**33**	**283**	**1,616**	**1,936**	**848**	**10,502**	**1,072**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	470	470	-	-	1,153
Insurance	-	-	-	-	118	118	-	-	-
Property taxes	-	-	-	-	249	249	-	-	-
Plant energy budget	-	-	-	-	12	12	-	-	-
Fixed Overhead	-	-	-	-	71	71	-	-	-
Railroad Track Maintenance	-	-	-	-	41	41	-	-	-
Security Staff Cost	-	-	-	-	352	352	-	-	4,999
Utility Staff Cost	-	-	-	-	261	261	-	-	3,792
Subtotal	-	-	-	-	**1,575**	**1,575**	-	-	**9,945**
Total (w/o contingency)	**0**	**3**	**33**	**283**	**3,191**	**3,511**	**848**	**10,502**	**11,017**
Total (w/25% contingency)	**0**	**4**	**41**	**354**	**3,989**	**4,389**			

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)

Document X01-1775-003, Rev. 0

DECOMMISSIONING COST ANALYSIS FOR A 70 YEAR OPERATING LIFE

for the

MONTICELLO NUCLEAR GENERATING PLANT

prepared for

Xcel Energy

prepared by

TLG Services, LLC
Bridgewater, Connecticut

October 2020

APPROVALS

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REVISION LOG

No.	Date	Item Revised	Reason for Revision
0	10-22-2020		Original Issue

EXECUTIVE SUMMARY

This report presents estimates of the cost to decommission the Monticello Nuclear Generating Plant (Monticello) for the identified DECON scenario following an assumed license extension, with cessation of plant operations in 2040. The estimates are designed to provide Xcel Energy with the information to assess its current decommissioning liability, as it relates to Monticello.

The analysis relies upon site-specific, technical information from an evaluation prepared in 2017, [1] updated to reflect current assumptions pertaining to the disposition of the nuclear plant and relevant industry experience in undertaking such projects. The costs are based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site restoration requirements.

While the analysis is not a detailed engineering evaluation, it represents the estimates prepared in advance of the detailed engineering required to carry out the decommissioning of the nuclear unit. It may also not reflect the actual plan to decommission Monticello; the plan may differ from the assumptions made in this analysis based on facts that exist at the time of decommissioning.

The primary goal of the decommissioning is the removal and disposal of the contaminated systems and structures so that the plant's operating license can be terminated. The analysis recognizes that spent fuel will be stored at the site in the reactor building's storage pool and/or in an Independent Spent Fuel Storage Installation (ISFSI) until such time that it can be transferred to a Department of Energy (DOE) facility. Consequently, the estimates also include those costs to manage and subsequently decommission these storage facilities.

The cost estimates in this report assume that Monticello ceases operations in 2040. The estimates also assume that the shutdown date of the nuclear unit is scheduled and pre-planned (i.e., there is no delay in transitioning the plant and workforce from operations or in obtaining regulatory relief from operating requirements, etc.). This estimate includes additional resources to support the engineering, planning, and licensing efforts for the station; this is done to support a decommissioning schedule similar to the prior estimate. The estimates include the continued operation of the reactor building as an interim wet fuel storage facility for approximately four years after operations cease. The spent fuel will remain in the ISFSI until the DOE is able to

1 "Decommissioning Cost Analysis for the Monticello Nuclear Generating Plant," Document No. X01-1725-002, Rev. 0, TLG Services, Inc., October 2017

complete the transfer of the fuel to a federal facility (e.g., a monitored retrievable storage facility). [2] The estimates also include the dismantling of non-essential structures and limited restoration of the site.

The 2017 plant inventory, the basis for the decontamination and dismantling requirements and cost, and the decommissioning waste streams, was reviewed for this analysis. Over the three-year period between estimates the plant confirmed there were no substantive changes to the configuration of the plant or site facilities (that would significantly impact decommissioning).

The costs to decommission Monticello, for the spent fuel scenarios evaluated, are tabulated at the end of this section. Costs are reported in 2020 dollars and include monies anticipated to be spent for radiological remediation and operating license termination, spent fuel management, and site restoration activities.

A complete discussion of the assumptions relied upon in this analysis is provided in Section 3, along with schedules of annual expenditures for each scenario. A sequence of significant project activities is provided in Section 4 with a timeline for each scenario. Detailed cost reports used to generate the summary tables contained within this document are provided in Appendices C through F.

Alternatives and Regulations

The ultimate objective of the decommissioning process is to reduce the inventory of contaminated and activated material so that the license can be terminated. The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule adopted on June 27, 1988.[3] In this rule, the NRC set forth technical and financial criteria for decommissioning licensed nuclear power facilities. The regulations addressed planning needs, timing, funding methods, and environmental review requirements for decommissioning. The rule also defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB.

> DECON is defined as "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are

2 Projected expenditures for spent fuel management identified in the cost analysis do not consider any compensation for damages with regard to the delays incurred by Xcel Energy in the timely removal of spent fuel by the DOE.

3 U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70 and 72, "General Requirements for Decommissioning Nuclear Facilities," Nuclear Regulatory Commission, 53 Fed. Reg. 24018, June 27, 1988

removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations."[4]

SAFSTOR is defined as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use."[5] Decommissioning is to be completed within 60 years, although longer time periods will be considered when necessary to protect public health and safety.

ENTOMB is defined as "the alternative in which radioactive contaminants are encased in a structurally long-lived material, such as concrete; the entombed structure is appropriately maintained and continued surveillance is carried out until the radioactivity decays to a level permitting unrestricted release of the property."[6] As with the SAFSTOR alternative, decommissioning is currently required to be completed within 60 years, although longer time periods will also be considered when necessary to protect public health and safety.

The 60-year restriction has limited the practicality for the ENTOMB alternative at commercial reactors that generate significant amounts of long-lived radioactive material. In 1997, the Commission directed its staff to re-evaluate this alternative and identify the technical requirements and regulatory actions that would be necessary for entombment to become a viable option. The resulting evaluation provided several recommendations, however, rulemaking has been deferred based upon several factors (e.g., no licensee has committed to pursuing the entombment option, the unresolved issues associated with the disposition of greater-than-Class C material (GTCC), and the NRC's current priorities) at least until after the additional research studies are complete. The Commission concurred with the staff's recommendation. In a draft regulatory basis document published in March 2017 in support of rulemaking that would amend NRC regulations concerning nuclear plant decommissioning, the NRC staff proposes removing any discussion of the ENTOMB option from existing guidance documents since the method is not deemed practically feasible.

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4 Ibid. Page FR24022, Column 3

5 Ibid.

6 Ibid. Page FR24023, Column 2

In 1996, the NRC published revisions to its general requirements for decommissioning nuclear power plants to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in the decommissioning process.[7] The amendments allow for greater public participation and better define the transition process from operations to decommissioning. Regulatory Guide 1.184 Revision 1, issued in October 2013, further described the methods and procedures that are acceptable to the NRC staff for implementing the requirements of the 1996 revised rule that relate to the initial activities and the major phases of the decommissioning process. The costs and schedules presented in this analysis follow the general guidance and sequence in the amended regulations. The format and content of the estimates is also consistent with the recommendations of Regulatory Guide 1.202, issued February 2005. [8]

In 2011, the NRC published amended regulations to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site.[9] The regulations require licensees to report additional details in their decommissioning cost estimate, including a decommissioning estimate for the ISFSI. This estimate is provided in Appendix G.

Decommissioning Scenarios

The following scenarios were evaluated and are intended to bound the liability associated with the removal of spent fuel from the site. The current operating license expires in 2030, but a license extension of 10 years is assumed to be requested of and approved by the NRC. The scenarios consist of four DECON spent fuel management scenarios. The duration of the spent fuel scenarios has little impact to the decommissioning costs and timing of the power block systems and structures. The spent fuel in the plant's spent fuel storage pool is transferred to the ISFSI within the first four years. The equipment, structures, and portions of the plant containing radioactive contaminants are removed or decontaminated to a level that permits the facility to be released for unrestricted use. Remaining site structures are then demolished. Spent fuel storage operations continue at the ISFSI until the transfer of the fuel to the DOE is completed (as shown in the "Last Spent Fuel Assembly" column in the following table).

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7 U.S. Code of Federal Regulations, Title 10, Parts 2, 50 and 51, "Decommissioning of Nuclear Power Reactors," Nuclear Regulatory Commission, 61 Fed. Reg. 39278, July 29, 1996

8 "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors," Regulatory Guide 1.202, Nuclear Regulatory Commission, February 2005

9 U.S. Code of Federal Regulations, Title 10, Parts 20, 30, 40, 50, 70, and 72, "Decommissioning Planning," Nuclear Regulatory Commission, Federal Register Volume 76, (p 35512 et seq.), June 17, 2011

Scenario	1st Spent Fuel Canister Replacement	1st Spent Fuel Assembly Removed from Monticello*	Last Spent Fuel Assembly Removed from Monticello	Scenario Identification
1	n/a	2052	2082	DECON with 42 Year DFS+
2	n/a	2078	2100	DECON with 60 Year DFS
3	2058	2118	2140	DECON with 100 Year DFS
4	2058	2218	2240	DECON with 200 Year DFS

* Spent fuel stored at Morris is removed prior to fuel stored at the Monticello site.
+ Dry Fuel Storage

For Scenario 1, although it only provides a total fuel storage period of 42 years following shutdown, some of the Monticello casks have been in storage since 2008. Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters for those casks that exceed 50 years. The assumption to not transfer spent fuel at 50-years total storage duration for this scenario was premised on the likelihood that the life of the canisters could be successfully extended for the additional years.

For Scenario 2, although it provides a total fuel storage period of nominally 60 years following shutdown, Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters at the 50-year mark.

In Scenarios 3 and 4, the Dry Shielded Canisters (DSCs) are assumed to be replaced after fifty years of use. Since the reactor building spent fuel storage pool and fuel handling facilities are removed by the year 2048, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. For Scenario 3, two such transfer is needed over the time frame assumed. For Scenario 4, the spent fuel will be transferred four times following initial placement in the ISFSI.

Methodology

The methodology used to develop the estimates follows the basic approach originally presented in the cost estimating guidelines [10] developed by the Atomic Industrial Forum (now Nuclear Energy Institute). This reference describes a unit cost factor

10 T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986

method for estimating decommissioning activity costs. The unit cost factors used in this analysis incorporate site-specific costs and the latest available information about worker productivity in decommissioning.

An activity duration critical path is used to determine the total decommissioning program schedule. This is required for calculating the carrying costs, which include program management, administration, field engineering, equipment rental, quality assurance, and security. This systematic approach for assembling decommissioning estimates ensures a high degree of confidence in the reliability of the resulting costs.

The estimates also reflect lessons learned from TLG's involvement in the Shippingport Station Decommissioning Project, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells and associated facilities, completed in 1997. In addition, the planning and engineering for the Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Oyster Creek, Connecticut Yankee, Crystal River, Vermont Yankee, Fort Calhoun, Pilgrim, and Indian Point nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Contingency

Consistent with cost estimating practice, contingencies are applied to the decontamination and dismantling costs developed as "specific provision for unforeseeable elements of cost within the defined project scope, particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur."[11] The cost elements in the estimates are based on ideal conditions; therefore, the types of unforeseeable events that are almost certain to occur in decommissioning, based on industry experience, are addressed through a percentage contingency applied on a line-item basis. This contingency factor is a nearly universal element in all large-scale construction and demolition projects. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station, or duration of the decommissioning program and dry fuel storage period.

Contingency funds are expected to be fully expended throughout the program. As such, inclusion of contingency is necessary to provide assurance that sufficient funding will be available to accomplish the intended tasks.

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11 Project and Cost Engineers' Handbook, Second Edition, American Association of Cost Engineers, Marcel Dekker, Inc., New York, New York, p. 239

Low-Level Radioactive Waste Disposal

The contaminated and neutron-activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for "shallow-land" disposal. With the passage of the "Low-Level Radioactive Waste Policy Act" in 1980, [12] and its Amendments of 1985, [13] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders. It was expected that groups of states would combine together to jointly deal with their radioactive wastes; these organizations are referred to as waste disposal compacts.

With the exception of Texas, no new compact facilities have been successfully sited, licensed, and constructed. The Texas Compact disposal facility is now operational and waste is being accepted from generators within the Compact by the operator, Waste Control Specialists (WCS). The facility is also able to accept limited quantities of non-Compact waste.

Disposition of the various waste streams produced by the decommissioning process considered all options and services currently available to Xcel Energy. The majority of the low-level radioactive waste designated for direct disposal (Class A [14]) can be sent to Energy*Solutions*' facility in Clive, Utah. Therefore, disposal costs for Class A waste were based upon current contract rates. This facility is not licensed to receive the higher activity portion of the decommissioning waste stream (Classes B and C resins and activated metal from the reactor vessel[15]).

The Texas facility is licensed to receive the higher activity waste forms (Classes B and C). As such, for this analysis, disposal costs for the Class B and C waste were based upon the Xcel-provided information on the cost for such from WCS.

The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow-land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the

12 "Low-Level Radioactive Waste Policy Act," Public Law 96-573, 1980

13 "Low-Level Radioactive Waste Policy Amendments Act of 1985," Public Law 99-240, 1986

14 Waste is classified in accordance with U.S. Code of Federal Regulations, Title 10, Part 61.55

15 U.S. Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste"

beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste.

The DOE issued its final Environmental Impact Statement for the disposal of GTCC on January 2016.[16] The study evaluated the potential environmental impacts associated with constructing and operating a new facility or using an existing facility, disposal methods, and locations. DOE is awaiting Congressional action on the report and its recommendations. At this time, the federal government has not identified a specific cost for disposing of GTCC or a schedule for acceptance.

For purposes of this analysis, the GTCC radioactive waste is assumed to be packaged and disposed of in a similar manner as high-level waste and at a cost equivalent to that envisioned for the spent fuel. The GTCC is packaged in the same canisters used for spent fuel and is stored on site along with the spent fuel in the ISFSI. The GTCC will be transferred to the DOE upon completion of spent fuel transfer to the DOE.

A significant portion of the waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be analyzed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to isolate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates reflect the savings from waste recovery/volume reduction.

<u>High-Level Radioactive Waste Management</u>

Congress passed the "Nuclear Waste Policy Act" [17] (NWPA) in 1982, assigning the federal government's long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The DOE was to begin accepting spent fuel by January 31, 1998; however, to date no progress in the removal of spent fuel from commercial generating sites has been made.

Today, the country is at an impasse on high-level waste disposal, even with the License Application for a geologic repository submitted by the DOE to the NRC in 2008. The Obama administration cut the budget for the repository program while promising to "conduct a comprehensive review of policies for managing the back end

16 "Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375)," January 2016

17 "Nuclear Waste Policy Act of 1982 and Amendments," DOE's Office of Civilian Radioactive Management, 1982

of the nuclear fuel cycle … and make recommendations for a new plan."[18] Towards this goal, the administration appointed a Blue Ribbon Commission on America's Nuclear Future (Blue Ribbon Commission) to make recommendations for a new plan for nuclear waste disposal. The Blue Ribbon Commission's charter includes a requirement that it consider "[o]ptions for safe storage of used nuclear fuel while final disposition pathways are selected and deployed."[19]

On January 26, 2012, the Blue Ribbon Commission issued its "Report to the Secretary of Energy" containing a number of recommendations on nuclear waste disposal. Two of the recommendations that may impact decommissioning planning are:

- "[T]he United States [should] establish a program that leads to the timely development of one or more consolidated storage facilities"[20]
- "[T]he United States should undertake an integrated nuclear waste management program that leads to the timely development of one or more permanent deep geological facilities for the safe disposal of spent fuel and high-level nuclear waste."[21]

In January 2013, the DOE issued the "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," in response to the recommendations made by the Blue Ribbon Commission and as "a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel..."[22] This document states:

"With the appropriate authorizations from Congress, the Obama Administration planned to implement a program over the next 10 years that would have:

- Sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites;

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18 Blue Ribbon Commission on America's Nuclear Future's Charter, http://cybercemetery.unt.edu/archive/brc/20120620215336/http://brc.gov/index.php?q=page/charter

19 Ibid.

20 "Blue Ribbon Commission on America's Nuclear Future, Report to the Secretary of Energy,", p. 32, January 2012

21 Ibid., p.27

22 "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," U.S. DOE, January 11, 2013

- Advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
- Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048."[23]

The NRC's review of DOE's license application to construct a geologic repository at Yucca Mountain was suspended in 2011 when the Obama Administration significantly reduced the budget for completing that work. However, the US Court of Appeals for the District of Columbia Circuit issued a writ of mandamus (in August 2013) [24] ordering NRC to comply with federal law and restart its review of DOE's Yucca Mountain repository license application to the extent of previously appropriated funding for the review. That review is now complete with the publication of the five-volume safety evaluation report. A supplement to DOE's environmental impact statement and an adjudicatory hearing on the contentions filed by interested parties must be completed before a licensing decision can be made. Although the DOE proposed it would start fuel acceptance in 2025, no progress has been made in the repository program since DOE's 2013 strategy was issued except for the completion of the Yucca Mountain safety evaluation report.

Holtec International submitted a license application to the NRC on March 30, 2017 for a consolidated interim spent fuel storage facility in southeast New Mexico called HI-STORE CIS (Consolidated Interim Storage) under the provisions of 10 CFR Part 72. The application is currently under NRC review.

A centralized interim storage project was initiated by Waste Control Specialists (WCS) for a site in Andrews County, Texas, adjacent to WCS's existing low-level radioactive waste and hazardous waste storage and disposal facilities. The NRC license application for this project was filed in April 2016. In April 2017, WCS asked the NRC to suspend the review of this application. Subsequently, WCS and Orano USA (formerly Areva Nuclear Materials) formed a joint venture to license the facility. In response to letters to the NRC in June and July 2018 from the joint venture, Interim Storage Partners, the NRC restarted its review of the application

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23 Ibid., p.2

24 United States Court of Appeals for the District Of Columbia Circuit, In Re: Aiken County, et al, August 2013

On May 10, 2018, the U.S. House of Representatives passed H.R. 3053, the "Nuclear Waste Policy Amendments Act of 2018." Proposed to amend the Nuclear Waste Policy Act of 1982, the legislation, if approved by the Senate and signed by the President, would provide the DOE the authority to site, construct, and operate one or more Monitored Retrieval Storage (MRS) facilities while a permanent repository is licensed and constructed and/or to enter into an MRS agreement with a non-Federal entity for temporary storage.

Completion of the decommissioning process is dependent upon the DOE's ability to remove spent fuel from the site in a timely manner. DOE's repository program had originally assumed that spent fuel allocations would be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was discharged from the reactor.[25] However, the Blue Ribbon Commission, in its final report, noted that: "[A]ccepting spent fuel according to the OFF [Oldest Fuel First] priority ranking instead of giving priority to shutdown reactor sites could greatly reduce the cost savings that could be achieved through consolidated storage if priority could be given to accepting spent fuel from shutdown reactor sites before accepting fuel from still-operating plants. …. The magnitude of the cost savings that could be achieved by giving priority to shutdown sites appears to be large enough (i.e., in the billions of dollars) to warrant DOE exercising its right under the Standard Contract to move this fuel first."

The state of Minnesota directed the Public Utilities Commission, "when considering approval of a plan for the accrual of funds for the decommissioning of nuclear facilities" …to "include an evaluation of the costs, if any, arising from storage of used nuclear fuel that may be incurred by the state of Minnesota, and any tribal community, county, city, or township where used nuclear fuel is located following the cessation of operations at a nuclear plant."[26]

The state of Minnesota statute also prescribed the parameters to be used in evaluating spent fuel management costs. "To assist the commission in making the determination … the filing shall provide cost estimates, including ratepayer impacts, assuming used

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25 U.S. Code of Federal Regulations, Title 10, Part 961.11, Article IV – Responsibilities of the Parties, B. DOE Responsibilities, 5.(a) … DOE shall issue an annual acceptance priority ranking for receipt of SNF and/or HLW at the DOE repository. This priority ranking shall be based on the age of SNF and/or HLW as calculated from the date of discharge of such materials from the civilian nuclear power reactor. The oldest fuel or waste will have the highest priority for acceptance …"

26 Minnesota Statute 216B.2445, "Nuclear Power Plant Decommissioning and Storage of Used Nuclear Fuel"

nuclear fuel will be stored in the state for 60 years, 100 years, and 200 years following the cessation of operation of the nuclear plant." [27]

Xcel Energy's current spent fuel management plan for the Monticello spent fuel is based in general upon:

1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
3) Fuel will be shipped in the existing NUHOMS DSCs (Scenarios 1, 2, 5, and 6); the NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility. [28]
6) Currently Monticello is storing spent fuel assemblies at the Morris Operation facility of GE Hitachi Nuclear Energy in Morris, Illinois. These assemblies will be shipped for final disposal to DOE prior to the removal of fuel from the Monticello site.

The NRC requires that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy, pursuant to 10 CFR Part 50.54(bb). [29] This requirement is prepared for through inclusion of certain cost elements in the decommissioning estimates, for example, associated with the isolation and continued operation of the spent fuel pool and the ISFSI.

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27 Ibid.

28 "Order Approving Nuclear Decommissioning Study, Assumptions, and Annual Accrual, and Setting Filing Requirements", Page 8, Items 12e and 12g, Minnesota Public Utilities Commission Docket E-002/M-14-761 October 4, 2015

29 U.S. Code of Federal Regulations, Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," Subpart 54 (bb), "Conditions of Licenses"

The spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core at shutdown. The assemblies are packaged into dry shielded canisters (DSCs) over the first four years after shutdown for transfer to the ISFSI for interim storage. It is assumed that this period provides the necessary cooling for the final core to meet the transport and/or storage requirements for decay heat.

An ISFSI, operated under a Part 50 General License (in accordance with 10 CFR 72, Subpart K [30]), has been constructed to support continued plant operations. The facility is assumed to be expanded to support decommissioning. This will allow decommissioning activities to proceed within the reactor building.

DOE has breached its obligations to remove fuel from reactor sites, and has also failed to provide the plant owners with information about how it will ultimately perform. DOE officials have stated that DOE does not have an obligation to accept already-canistered fuel without an amendment to DOE's contracts with plant licensees to remove the fuel (the "Standard Contract"), but DOE has not explained what any such amendment would involve. Consequently, Xcel Energy has no information or expectations on how DOE will remove fuel from the site in the future. In the absence of information about how DOE will perform, and for purposes of this analysis only, it is assumed that DOE will accept already-canistered fuel. If this assumption is incorrect, it is assumed that DOE will have liability for costs incurred to transfer the fuel to DOE-supplied containers.

Xcel Energy's position is that the DOE has a contractual obligation to accept Monticello's fuel earlier than the projections set out above consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, including the cost of storing spent fuel in this study is appropriate to ensure the availability of sufficient decommissioning funds at the end of the station's life if the DOE has not met its obligation. The cost for the interim storage of spent fuel has been calculated and is separately presented as "Spent Fuel Management" expenditures in this report.

Site Restoration

The efficient removal of the contaminated materials at the site may result in damage to many of the site structures. Blasting, coring, drilling, and the other decontamination activities can substantially damage power block structures, potentially weakening the footings and structural supports. It is unreasonable to anticipate that these structures would be repaired and preserved after the

[30] U.S. Code of Federal Regulations, Title 10, Part 72, Subpart K, "General License for Storage of Spent Fuel at Power Reactor Sites"

radiological contamination is removed. The cost to dismantle site structures with a work force already mobilized is more efficient and less costly than if the process were deferred. Experience at shutdown generating stations has shown that plant facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public and the demolition work force.

This estimate assumes that some site features will remain following the decommissioning project. These include the existing electrical switchyard, which is assumed to remain functional in support of the regional electrical distribution system. The existing shoreline will also be left intact.

Consequently, non-essential site structures addressed by this analysis are completely removed (including foundations) as required by Minnesota statute [31]. The site is then graded and stabilized. The cost for the site restoration of non-essential and/or non-contaminated structures has been calculated and is separately presented as "Site Restoration" expenditures in this report.

Summary

The costs to decommission the Monticello station were evaluated for several spent fuel removal scenarios, using the DECON decommissioning alternative. Regardless of spent fuel scenario, the estimates to decommission Monticello assume the removal of all contaminated and activated plant components and structural materials such that Xcel Energy may then have unrestricted use of the site with no further requirements for an operating license. In the scenarios, spent fuel remains on site following the decommissioning and site restoration of the power block structures. The spent fuel remains in storage at the site until such time that the transfer to a DOE facility can be completed. Once the transfer is complete, the storage facilities are also decommissioned.

The decommissioning alternative evaluated in this analysis is described in Section 2. The assumptions are presented in Section 3, along with schedules of annual expenditures. The major cost contributors are identified in Section 6, with detailed activity costs, waste volumes, and associated manpower requirements delineated in Appendices C through F. The major cost components are also identified in the cost summary provided at the end of this section.

The estimates presented in this document reflect the total cost to decontaminate the nuclear unit, manage the spent fuel until the DOE is able to complete the transfer to a federal facility, dismantle the plant and restore the site for alternative use.

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31 Minnesota Administrative Rule part 7035.0400 "General Requirements"

The cost elements in the estimates for the four DECON alternatives are assigned to one of three subcategories: NRC License Termination (radiological remediation), Spent Fuel Management, and Site Restoration. The subcategory "NRC License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). The cost reported for this subcategory is generally sufficient to terminate the unit's operating license, recognizing that there may be some additional cost impact from spent fuel management. The License Termination cost subcategory also includes costs to decommission the ISFSI (as required by 10 CFR §72.30). Section 3.4.1 provides the basis for the ISFSI decommissioning cost.

The "Spent Fuel Management" subcategory contains costs associated with the containerization and transfer of spent fuel from the wet storage pool to the ISFSI, as well as the transfer of the spent fuel in storage at the ISFSI to the DOE. Costs are included for the operation of the storage pool and the management of the ISFSI until such time that the transfer is complete. It does not include any spent fuel management expenses incurred prior to the cessation of plant operations, nor does it include any costs related to the final disposal of the spent fuel.

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are completely removed (including foundations) and backfilled to conform to local surface elevation.

It should be noted that the costs assigned to these subcategories are allocations. Delegation of cost elements is for the purposes of comparison (e.g., with NRC financial guidelines) or to permit specific financial treatment (e.g., Asset Retirement Obligation determinations). In reality, there can be considerable interaction between the activities in the three subcategories. For example, Xcel Energy may decide to remove non-contaminated structures early in the project to improve access to highly contaminated facilities or plant components. In these instances, the non-contaminated removal costs could be reassigned from Site Restoration to an NRC License Termination support activity. However, in general, the allocations represent a reasonable accounting of those costs that can be expected to be incurred for the specific subcomponents of the total estimated program cost, if executed as described.

As noted within this document, the estimates were developed and costs are presented in 2020 dollars. As such, the estimates do not reflect the escalation of costs (due to inflationary and market forces) over the remaining operating life of the plant or during the decommissioning period.

SCENARIO 1: DECON WITH 42 YEARS DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total
Decontamination	24,330
Removal	125,270
Packaging	26,543
Transportation	14,145
Waste Disposal	114,148
Off-site Waste Processing	57,444
Program Management [1]	291,789
Site Security	300,346
Spent Fuel Pool Isolation	14,576
Spent Fuel Storage (Direct Costs) [2]	237,381
Insurance and Regulatory Fees	39,753
Energy	10,030
Characterization and Licensing Surveys	23,012
Property Taxes	55,377
Miscellaneous	7,411
Railroad Track Maintenance	6,914
Retention and Severance	41,002
Security Modifications	10,000
Total [3]	1,399,471

Cost Element	Total
NRC License Termination	776,355
Spent Fuel Management	549,339
Site Restoration	73,776
Total [3]	1,399,471

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total
Decontamination	24,330
Removal	125,270
Packaging	26,543
Transportation	14,145
Waste Disposal	114,148
Off-site Waste Processing	57,444
Program Management [1]	317,530
Security	389,426
Spent Fuel Pool Isolation	14,576
Spent Fuel Storage (Direct Costs) [2]	306,597
Insurance and Regulatory Fees	53,687
Energy	10,030
Characterization and Licensing Surveys	23,012
Property Taxes	73,368
Miscellaneous Equipment	7,411
Railroad Track Maintenance	9,504
Retention and Severance	41,002
Security Modifications	10,000
Total [3]	1,618,023

Cost Element	Total
NRC License Termination	776,355
Spent Fuel Management	767,892
Site Restoration	73,776
Total [3]	1,618,023

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total
Decontamination	24,330
Removal	125,359
Packaging	26,543
Transportation	14,145
Waste Disposal	114,148
Off-site Waste Processing	57,444
Program Management [1]	502,435
Security	587,397
Spent Fuel Pool Isolation	14,576
Spent Fuel Storage (Direct Costs) [2]	954,297
Insurance and Regulatory Fees	84,655
Energy	10,030
Characterization and Licensing Surveys	23,012
Property Taxes	113,348
Miscellaneous Equipment	7,411
Railroad Track Maintenance	15,260
Retention and Severance	41,002
Security Modifications	10,000
Total [3]	2,725,392

Cost Element	Total
NRC License Termination	776,400
Spent Fuel Management	1,874,865
Site Restoration	74,127
Total [3]	2,725,392

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total
Decontamination	24,330
Removal	125,359
Packaging	26,543
Transportation	14,145
Waste Disposal	114,148
Off-site Waste Processing	57,444
Program Management [1]	782,364
Security	1,082,311
Spent Fuel Pool Isolation	14,576
Spent Fuel Storage (Direct Costs) [2]	2,114,481
Insurance and Regulatory Fees	162,073
Energy	10,030
Characterization and Licensing Surveys	23,012
Property Taxes	213,298
Miscellaneous Equipment	7,411
Railroad Track Maintenance	29,650
Retention and Severance	41,002
Security Modifications	10,000
Total [3]	4,852,175

Cost Element	Total
NRC License Termination	776,400
Spent Fuel Management	4,001,648
Site Restoration	74,127
Total [3]	4,852,175

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

1. INTRODUCTION

This report presents estimates of the cost to decommission the Monticello Nuclear Generating Plant (Monticello) and the operation and eventual decommissioning of the on-site Independent Spent Fuel Storage Installation (ISFSI) for the selected decommissioning scenarios following the scheduled cessation of plant operations. The estimates are designed to provide Xcel Energy with the information to assess its current decommissioning liability, as it relates to Monticello.

The analysis relies upon site-specific, technical information from an earlier evaluation prepared in 2017, [1]* updated to reflect current assumptions pertaining to the disposition of the nuclear plant and relevant industry experience in undertaking such projects. The costs are based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site restoration requirements.

The analysis is not a detailed engineering evaluation, but an estimate prepared in advance of the detailed engineering required to carry out the decommissioning of the nuclear unit. It may also not reflect the actual plan to decommission Monticello; the plan may differ from the assumptions made in this analysis based on facts that exist at the time of decommissioning.

The 2017 plant inventory was reviewed for this analysis. It serves as the basis for the decontamination and dismantling requirements, cost, and the decommissioning waste streams. The review confirmed that there were no substantive changes to the configuration of the plant or site facilities that would impact decommissioning over the last three years.

1.1 OBJECTIVES OF STUDY

The objectives of this study are to prepare comprehensive estimates of the cost to decommission Monticello, to provide a sequence or schedule for the associated activities, and to develop waste stream projections from the decontamination and dismantling activities.

The operating license was originally issued for the plant on September 8th, 1970, and was valid for a period of 40 years. In early 2005, Nuclear Management Company (as agent for Xcel Energy), submitted an application for

* Annotated references for citations in Sections 1-6 are provided in Section 7

a renewed license (i.e., 20 year extension). The application was approved by the NRC in November 2006. For the purposes of this study, a subsequent license renewal is assumed to be requested and approved, with a final shutdown date (license expiration) for Monticello changing to September 8th, 2040, assuming a 70-year operating life (ten years after the current operating license's expiration date).

1.2 SITE DESCRIPTION

Monticello is located on the Mississippi River within the city limits of Monticello, in Wright County, Minnesota. The plant is located approximately 30 miles northwest of the Minneapolis-St. Paul area.

The Nuclear Steam Supply System (NSSS) consists of a single cycle, forced circulation, low power density boiling water reactor. The reactor recirculation system is comprised of the reactor vessel; the two loop reactor recirculation system with its pumps, pipes, and valves; the main steam piping up to the main steam isolation valves; and the reactor auxiliary systems piping. The system is housed within a "containment system," consisting of a steel light bulb-shaped drywell, a steel doughnut-shaped pressure suppression chamber, and interconnecting vent pipes. This system provides the first containment barrier surrounding the reactor vessel and reactor primary system. The reactor building provides secondary containment and is designed as a controlled leakage structure.

The saturated steam leaving the reactor vessel flows through the four main steam lines to the main turbine located in the turbine building. After passing through the main turbine, low-pressure steam is condensed, the non-condensable gases are removed, and the condensate is demineralized before being returned to the reactor vessel through the reactor feedwater system heaters. The turbine-generator system converts the thermodynamic energy of the steam into electrical energy. The unit's turbine-generator consists of one single-flow, high-pressure, and two double-flow, low-pressure turbines driving a direct-coupled generator at 1800 rpm. Heat rejected in the main condenser is removed by the circulating water system.

The circulating water system has been designed for open cycle once-through cooling towers, closed cycle with cooling towers, or for variations of these modes, i.e., partial recirculation. The system for open cycle operation consists of an intake structure with two half-capacity circulating water pumps, piping river water through the condenser to a discharge structure where the water enters a 1000-foot long canal that returns the water to the river downstream from the intake. Two induced-draft cooling towers are used during the open

and closed cycle operations. Cooled effluent returns by gravity to the intake structure from the cooling tower basins.

1.3 REGULATORY GUIDANCE

The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule "General Requirements for Decommissioning Nuclear Facilities," issued in June 1988.[2] This rule set forth financial criteria for decommissioning licensed nuclear power facilities. The regulation addressed decommissioning planning needs, timing, funding methods, and environmental review requirements. The intent of the rule was to ensure that decommissioning would be accomplished in a safe and timely manner and that adequate funds would be available for this purpose. Subsequent to the rule, the NRC issued Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors,[3]" which provided additional guidance to the licensees of nuclear facilities on the financial methods acceptable to the NRC staff for complying with the requirements of the rule. The regulatory guide addressed the funding requirements and provided guidance on the content and form of the financial assurance mechanisms indicated in the rule.

The rule defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB. The DECON alternative assumes that any contaminated or activated portion of the plant's systems, structures, and facilities are removed or decontaminated to levels that permit the site to be released for unrestricted use shortly after the cessation of plant operations while the SAFSTOR and ENTOMB alternatives defer the process.

The rule also placed limits on the time allowed to complete the decommissioning process. For the SAFSTOR alternative, the process is restricted in overall duration to 60 years, unless it can be shown that a longer duration is necessary to protect public health and safety. The guidelines for ENTOMB are similar, providing the NRC with both sufficient leverage and flexibility to ensure that these deferred options are only used in situations where it is reasonable and consistent with the definition of decommissioning. At the conclusion of a 50 to 60-year dormancy period (or longer for ENTOMB if the NRC approves such a case), the site would still require significant remediation to meet the unrestricted release limits for license termination.

The ENTOMB alternative has not been viewed as a viable option for power reactors due to the significant time required to isolate the long-lived radionuclides for decay to permissible levels. However, with rulemaking permitting the controlled release of a site, [4] the NRC did re-evaluate the

alternative. The resulting feasibility study, based upon an assessment by Pacific Northwest National Laboratory, concluded that the method did have conditional merit for some, if not most reactors. The staff also found that additional rulemaking would be needed before this option could be treated as a generic alternative.

The NRC had considered rulemaking to alter the 60-year time for completing decommissioning and to clarify the use of engineered barriers for reactor entombments.[5] However, the NRC's staff has recommended that rulemaking be deferred, based upon several factors, e.g., no licensee has committed to pursuing the entombment option, the unresolved issues associated with the disposition of greater-than-Class C material (GTCC), and the NRC's current priorities, at least until after the additional research studies are complete. The Commission concurred with the staff's recommendation. In a draft regulatory basis document published in March 2017 in support of rulemaking that would amend NRC regulations concerning nuclear plant decommissioning, the NRC staff proposes removing any discussion of the ENTOMB option from existing guidance documents since the method is not deemed practically feasible.

In 1996, the NRC published revisions to the general requirements for decommissioning nuclear power plants. [6] When the regulations were originally adopted in 1988, it was assumed that the majority of licensees would decommission at the end of the facility's operating licensed life. Since that time, several licensees permanently and prematurely ceased operations. Exemptions from certain operating requirements were required once the reactor was defueled to facilitate the decommissioning. Each case was handled individually, without clearly defined generic requirements. The NRC amended the decommissioning regulations in 1996 to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in the decommissioning process. The new amendments allow for greater public participation and better define the transition process from operations to decommissioning.

Under the revised regulations, licensees will submit written certification to the NRC within 30 days after permanent shutdown. Certification will also be required once the fuel is permanently removed from the reactor vessels. Submittal of these notices will entitle the licensee to a fee reduction and eliminate the obligation to follow certain requirements needed only during operation of the reactor. Prior to or within two years following permanent cessation of operations, the licensee is required to submit a Post-Shutdown Decommissioning Activities Report (PSDAR) to the NRC, and a copy to the affected State(s) (10 CFR 50.82(a)(4)(i)). The PSDAR describes the planned decommissioning activities, the associated sequence and schedule, and an

estimate of expected costs. Prior to completing decommissioning, the licensee is required to submit applications to the NRC to terminate the license, which will include a License Termination Plan (LTP).

In 2011, the NRC published amended regulations to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site.[7] The regulations require licensees to report additional details in their decommissioning cost estimate including a decommissioning estimate for the ISFSI. This estimate is provided in Appendix G.

1.3.1 High-Level Radioactive Waste Management

Congress passed the "Nuclear Waste Policy Act" [8] (NWPA) in 1982, assigning the federal government's long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The DOE was to begin accepting spent fuel by January 31, 1998; however, to date no progress in the removal of spent fuel from commercial generating sites has been made.

Today, the country is at an impasse on high-level waste disposal, even with the License Application for a geologic repository submitted by the DOE to the NRC in 2008. The Obama administration cut the budget for the repository program while promising to "conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle … and make recommendations for a new plan." Towards this goal, the administration appointed a Blue Ribbon Commission on America's Nuclear Future (Blue Ribbon Commission) to make recommendations for a new plan for nuclear waste disposal. The Blue Ribbon Commission's charter includes a requirement that it consider "[o]ptions for safe storage of used nuclear fuel while final disposition pathways are selected and deployed."[9]

On January 26, 2012, the Blue Ribbon Commission issued its "Report to the Secretary of Energy" containing a number of recommendations on nuclear waste disposal. Two of the recommendations that may impact decommissioning planning are:

- "[T]he United States [should] establish a program that leads to the timely development of one or more consolidated storage facilities"[10]
- "[T]he United States should undertake an integrated nuclear waste management program that leads to the timely

development of one or more permanent deep geological facilities for the safe disposal of spent fuel and high-level nuclear waste."

In January 2013, the DOE issued the "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," in response to the recommendations made by the Blue Ribbon Commission and as "a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel..." [11] This document states:

"With the appropriate authorizations from Congress, the Obama Administration planned to implement a program over the next 10 years that would have:

- Sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites;
- Advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
- Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048."

The NRC's review of DOE's license application to construct a geologic repository at Yucca Mountain was suspended in 2011 when the Obama Administration significantly reduced the budget for completing that work. However, the US Court of Appeals for the District of Columbia Circuit issued a writ of mandamus (in August 2013) [12] ordering NRC to comply with federal law and restart its review of DOE's Yucca Mountain repository license application to the extent of previously appropriated funding for the review. That review is now complete with the publication of the five-volume safety evaluation report. A supplement to DOE's environmental impact statement and an adjudicatory hearing on the contentions filed by interested parties must be completed before a licensing decision can be made. Although the DOE proposed it would start fuel acceptance in 2025, no progress has been made in the repository program since DOE's 2013 strategy was issued except for the completion of the Yucca Mountain safety evaluation report.

Holtec International submitted a license application to the NRC on March 30, 2017 for a consolidated interim spent fuel storage facility in southeast New Mexico called HI-STORE CIS (Consolidated Interim Storage) under the provisions of 10 CFR Part 72. The application is currently under NRC review.

A centralized interim storage project was initiated by Waste Control Specialists (WCS) for a site in Andrews County, Texas, adjacent to WCS's existing low-level radioactive waste and hazardous waste storage and disposal facilities. The NRC license application for this project was filed in April 2016. In April 2017, WCS asked the NRC to suspend the review of this application. Subsequently, WCS and Orano USA (formerly Areva Nuclear Materials) formed a joint venture to license the facility. In response to letters to the NRC in June and July 2018 from the joint venture, Interim Storage Partners, the NRC restarted its review of the application.

On May 10, 2018, the U.S. House of Representatives passed H.R. 3053, the "Nuclear Waste Policy Amendments Act of 2018." Proposed to amend the Nuclear Waste Policy Act of 1982, the legislation, if approved by the Senate and signed by the President, would provide the DOE the authority to site, construct, and operate one or more Monitored Retrieval Storage (MRS) facilities while a permanent repository is licensed and constructed and/or to enter into an MRS agreement with a non-Federal entity for temporary storage.

Completion of the decommissioning process is dependent upon the DOE's ability to remove spent fuel from the site in a timely manner. DOE's repository program had originally assumed that spent fuel allocations would be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was discharged from the reactor.[13] However, the Blue Ribbon Commission, in its final report, noted that: "[A]ccepting spent fuel according to the OFF [Oldest Fuel First] priority ranking instead of giving priority to shutdown reactor sites could greatly reduce the cost savings that could be achieved through consolidated storage if priority could be given to accepting spent fuel from shutdown reactor sites before accepting fuel from still-operating plants. …. The magnitude of the cost savings that could be achieved by giving priority to shutdown sites appears to be large enough (i.e., in the billions of dollars) to warrant DOE exercising its right under the Standard Contract to move this fuel first."

The state of Minnesota directed the Public Utilities Commission, "when considering approval of a plan for the accrual of funds for the decommissioning of nuclear facilities" …to "include an evaluation of the costs, if any, arising from storage of used nuclear fuel that may be incurred by the state of Minnesota, and any tribal community, county, city, or township where used nuclear fuel is located following the cessation of operations at a nuclear plant."[14]

The state of Minnesota statute also prescribed the parameters to be used in evaluating spent fuel management costs. "To assist the commission in making the determination … the filing shall provide cost estimates, including ratepayer impacts, assuming used nuclear fuel will be stored in the state for 60 years, 100 years, and 200 years following the cessation of operation of the nuclear plant."

Xcel Energy's current spent fuel management plan for the Monticello spent fuel is based in general upon:

1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
3) Fuel will be shipped in the existing NUHOMS DSCs (Scenarios 1, 2, 5, and 6); the NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility.[15]
6) Currently Monticello is storing spent fuel assemblies at the Morris Operation facility of GE Hitachi Nuclear Energy in Morris, Illinois. These assemblies will be shipped for final disposal to DOE prior to the removal of fuel from the Monticello site.

The NRC requires that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy,

pursuant to 10 CFR Part 50.54(bb). [16] This requirement is prepared for through inclusion of certain cost elements in the decommissioning estimates, for example, associated with the isolation and continued operation of the spent fuel pool and the ISFSI.

The spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core at shutdown. The assemblies are packaged into dry shielded canisters (DSCs) over the first four years after shutdown for transfer to the ISFSI for interim storage. It is assumed that this period provides the necessary cooling for the final core to meet the transport and/or storage requirements for decay heat.

An ISFSI, operated under a Part 50 General License (in accordance with 10 CFR 72, Subpart K [17]), has been constructed to support continued plant operations. The facility is assumed to be expanded to support decommissioning. This will allow decommissioning activities to proceed within the reactor building.

DOE has breached its obligations to remove fuel from reactor sites, and has also failed to provide the plant owners with information about how it will ultimately perform. DOE officials have stated that DOE does not have an obligation to accept already-canistered fuel without an amendment to DOE's contracts with plant licensees to remove the fuel (the "Standard Contract"), but DOE has not explained what any such amendment would involve. Consequently, Xcel Energy has no information or expectations on how DOE will remove fuel from the site in the future. In the absence of information about how DOE will perform, and for purposes of this analysis only, it is assumed that DOE will accept already-canistered fuel. If this assumption is incorrect, it is assumed that DOE will have liability for costs incurred to transfer the fuel to DOE-supplied containers.

Xcel Energy's position is that the DOE has a contractual obligation to accept Monticello's fuel earlier than the projections set out above, consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, including the cost of storing spent fuel in this study is appropriate to ensure the availability of sufficient decommissioning funds at the end of the station's life if the DOE has not met its obligation. The cost for the interim storage of spent fuel has been calculated and is separately presented as "Spent Fuel Management" expenditures in this report.

1.3.2 Low-Level Radioactive Waste Disposal

The contaminated and activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for "shallow-land" disposal. With the passage of the "Low-Level Radioactive Waste Policy Act" in 1980, [18] and its Amendments of 1985, [19] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders. It was expected that groups of states would combine together to jointly deal with their radioactive wastes; these organizations are referred to as waste disposal compacts.

With the exception of Texas, no new compact facilities have been successfully sited, licensed, and constructed. The Texas Compact disposal facility is now operational and waste is being accepted from generators within the Compact by the operator, Waste Control Specialists (WCS). The facility is also able to accept limited quantities of non-Compact waste.

Disposition of the various waste streams produced by the decommissioning process considered all options and services currently available to Xcel Energy. The majority of the low-level radioactive waste designated for direct disposal (Class A [20]) can be sent to Energy*Solutions*' facility in Clive, Utah. Therefore, disposal costs for Class A waste were based upon current contract rates. This facility is not licensed to receive the higher activity portion (Classes B and C) of the decommissioning waste stream.

The Texas facility is licensed to receive the higher activity waste forms (Classes B and C). As such, for this analysis, disposal costs for the Class B and C waste were based upon the preliminary and indicative information on the cost for such from WCS.

The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow-land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste.

The DOE issued its final Environmental Impact Statement for the disposal of GTCC on January 2016.[21] The study evaluated the potential environmental impacts associated with constructing and operating a new facility or using an existing facility, disposal methods, and locations. DOE is awaiting Congressional action on the report and its recommendations. At this time, the federal government has not identified a specific cost for disposing of GTCC or a schedule for acceptance.

For purposes of this analysis, the GTCC radioactive waste is assumed to be packaged and disposed of in a similar manner as high-level waste and at a cost equivalent to that envisioned for the spent fuel. The GTCC is packaged in the same canisters used for spent fuel and is stored on site along with the spent fuel in the ISFSI. The GTCC will be transferred to the DOE upon completion of spent fuel transfer to the DOE.

A significant portion of the metallic waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be surveyed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to isolate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates reflect the savings from waste recovery/volume reduction.

1.3.3 Radiological Criteria for License Termination

In 1997, the NRC published Subpart E, "Radiological Criteria for License Termination," [22] amending 10 CFR §20. This subpart provides radiological criteria for releasing a facility for unrestricted use. The regulation states that the site can be released for unrestricted use if radioactivity levels are such that the average member of a critical group would not receive a Total Effective Dose Equivalent (TEDE) in excess of 25 millirem per year, and provided that residual radioactivity has been reduced to levels that are As Low As Reasonably Achievable (ALARA). The decommissioning estimates assume that the Monticello site will be remediated to a residual level consistent with the NRC-prescribed level.

It should be noted that the NRC and the Environmental Protection Agency (EPA) differ on the amount of residual radioactivity considered

acceptable in site remediation. The EPA has two limits that apply to radioactive materials. An EPA limit of 15 millirem per year is derived from criteria established by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund). [23] An additional and separate limit of 4 millirem per year, as defined in 40 CFR §141.66, is applied to drinking water. [24]

On October 9, 2002, the NRC signed an agreement with the EPA on the radiological decommissioning and decontamination of NRC-licensed sites. The Memorandum of Understanding (MOU) [25] provides that EPA will defer exercise of authority under CERCLA for the majority of facilities decommissioned under NRC authority. The MOU also includes provisions for NRC and EPA consultation for certain sites when, at the time of license termination, (1) groundwater contamination exceeds EPA-permitted levels; (2) NRC contemplates restricted release of the site; and/or (3) residual radioactive soil concentrations exceed levels defined in the MOU.

The MOU does not impose any new requirements on NRC licensees and should reduce the involvement of the EPA with NRC licensees who are decommissioning. Most sites are expected to meet the NRC criteria for unrestricted use, and the NRC believes that only a few sites will have groundwater or soil contamination in excess of the levels specified in the MOU that trigger consultation with the EPA. However, if there are other hazardous materials on the site, the EPA may be involved in the cleanup. As such, the possibility of dual regulation remains for certain licensees. The present study does not include any costs for this occurrence.

FIGURE 1.1
MONTICELLO NUCLEAR GENERATING PLANT
GENERAL PLAN

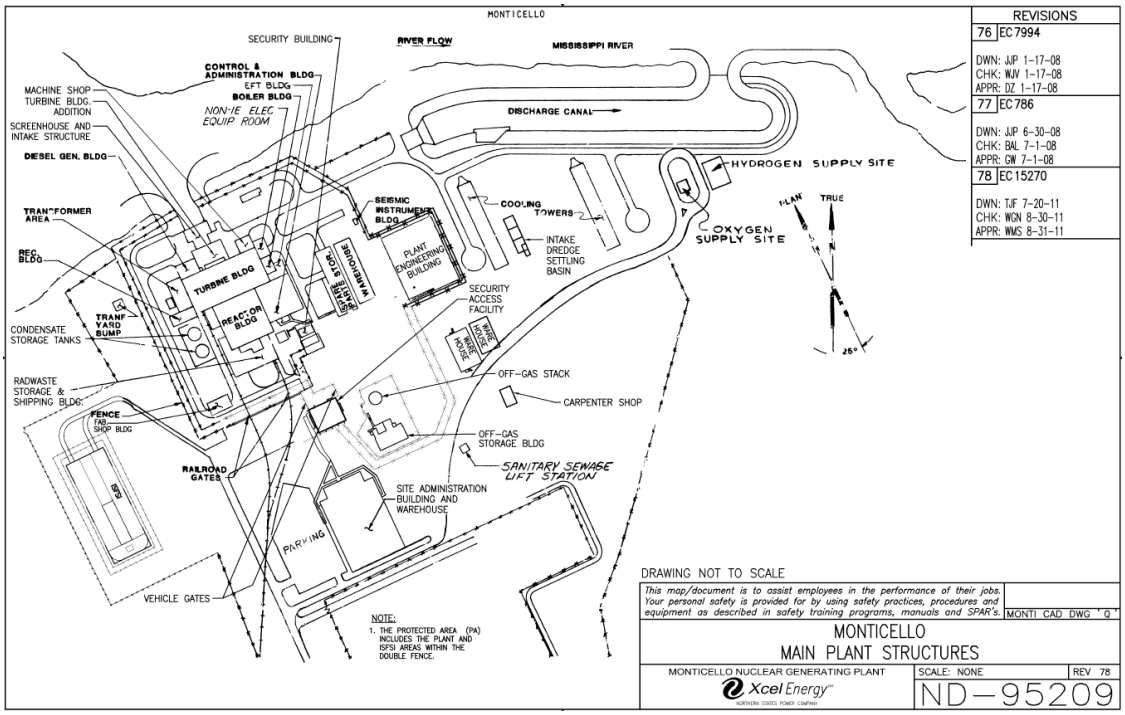
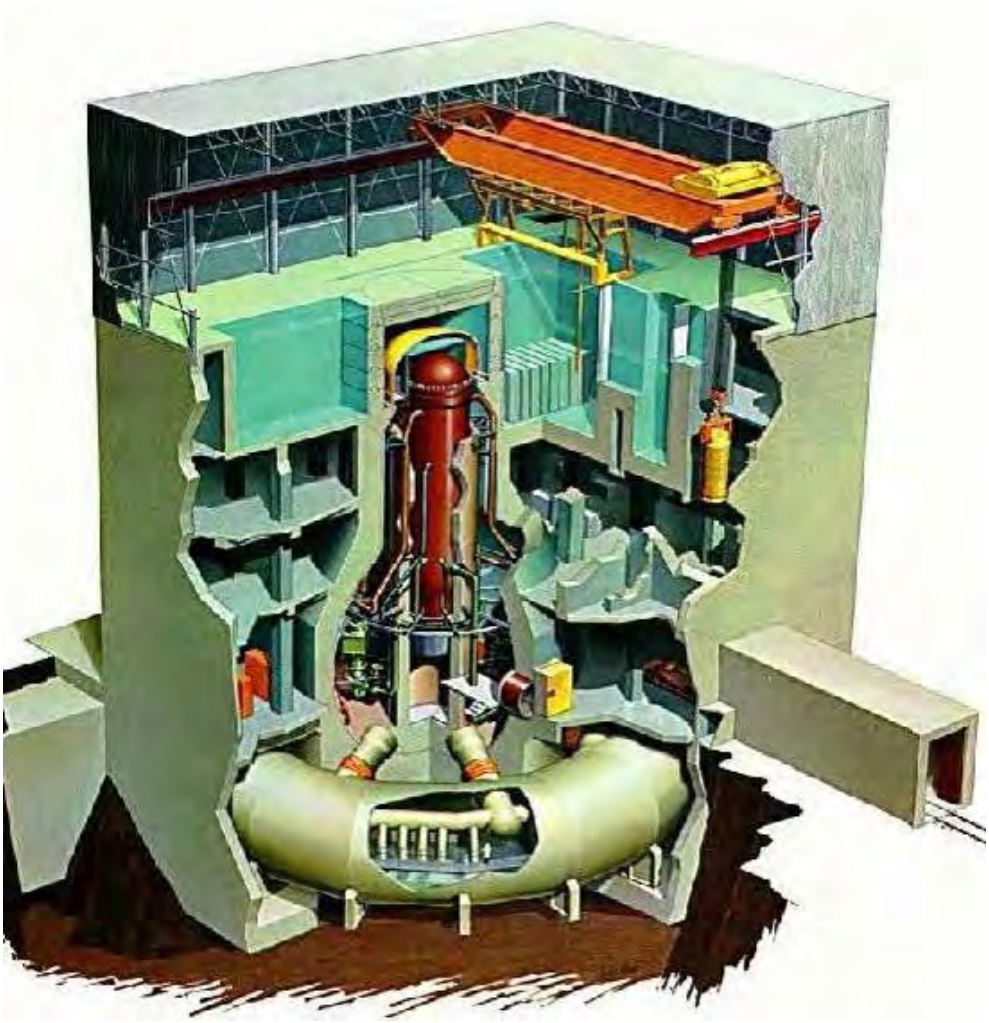


FIGURE 1.2
MONTICELLO NUCLEAR GENERATING PLANT
AERIAL VIEW

FIGURE 1.3
MONTICELLO NUCLEAR GENERATING PLANT
REACTOR BUILDING SECTION



2. DECON DECOMMISSIONING ALTERNATIVE

Detailed cost estimates were developed to decommission Monticello based upon the approved DECON decommissioning alternative. Although the alternatives differ with respect to technique, process, cost, and schedule, they attain the same result: the ultimate release of the site for unrestricted use.

The following scenarios were evaluated and are intended to bound the liability associated with the removal of spent fuel from the site. The scenarios consist of four spent fuel management scenarios. The duration of the spent fuel scenarios has little impact to the decommissioning costs and timing of the power block systems and structures. The spent fuel in the plant's spent fuel storage pool is transferred to the ISFSI within the first four years. The equipment, structures, and portions of the plant containing radioactive contaminants are removed or decontaminated to a level that permits the facility to be released for unrestricted use. Non-essential structures are then demolished. Spent fuel storage operations continue at the ISFSI until the transfer of the fuel to the DOE is completed (as shown in the "Last Spent Fuel Assembly" column in the following table).

Scenario	1st Spent Fuel Canister Replacement	1st Spent Fuel Assembly Removed from Monticello	Last Spent Fuel Assembly Removed from Monticello	Scenario Identification
1	n/a	2052	2082	DECON with 42 Year DFS+
2	n/a	2078	2100	DECON with 60 Year DFS
3	2058	2118	2140	DECON with 100 Year DFS
4	2058	2218	2240	DECON with 200 Year DFS

***** Spent fuel stored at Morris is removed after fuel stored at the Monticello site.
+ Dry Fuel Storage

For Scenario 1, although it only provides a total fuel storage period of 42 years following shutdown, some of the Monticello casks have been in storage since 2008. Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters for those casks that exceed 50 years. The assumption to not transfer spent fuel at 50-years total storage duration for this scenario was premised on the likelihood that the life of the canisters could be successfully extended for the additional years.

For Scenario 2, although it provides a total fuel storage period of nominally 60 years following shutdown, Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters at the 50-year mark.

In Scenarios 3 and 4, the Dry Shielded Canisters (DSCs) are assumed to be replaced after fifty years of use. Since the reactor building spent fuel storage pool and fuel handling facilities are removed by the year 2048, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. For Scenario 3, two such transfer is needed over the time frame assumed. For Scenario 4, the spent fuel will be transferred four times following initial placement in the ISFSI. The following sections describe the basic activities associated with each alternative. Although detailed procedures for each activity identified are not provided, and the actual sequence of work may vary, the activity descriptions provide a basis not only for estimating but also for the expected scope of work (i.e., engineering and planning at the time of decommissioning).

The conceptual approach that the NRC has described in its regulations divides decommissioning into three phases. The initial phase commences with the effective date of permanent cessation of operations and involves the transition of both plant and licensee from reactor operations (i.e., power production) to facilitate de-activation and closure. During the first phase, notification is to be provided to the NRC certifying the permanent cessation of operations and the removal of fuel from the reactor vessel. The licensee would then be prohibited from reactor operation.

The second phase encompasses activities during the storage period or during major decommissioning activities, or a combination of the two. The third phase pertains to the activities involved in license termination. The decommissioning estimates developed for Monticello are also divided into phases or periods; however, demarcation of the phases is based upon major milestones within the project or significant changes in the projected expenditures.

This study does not address the cost to dispose of the spent fuel residing at the site; such costs are funded through a surcharge on electrical generation. However, the study does estimate the costs incurred with the interim on-site storage of the fuel pending shipment by the DOE to an off-site disposal facility. Those costs are separately presented as "Spent Fuel Management" expenditures in this report.

The DECON alternative, as defined by the NRC, is "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations." The DECON alternative for Monticello is detailed below.

2.1 PERIOD 1 - PREPARATIONS

In anticipation of the cessation of plant operations, detailed preparations are undertaken to provide a smooth transition from plant operations to site decommissioning. Through implementation of a staffing transition plan, the organization required to manage the intended decommissioning activities is assembled from available plant staff and outside resources. Preparations include the planning for permanent defueling of the reactor, revision of technical specifications applicable to the operating conditions and requirements, a characterization of the facility and major components, and the development of the PSDAR.

Engineering and Planning

The PSDAR, required prior to, or within two years of permanent cessation of operations, provides a description of the licensee's planned decommissioning activities, a timetable, a site-specific decommissioning cost estimate, and the associated financial requirements of the intended decommissioning program. Upon receipt of the PSDAR, the NRC will make the document available to the public for comment in a local meeting to be held in the vicinity of the reactor site. Ninety days following submittal and NRC receipt of the PSDAR, the licensee may begin to perform major decommissioning activities under a modified 10 CFR §50.59 procedure, (10 CFR §50.59 establishes the conditions under which licensees may make changes to the facility or procedures and conduct test or experiments, i.e., without prior NRC approval). Major activities are defined as any activity that results in permanent removal of major radioactive components, permanently modifies the structure of the containment, or results in dismantling components (for shipment) containing GTCC, as defined by 10 CFR §61. Major components are further defined as comprising the reactor vessel and internals, large bore reactor recirculation system piping, and other large components that are radioactive. The NRC includes the following additional criteria for use of the §50.59 process in decommissioning. The proposed activity must not:

- foreclose release of the site for possible unrestricted use,
- significantly increase decommissioning costs,
- cause any significant environmental impact not previously reviewed, or
- result in there no longer being reasonable assurance that adequate funds will be available for decommissioning

Existing operational technical specifications are reviewed and modified to reflect plant conditions and the safety concerns associated with permanent

cessation of operations. The environmental impact associated with the planned decommissioning activities is also considered. Typically, a licensee will not be allowed to proceed if the consequences of a particular decommissioning activity are greater than that bounded by previously evaluated environmental assessments or impact statements. In this instance, the licensee would have to submit a license amendment for the specific activity and update the environmental report.

The decommissioning program outlined in the PSDAR will be designed to accomplish the required tasks within the ALARA guidelines (as defined in 10 CFR §20) for protection of personnel from exposure to radiation hazards. It will also address the continued protection of the health and safety of the public and the environment during the dismantling activity. Consequently, with the development of the PSDAR, activity specifications, cost-benefit and safety analyses, and work packages and procedures, would be assembled to support the proposed decontamination and dismantling activities.

Site Preparations

Following final plant shutdown, and in preparation for actual decommissioning activities, the following activities are initiated:

- Characterization of the site and surrounding environs. This includes radiation surveys of work areas, major components (including the reactor vessel and its internals), internal piping, and primary shield cores.
- An ISFSI has been constructed to support continued plant operation and will need to be expanded following the cessation of operations to offload the spent fuel pool in support of the decommissioning program.
- Isolation of the spent fuel storage pool and fuel handling systems, such that decommissioning operations can commence on the balance of the plant. Decommissioning operations are scheduled around the fuel handling area to optimize the overall project schedule. It is assumed that the fuel pool remains operational for the transfer of fuel for approximately four years following the cessation of operations.
- Specification of transport and disposal requirements for activated materials and/or hazardous materials, including shielding and waste stabilization.
- Development of procedures for occupational exposure control, control and release of liquid and gaseous effluent, processing of radwaste (including dry-active waste, resins, filter media, metallic and non-metallic

components generated in decommissioning), site security and emergency programs, and industrial safety.

- Perform chemical decontamination of the NSSS to reduce radiation levels in support of removal operations.

2.2 PERIOD 2 -DECOMMISSIONING OPERATIONS

This period includes the physical decommissioning activities associated with the removal and disposal of contaminated and activated components and structures, including the successful amendment of the 10 CFR §50 operating license (releasing the site, exclusive of the ISFSI). Significant decommissioning activities in this phase include:

- Construction of temporary facilities and/or modification of existing facilities to support dismantling activities. This may include a centralized processing area to facilitate equipment removal and component preparations for off-site disposal.
- Reconfiguration and modification of site structures and facilities as needed to support decommissioning operations. This may include the upgrading of roads (on- and off-site) to facilitate hauling and transport. Modifications may be required to the containment structure to facilitate access of large/heavy equipment. Modifications may also be required to the refueling area of the reactor building to support the segmentation of the reactor vessel internals and component extraction.
- Transfer of the spent fuel from the spent fuel storage pool to the ISFSI pad for interim storage.
- Design and fabrication of temporary and permanent shielding to support removal and transportation activities, construction of contamination control envelopes, and the procurement of specialty tooling.
- Procurement (lease or purchase) of shipping canisters, cask liners, and industrial packages.
- Decontamination of components and piping systems as required to control (minimize) worker exposure.
- Removal of piping and components no longer essential to support decommissioning operations.
- Transfer of the steam separator and dryer assemblies to the dryer-separator pool for segmentation. Segmentation by weight and activity maximizes the loading of the shielded transport casks. The operations are conducted under water using remotely operated tooling and contamination controls.

- Disconnection of the control blades from the drives on the vessel lower head. Blades are transferred to the spent fuel pool for packaging.
- Disassembly, segmentation, and packaging of the core shroud and in-core guide tubes. Some of the material is expected to exceed Class C disposal requirements. As such, those segments are packaged in modified fuel storage canisters for geologic disposal.
- Removal and segmentation of the remaining internals including the jet pump assemblies, fuel support castings, and core plate assembly.
- Removal of spent fuel storage racks from spent fuel pool, and cleanup of spent fuel pool.
- Draining and decontamination of the reactor well and the permanent sealing of the spent fuel transfer gate. Installation of a shielded platform for segmentation of the reactor vessel. Cutting operations are performed in air using remotely operated equipment within a contamination control envelope, with the water level maintained just below the cut to minimize the working area dose rates. Sections are transferred to the dryer-separator pool for packaging and interim storage.
- Disconnection of the control rod drives and instrumentation tubes from the reactor vessel lower head. The lower reactor head and vessel supporting structure are then segmented.
- Removal of the reactor recirculation pumps. Exterior surfaces are decontaminated and openings covered. Components can serve as their own burial containers provided that all penetrations are properly sealed.
- Demolition of the sacrificial shield wall activated concrete by controlled demolition.
- Expansion of the ISFSI and transfer of the spent fuel from the storage pool to the ISFSI pad for interim storage. Spent fuel storage operations continue throughout the active decommissioning period. Fuel transfer to DOE is expected to be completed by the end of the year 2082 (Scenario 1).

At least two years prior to the anticipated date of license termination, an LTP is required. Submitted as a supplement to the Final Safety Analysis Report (FSAR) or its equivalent, the plan must include: a site characterization, description of the remaining dismantling activities, plans for site remediation, procedures for the final radiation survey, designation of the end use of the site, an updated cost estimate to complete the decommissioning, and any associated environmental concerns. The NRC will notice the receipt of the plan, make the plan available for public comment, and schedule a local meeting. LTP approval will be subject to any conditions and limitations as deemed appropriate by the

Commission. The licensee may then commence with the final remediation of site facilities and services, including:

- Removal of remaining plant systems and associated components as they become nonessential to the decommissioning program or worker health and safety (e.g., waste collection and treatment systems, electrical power and ventilation systems).
- Removal of the steel liners from the drywell, disposing of the activated and contaminated sections as radioactive waste. Removal of any activated/contaminated concrete.
- Removal of the steel liners from the dryer/separator pool, reactor well, and spent fuel storage pool.
- Surveys of the decontaminated areas of the containment structure.
- Removal of the contaminated equipment and material from the turbine and radwaste buildings, and any other contaminated facility. Use radiation and contamination control techniques until radiation surveys indicate that the structures can be released for unrestricted access and conventional demolition. This activity may necessitate the dismantling and disposition of most of the systems and components (both clean and contaminated) located within these buildings. This activity will facilitate surface decontamination and subsequent verification surveys required prior to obtaining release for demolition.
- Removal of the remaining components, equipment, and plant services in support of the area release survey(s).
- Routing of material removed in the decontamination and dismantling to a central processing area. Material certified to be free of contamination is released for unrestricted disposition, e.g., as scrap, recycle, or general disposal. Contaminated material is characterized and segregated for additional off-site processing (disassembly, chemical cleaning, volume reduction, and waste treatment), and/or packaged for controlled disposal at a low-level radioactive waste disposal facility.

Incorporated into the LTP is the Final Survey Plan. This plan identifies the radiological surveys to be performed once the decontamination activities are completed and is developed using the guidance provided in the "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)."[26] This document incorporates the statistical approaches to survey design and data interpretation used by the EPA. It also identifies commercially available instrumentation and procedures for conducting radiological surveys. Use of this guidance ensures that the surveys are conducted in a manner that

provides a high degree of confidence that applicable NRC criteria are satisfied. Once the survey is complete, the results are provided to the NRC in a format that can be verified. The NRC then reviews and evaluates the information, performs an independent confirmation of radiological site conditions, and makes a determination on the requested change to the operating license (that would release the property, exclusive of the ISFSI, for unrestricted use).

The NRC will amend the operating license to reduce the licensed area to the ISFSI area if it determines that site remediation has been performed in accordance with the LTP, and that the terminal radiation survey and associated documentation demonstrate that the property (exclusive of the ISFSI) is suitable for release.

2.3 PERIOD 3 –SITE RESTORATION

Following completion of decommissioning operations, site restoration activities will begin. Efficient removal of the contaminated materials and verification that residual radionuclide concentrations are below the NRC limits will result in substantial damage to many of the structures. Although performed in a controlled and safe manner, blasting, coring, drilling, scarification (surface removal), and the other decontamination activities will substantially degrade power block structures including the reactor, turbine and radwaste buildings. Under certain circumstances, verifying that subsurface radionuclide concentrations meet NRC site release requirements will require removal of grade slabs and lower floors, potentially weakening footings and structural supports. This removal activity will be necessary for those facilities and plant areas where historical records, when available, indicate the potential for radionuclides having been present in the soil, where system failures have been recorded, or where it is required to confirm that subsurface process and drain lines were not breached over the operating life of the station.

Dismantling of site structures following decommissioning is clearly the most appropriate and cost-effective option. It is unreasonable to anticipate that these structures would be repaired and preserved after the radiological contamination is removed. The effort to dismantle site structures with a work force already mobilized on site is more efficient than if the process were deferred. Site facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public as well as to future workers. Abandonment creates a breeding ground for vermin infestation as well as other biological hazards.

This cost study presumes that non-essential structures and site facilities are dismantled as a continuation of the decommissioning activity. Foundations

and exterior walls are completely removed, including foundations and basemats, as required by Minnesota regulations. [27] Site areas affected by the dismantling activities are restored and the plant area graded as required to prevent ponding, establish erosion control by the planting of native vegetation, and inhibit the refloating of subsurface materials.

Non-contaminated concrete rubble produced by demolition activities is processed to remove reinforcing steel and miscellaneous embedments. All non-contaminated materials are trucked to an off-site area for disposal as construction debris. Subgrade voids are backfilled with clean construction fill, suitable under Minnesota regulations.

2.4 ISFSI OPERATIONS AND DECOMMISSIONING

The ISFSI will continue to operate under a general license (10 CFR §50) following the amendment of the operating license to release the adjacent (power block) property. Assuming that Monticello spent fuel shipments begin in 2052, the process is not expected to be completed until 2082 (Scenario 1). Any delay in the transfer process, for example, due to a delay in the scheduled opening of the geologic repository, a slower acceptance rate, or a combination of both, can result in a longer on-site residence time for the fuel discharge from the reactor, as well as additional caretaking expenses. Scenarios 3 and 4 address extended delay periods, which includes the assumption that the spent fuel DSCs and NUHOMS horizontal storage modules (HSMs) will need to be replaced every fifty years.

The assumed design for the ISFSI is based upon the use of a multi-purpose dry shielded storage canister and a NUHOMS HSM for pad storage.

At the conclusion of the spent fuel transfer process, the ISFSI will be decommissioned. The Commission will terminate the license if it determines that the remediation of the ISFSI has been performed in accordance with an ISFSI license termination plan and that the final radiation survey and associated documentation demonstrate that the facility is suitable for release. Once the requirements are satisfied, the NRC can terminate the license for the ISFSI.

For purposes of this cost analysis, it is assumed that once the DSCs containing the spent fuel assemblies have been removed, any required decontamination is performed on the storage overpacks (some minor neutron-induced activation is assumed), and the license for the facility terminated, the concrete overpacks can be dismantled using conventional techniques for the demolition of

reinforced concrete. The concrete storage pad is then removed and the area regraded. This topic is discussed in greater detail in section 3.4.1.

3. COST ESTIMATES

The cost estimates prepared for decommissioning Monticello consider the unique features of the site, including the NSSS, power generation systems, support services, site buildings, and ancillary facilities. The basis of the estimates, including the sources of information relied upon, the estimating methodology employed, site-specific considerations, and other pertinent assumptions, is described in this section.

3.1 BASIS OF ESTIMATES

The estimates were developed using the site-specific, technical information from the 2017 analysis. The plant inventory, the basis for the decontamination and dismantling requirements and cost, and the decommissioning waste streams, was reviewed for this analysis; no substantive changes were identified over the three-year period (between estimates) to the configuration of the plant or site facilities that would impact decommissioning. The site-specific considerations and assumptions used in the previous evaluation were also revisited; no necessary modifications were identified. Modifications were incorporated where new information was available or experience from ongoing decommissioning programs provided viable alternatives or improved processes.

3.2 METHODOLOGY

The methodology used to develop the estimates follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates,"[28] and the DOE "Decommissioning Handbook."[29] These documents present a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/inch) were developed using local labor rates. The activity-dependent costs were estimated with the item quantities (cubic yards and tons), developed from plant drawings and inventory documents. Removal rates and material costs for the conventional disposition of components and structures relied upon information available in the industry publication, "Building Construction Cost Data," published by RSMeans. [30]

The unit factor method provides a demonstrable basis for establishing reliable cost estimates. The detail provided in the unit factors, including activity duration, labor costs (by craft), and equipment and consumable costs, ensures that essential elements have not been omitted. Appendix A presents the

detailed development of a typical unit factor. Appendix B provides the values contained within one set of factors developed for this analysis.

Regulatory Guide 1.184 [31] describes the methods and procedures that are acceptable to the NRC staff for implementing the requirements that relate to the initial activities and the major phases of the decommissioning process. The costs and schedules presented in this analysis follow the general guidance and sequence in the regulations. The format and content of the estimates is also consistent with the recommendations of Regulatory Guide 1.202. [32]

The estimates also reflect lessons learned from TLG's involvement in the Shippingport Station Decommissioning Project, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells and associated facilities, completed in 1997. In addition, the planning and engineering for the Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Oyster Creek, Connecticut Yankee, Crystal River, Vermont Yankee, Fort Calhoun, Pilgrim, and Indian Point nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Work Difficulty Factors

The estimates follow the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

Work difficulty adjustment factors (WDFs) account for the inefficiencies in working in a power plant environment. The factors are assigned to each unique set of unit cost factors, commensurate with the inefficiencies associated with working in confined, hazardous environments. The ranges used for the WDFs are as follows:

- Access Factor 10% to 20%
- Respiratory Protection Factor 10% to 50%
- Radiation/ALARA Factor 10% to 40%
- Protective Clothing Factor 10% to 30%
- Work Break Factor 8.33%

The factors and their associated range of values were developed in conjunction with the AIF/NESP-036 study. The application of the factors is discussed in more detail in that publication.

Scheduling Program Durations

The unit factors, adjusted by the WDFs as described above, are applied against the inventory of materials to be removed in the radiologically controlled areas. The resulting man-hours, or crew-hours, are used in the development of the decommissioning program schedule, using resource loading and event sequencing considerations. The scheduling of conventional removal and dismantling activities are based upon productivity information available from the RSMeans "Building Construction Cost Data" publication. Dismantling of the fuel handing systems and decontamination of the spent fuel pool is also dependent upon the timetable for the transfer of the spent fuel assemblies from the pool to the ISFSI.

The program schedule is used to determine the period-dependent costs for program management, administration, field engineering, equipment rental, contracted services, etc. The study relies upon regional or site-specific salary and wage rates for the personnel associated with the intended program.

3.3 FINANCIAL COMPONENTS OF THE COST MODEL

TLG's proprietary decommissioning cost model, DECCER, produces a number of distinct cost elements. These direct expenditures, however, do not comprise the total cost to accomplish the project goal, i.e., license termination and site restoration.

3.3.1 Contingency

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In the DECCER cost model, contingency fulfills this role. Contingency is added to each line item to account for costs that are difficult or impossible to develop analytically. Such costs are historically inevitable over the duration of a job of this magnitude; therefore, this cost analysis includes funds to cover these types of expenses.

The activity- and period-dependent costs are combined to develop the total decommissioning cost. A contingency is then applied on a line-item basis, using one or more of the contingency types listed in the

AIF/NESP-036 study. "Contingencies" are defined in the American Association of Cost Engineers "Project and Cost Engineers' Handbook"[33] as "specific provision for unforeseeable elements of cost within the defined project scope; particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur." The cost elements in this analysis are based upon ideal conditions and maximum efficiency; therefore, consistent with industry practice, a contingency factor has been applied. In the AIF/NESP-036 study, the types of unforeseeable events that are likely to occur in decommissioning are discussed and guidelines are provided for percentage contingency in each category. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station.

The use and role of contingency within decommissioning estimates is not a "safety factor issue." Safety factors provide additional security and address situations that may never occur. Contingency funds are expected to be fully expended throughout the program. They also provide assurance that sufficient funding is available to accomplish the intended tasks. An estimate without contingency, or from which contingency has been removed, can disrupt the orderly progression of events and jeopardize a successful conclusion to the decommissioning process.

For example, the most technologically challenging task in decommissioning a commercial nuclear plant is the disposition of the reactor vessel and internal components, now highly radioactive after a lifetime of exposure to core activity. The disposition of these components forms the basis of the critical path (schedule) for decommissioning operations. Cost and schedule are interdependent, and any deviation in schedule has a significant impact on cost for performing a specific activity.

Disposition of the reactor vessel internals involves the underwater cutting of complex components that are highly radioactive. Costs are based upon optimum segmentation, handling, and packaging scenarios. The schedule is primarily dependent upon the turnaround time for the heavily shielded shipping casks, including preparation, loading, and decontamination of the containers for transport. The number of casks required is a function of the pieces generated in the segmentation activity, a value calculated on optimum performance of the tooling employed in cutting the various subassemblies. The expected

optimization, however, may not be achieved, resulting in delays and additional program costs. For this reason, contingency must be included to mitigate the consequences of the expected inefficiencies inherent in this complex activity, along with related concerns associated with the operation of highly specialized tooling, field conditions, and water clarity.

Contingency funds are an integral part of the total cost to complete the decommissioning process. Exclusion of this component puts at risk a successful completion of the intended tasks and, potentially, subsequent related activities. For this study, TLG examined the major activity-related problems (decontamination, segmentation, equipment handling, packaging, transport, and waste disposal) that necessitate a contingency. Individual activity contingencies ranged from 10% to 75%, depending on the degree of difficulty judged to be appropriate from TLG's actual decommissioning experience. The contingency values used in this study are as follows:

Decontamination	50%
Contaminated Component Removal	25%
Contaminated Component Packaging	10%
Contaminated Component Transport	15%
Low-Level Radioactive Waste Disposal	25%
Low-Level Radioactive Waste Processing	15%
Reactor Segmentation	75%
NSSS Component Removal	25%
Reactor Waste Packaging	25%
Reactor Waste Transport	25%
Reactor Vessel Component Disposal	50%
GTCC Disposal	15%
Staffing	15%
Spent Fuel Management	15%
Non-Radioactive Component Removal	15%
Heavy Equipment and Tooling	15%
Supplies	25%
Engineering	15%
Energy	15%
Insurance and Fees	10%
Characterization and Termination Surveys	30%
Operations and Maintenance Expense	15%

Construction	15%
Property Taxes	10%
ISFSI Decommissioning	25%

The contingency values are applied to the appropriate components of the estimates on a line item basis. A composite value is then reported at the end of each detailed estimate (as provided in Appendices C through F). Appendix G, the ISFSI decommissioning calculation, uses a flat 25% contingency added at the end of the calculation.

3.3.2 Financial Risk

In addition to the routine uncertainties addressed by contingency, another cost element that is sometimes necessary to consider when bounding decommissioning costs relates to uncertainty, or risk. Examples can include changes in work scope, pricing, job performance, and other variations that could conceivably, but not necessarily, occur. Consideration is sometimes necessary to generate a level of confidence in the estimate, within a range of probabilities. TLG considers these types of costs under the broad term "financial risk." Included within the category of financial risk are:

- Transition activities and costs: ancillary expenses associated with eliminating 50% to 80% of the site labor force shortly after the cessation of plant operations, added cost for worker separation packages throughout the decommissioning program, national or company-mandated retraining, and retention incentives for key personnel.
- Delays in approval of the decommissioning plan due to intervention, public participation in local community meetings, legal challenges, and national and local hearings.
- Changes in the project work scope from the baseline estimate, involving the discovery of unexpected levels of contaminants, contamination in places not previously expected, contaminated soil previously undiscovered (either radioactive or hazardous material contamination), variations in plant inventory or configuration not indicated by the as-built drawings.
- Regulatory changes (e.g., affecting worker health and safety, site release criteria, waste transportation, and disposal).
- Policy decisions altering national commitments (e.g., in the ability to accommodate certain waste forms for disposition) or in the timetable

for such, for example, the start and rate of acceptance of spent fuel by the DOE.

- Pricing changes for basic inputs such as labor, energy, materials, and disposal. Items subject to widespread price competition (such as materials) may not show significant variation; however, others such as waste disposal could exhibit large pricing uncertainties, particularly in markets where limited access to services is available.

This cost study does not add any additional costs to the estimate for financial risk, since there is insufficient historical data from which to project future liabilities. Consequently, the areas of uncertainty or risk are revisited periodically and addressed through repeated revisions or updates of the base estimates.

3.4 SITE-SPECIFIC CONSIDERATIONS

There are a number of site-specific considerations that affect the method for dismantling and removal of equipment from the site and the degree of restoration required. The cost impacts of the considerations identified below are included in this cost study.

3.4.1 Spent Fuel Management

The cost to dispose of spent fuel generated from plant operations is not reflected within the estimates to decommission Monticello. Ultimate disposition of the spent fuel is within the province of the DOE's Waste Management System, as defined by the Nuclear Waste Policy Act. As such, the disposal cost was financed by a 1 mill/kWhr surcharge paid into the DOE's waste fund during operations. On November 19, 2013, the U.S. Court of Appeals for the D.C. Circuit ordered the Secretary of the Department of Energy to suspend collecting annual fees for nuclear waste disposal from nuclear power plant operators until the DOE has conducted a legally adequate fee assessment.

The NRC does, however, require licensees to establish a program to manage and provide funding for the management of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy. This requirement is prepared for through inclusion of certain high-level waste cost elements within the estimates, as described below.

Xcel Energy's current spent fuel management plan for the Monticello spent fuel is based in general upon:

1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
3) Fuel will be shipped in the existing NUHOMS DSCs (Scenarios 1, 2, 5, and 6); the NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility.
6) Currently Monticello is storing spent fuel assemblies at the Morris Operation facility of GE Hitachi Nuclear Energy in Morris, Illinois. These assemblies will be shipped for final disposal to DOE prior to the removal of fuel from the Monticello site.

This analysis assumes that the existing ISFSI is modified at the cessation of plant operations to accommodate the fuel present in the storage pool at shutdown.

The DOE's repository program assumes that spent fuel will be accepted for disposal from the nation's commercial nuclear plants in the order (the "queue") in which it was removed from service ("oldest fuel first").[34] Repository operations were based upon annual industry-wide receipt of 400 Metric Tons Heavy Metal (MTHM) in the first year of operation, a total of 3,800 MTHM in years 2 through 4 and 3,000 MTHM for year 5 and beyond.[35] This logic supports the spent fuel schedule for Scenario 1. All other spent fuel scenarios are consistent with those identified by the Minnesota PSC.

Operation and maintenance costs for the spent fuel pool and ISFSI are included within the estimates and address the costs for staffing the facility, as well as security, insurance, and licensing fees. The estimates also include the costs to purchase, load, and transfer the NUHOMs DSCs from the pool to the ISFSI. Costs are also provided for the final

disposition of the ISFSI once the transfer of the DSCs from the ISFSI to the DOE is complete.

Storage Canister Design

The design and capacity of the ISFSI is based upon the Transnuclear NUHOMS system (with a 61-fuel assembly capacity). The system consists of a multi-purpose (storage and transport) dry shielded storage canister (DSC) and a horizontal storage module (HSM). The existing DSCs and HSMs will remain in the ISFSI until either shipment to the DOE, or until recasked.

Canister Loading and Transfer

The estimates include an average cost of $626,000 for the labor to load/transport the spent fuel from the pool to the ISFSI pad. For estimating purposes an allowance of $361,000 is used for the cost to transfer each fuel canister from the ISFSI pad to the DOE transport vehicle.

Operations and Maintenance

An annual cost (excluding labor) of approximately $845,000 and $112,000 are used for operation and maintenance of the spent fuel pool and the ISFSI, respectively.

At shutdown, the spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles). Over the next four years the assemblies are packaged into DSCs for transfer to the ISFSI for transfer to the DOE. It is assumed that the four years provides the necessary cooling period for the final core to meet the decay heat requirements for dry storage. Once the pool is emptied, the spent fuel storage and handling facilities are available for decommissioning.

Replacement of DSCs during ISFSI fuel storage period

Scenarios 1 and 2 do not assume any replacement of the spent fuel storage DSCs (recasking).

The other four cost estimates, Scenarios 3 and 4, include costs to recask the spent fuel, based upon an assumption that the DSC has a limited lifetime of approximately 50 years.

Scenario 3 which is 100 years (nominally) in length, considers two repackaging effort for each DSC in the ISFSI.

Scenario 4, which is a (nominal) 200-year scenario, assumes that when any DSC in the ISFSI reaches the 50 years of storage milestone, the DSC is replaced. The fuel will be recasked four times following final shutdown of Monticello.

Since the reactor building, spent fuel storage pool, and fuel handling facilities are removed by the year 2048, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. Scenarios 3 and 4 include the cost to construct such a transfer facility, as well as additional staffing positions for support of the dry transfer activities, and additional NRC oversight associated with the transfer operations. The decommissioning of this transfer facility is also included in these scenarios.

ISFSI Decommissioning

In accordance with 10 CFR §72.30, licensees must have a proposed decommissioning plan for the ISFSI site and facilities that includes a cost estimate for the plan. The plan should contain sufficient information on the proposed practices and procedures for the decontamination of the ISFSI and for the disposal of residual radioactive materials after all spent fuel, high-level radioactive waste, and reactor-related GTCC waste have been removed.

The NUHOMS multi-purpose dry shielded storage canister with a horizontal, reinforced concrete storage module is used as a basis for the ISFSI decommissioning cost analyses. The modules are assumed to have some level of neutron-induced activation, as a result of the long-term storage of the fuel, i.e., to levels exceeding free-release limits. As an allowance, 8 modules are assumed to require remediation, equivalent to the number of modules required to accommodate the final core offload at Monticello (484 assemblies). The cost of the disposition of this material, as well as the demolition of the ISFSI facility, is included in the estimates.

In accordance with the specific requirements of 10 CFR §72.30 for the ISFSI work scope, the cost estimate for decommissioning the ISFSI reflects: 1) the cost of an independent contractor performing the decommissioning activities; 2) an adequate contingency factor; and 3) the cost of meeting the criteria for unrestricted use. The cost summary

for decommissioning the ISFSI is presented in Appendix G. It contains two different scenarios reflecting the different number of casks present at the end of the ISFSI operations. The demolition of the ISFSI for both scenarios is reflected within the estimates.

GTCC

The dismantling of the reactor internals is expected to generate radioactive waste considered unsuitable for shallow land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste. [36]

Although the material is not classified as high-level waste, federal regulations under the Act designate that disposal of this material is a federal responsibility under Section 3(b)(1)(D). However, the DOE has not been forthcoming with an acceptance criteria or disposition schedule for this material, and numerous questions remain as to the ultimate disposal cost and waste form requirements.

As such, for purposes of this study, the GTCC has been packaged and disposed of in the same manner as high-level waste, at a cost equivalent to that envisioned for the spent fuel. The number of DSCs required and the packaged volume for GTCC was based upon experience at Maine Yankee (e.g., the constraints on loading as identified in the canister's certificate of compliance), but adjusted for the increased spent fuel capacity of the current DSCs.

It is assumed that the DOE would not accept this waste prior to completing the transfer of spent fuel. Therefore, until such time the DOE is ready to accept GTCC waste, it is reasonable to assume that this material would remain in storage at Monticello. GTCC costs have been segregated and included within the "License Termination" expenditures.

3.4.2 Reactor Vessel and Internal Components

The reactor coolant system components are assumed to be decontaminated using chemical agents prior to the start of cutting operations. This type of decontamination can be expected to have a

significant ALARA impact, since the removal work is done within the first few years of shutdown. A decontamination factor (average reduction) of 10 is assumed for the process. Disposal of the decontamination solution effluent is included within the estimate as a "process liquid waste" charge.

The reactor pressure vessel and internal components are segmented for disposal in shielded, reusable transportation casks. Segmentation is performed underwater in the dryer-separator pool, where a turntable and remote cutter are installed. The vessel is segmented in place, using a mast-mounted cutter supported off the lower head and directed from a shielded work platform installed overhead in the reactor well. Transportation cask specifications and transportation regulations dictate the segmentation and packaging methodology.

Intact disposal of reactor vessel shells has been successfully demonstrated at several of the sites that have been decommissioned. Access to navigable waterways has allowed these large packages to be transported to the Barnwell disposal site with minimal overland travel. Intact disposal of the reactor vessel and internal components can provide savings in cost and worker exposure by eliminating the complex segmentation requirements, isolation of the GTCC material, and transport/storage of the resulting waste packages. Portland General Electric (PGE) was able to dispose of the Trojan reactor as an intact package (including the internals). However, its location on the Columbia River simplified the transportation analysis since:

- the reactor package could be secured to the transport vehicle for the entire journey, i.e., the package was not lifted during transport,
- there were no man-made or natural terrain features between the plant site and the disposal location that could produce a large drop, and
- transport speeds were very low, limited by the overland transport vehicle and the river barge.

As a member of the Northwest Compact, PGE had a site available for disposal of the package - the US Ecology facility in Washington State. The characteristics of this arid site proved favorable in demonstrating compliance with land disposal regulations.

It is not known whether this option will be available when Monticello ceases operation. Future viability of this option will depend upon the ultimate location of the disposal site, as well as the disposal site licensee's ability to accept highly radioactive packages and effectively isolate them from the environment. Additionally, with BWRs, the diameter of the reactor vessel may severely limit overland transport. Consequently, the study assumes the reactor vessel will require segmentation, as a bounding condition.

3.4.3 Primary System Components

Reactor recirculation piping is cut from the reactor vessel once the water level in the vessel (used for personnel shielding during dismantling and cutting operations in and around the vessel) is dropped below the nozzle zone. The piping is boxed and transported by shielded van. The reactor recirculation pumps and motors are lifted out intact, packaged, and transported for processing and/or disposal.

3.4.4 Main Turbine and Condenser

The main turbine will be dismantled using conventional maintenance procedures. The turbine rotors and shafts will be removed to a laydown area. The lower turbine casings will be removed from their anchors by controlled demolition. The main condensers will also be disassembled and moved to a laydown area. Material is then prepared for transportation to an off-site recycling facility where it will be surveyed and designated for either decontamination or volume reduction, or controlled disposal. Components will be packaged and readied for transport in accordance with the intended disposition.

3.4.5 Transportation Methods

Contaminated piping, components, and structural material other than the highly activated reactor vessel and internal components will qualify as LSA-I, II or III or Surface Contaminated Object, SCO-I or II, as described in Title 49. [37] The contaminated material will be packaged in Industrial Packages (IP-1, IP-2, or IP-3, as defined in subpart 10 CFR 173.411) for transport unless demonstrated to qualify as their own shipping containers. The reactor vessel and internal components are expected to be transported in accordance with 10 CFR Part 71, as Type B. It is conceivable that the reactor, due to its limited specific activity, could qualify as LSA II or III. However, the high radiation levels on the outer surface would require that additional shielding be incorporated

within the packaging so as to attenuate the dose to levels acceptable for transport.

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ^{137}Cs, ^{90}Sr, or transuranics) has been prevented from reaching levels exceeding those that permit the major reactor components to be shipped under current transportation regulations and disposal requirements.

Transport of the highly activated metal, produced in the segmentation of the reactor vessel and internal components, will be by shielded truck cask. Cask shipments may exceed 95,000 pounds, including vessel segment(s), supplementary shielding, cask tie-downs, and tractor-trailer. The maximum level of activity per shipment assumed permissible was based upon the license limits of the available shielded transport casks. The segmentation scheme for the vessel and internal segments is designed to meet these limits.

Transportation costs for Class A radioactive material requiring controlled disposal are based upon the mileage to the Energy*Solutions* facility in Clive, Utah. Transportation costs for the higher activity Class B and C radioactive material are based upon the mileage to the WCS facility in Andrews County, Texas. The transportation cost for the GTCC material is assumed to be contained within the disposal cost. Transportation costs for off-site waste processing are based upon the mileage to Oak Ridge, Tennessee. Truck transport costs were estimated using published tariffs from Tri-State Motor Transit. [38]

3.4.6 Low-Level Radioactive Waste Disposal

To the greatest extent practical, metallic material generated in the decontamination and dismantling processes is processed to reduce the total cost of controlled disposal. Material meeting the regulatory and/or site release criterion, is released as scrap, requiring no further cost consideration. Conditioning (preparing the material to meet the waste acceptance criteria of the disposal site) and recovery of the waste stream is performed off site at a licensed processing center. Any material leaving the site is subject to a survey and release charge, at a minimum.

The mass of radioactive waste generated during the various decommissioning activities at the site is shown on a line-item basis in the detailed Appendices C through F, and summarized in Section 5. The

quantified waste summaries shown in these tables are consistent with 10 CFR Part 61 classifications. Commercially available steel containers are presumed to be used for the disposal of piping, small components, and concrete. Larger components can serve as their own containers, with proper closure of all openings, access ways, and penetrations. The volumes are calculated based on the exterior package dimensions for containerized material or a specific calculation for components serving as their own waste containers.

The more highly activated reactor components will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume and weight, with surcharges added for the special handling requirements and the radiological characteristics of the payload. Packaging efficiencies are lower for the highly activated materials (greater than Type A quantity waste), where high concentrations of gamma-emitting radionuclides limit the capacity of the shipping canisters.

The cost to dispose of the lowest level and majority of the material generated from the decontamination and dismantling activities is based upon representative costs for disposal at Energy*Solutions* facility in Clive, Utah. Disposal costs for the higher activity waste (Class B and C) were based upon preliminary and indicative information from WCS for the Andrews County facility.

Material exceeding Class C limits (limited to material closest to the reactor core and comprising less than 1% of the total waste volume) is generally not suitable for shallow-land disposal. This material is packaged in the same multipurpose canisters used for spent fuel storage/transport, for eventual transfer to the DOE for disposal.

3.4.7 Site Conditions Following Decommissioning

The NRC will amend or terminate the unit license if it determines that site remediation has been performed in accordance with the license termination plan, and that the terminal radiation survey and associated documentation demonstrate that the facility is suitable for release. The NRC's involvement in the decommissioning process will end at this point. Building codes and environmental regulations will dictate the next step in the decommissioning process, as well as Xcel Energy's own future plans for the site, e.g., the electrical switchyard will remain in support of the regional transmission and distribution system.

Asphalt surfaces in the immediate vicinity of site buildings are broken up and the material disposed of as construction debris. The site access road will remain.

Only existing site structures are considered in the dismantling cost. All subgrade structures are removed. The voids are backfilled with clean debris and capped with soil. The site is then re-graded to conform to the adjacent landscape. Vegetation is established to inhibit erosion. These "non-radiological costs" are included in the total cost of decommissioning.

Bulk excavation of soil and material in the immediate vicinity of the reactor building is included to remove various duct banks, catch basins, and underground utilities that may exist.

The estimates do not assume the remediation of any significant volume of contaminated soil. This assumption may be affected by continued plant operations and/or future regulatory actions, such as the development of site-specific release criteria.

3.5 ASSUMPTIONS

The following are the major assumptions made in the development of the estimates for decommissioning the site.

3.5.1 Estimating Basis

Decommissioning costs are reported in the year of projected expenditure; however, the values are provided in 2020 dollars. Costs are not inflated, escalated, or discounted over the periods of performance.

The estimates rely upon the physical plant inventory that was the basis for the 2017 analysis (updated to reflect any material changes to the plant over the past three years).

The study follows the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

3.5.2 Labor Costs

For purposes of this analysis, it is assumed that Xcel Energy will hire a Decommissioning Operations Contractor (DOC) to manage the decommissioning. Xcel Energy will provide site security, radiological health and safety, quality assurance and overall site administration during the decommissioning and demolition phases. Contract personnel will provide engineering services (e.g., for preparing the activity specifications, work procedures, neutron activation, and structural analyses) under the direction of Xcel Energy.

Utility labor costs were provided by Xcel Energy. Average costs were provided by department or work group and included payroll overheads. Decommissioning Operations Contractor (DOC) labor costs were based on utility labor costs with modified markups to account for employee benefits, DOC overhead and profit.

The craft labor required to decontaminate and dismantle the nuclear station will be acquired through standard site contracting practices. Craft labor costs were based upon information from Xcel Energy. Craft labor costs include applicable overheads and profit.

Security levels are assumed to be maintained at "operating levels" for approximately 18 months after operations ceases. Additional reductions in force size are assumed when the pool is empty and with the completion of the decommissioning and site restoration activities.

Staffing levels are assigned by sub-period and functional area. The types of positions and staffing levels are adjusted based upon the type of activity occurring in each sub-period.

Representative profiles of the staffing level for decommissioning, including contractors and craft, is provided in Figure 3.1 (Scenario 2). Utility staffing levels will gradually decrease after completing the removal of physical systems. Staffing levels and management support will vary based upon the amount and type of decommissioning work. Craft manpower levels decrease after systems removal and structures decontamination and drop substantially during the delay period and the license termination survey period. However, craft levels increase again during the site restoration period due to the work associated with structures demolition.

Security, while reduced from operating levels, is maintained throughout the decommissioning for access control, material control, and to safeguard the spent fuel (in accordance with the requirements of 10 CFR Part 37, Part 72, and Part 73).

3.5.3 Design Conditions

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ^{137}Cs, ^{90}Sr, or transuranics) has been prevented from reaching levels exceeding those that permit the major NSSS components to be shipped under current transportation regulations and disposal requirements.

The curie contents of the vessel and internals at final shutdown are derived from those listed in NUREG/CR-3474.[39] Actual estimates are derived from the curie/gram values contained therein and adjusted for the different mass of the Monticello components, projected operating life, and different periods of decay. Additional short-lived isotopes were derived from NUREG/CR-0130[40] and NUREG/CR-0672, [41] and benchmarked to the long-lived values from NUREG/CR-3474.

The disposal cost for the control blades removed from the vessel with the final core load was included within the estimates. Control blade residence time in the reactor is assumed to be controlled such that the blades do not become GTCC material. Disposition of any blades stored in the pool from operations was considered an operating expense and therefore not accounted for in the estimates.

Neutron activation of the reactor building structure is confined to the reactor sacrificial shield.

3.5.4 General

Transition Activities

Existing warehouses will be cleared of non-essential material and remain for use by Xcel Energy and subcontractors. The plant's operating staff will perform the following activities at no additional cost or credit to the project during the transition period:

- Drain and collect fuel oils, lubricating oils, and transformer oils for recycle and/or sale.

- Drain and collect acids, caustics, and other chemical stores for recycle and/or sale.
- Processes operating waste inventories, i.e., the estimates do not address the disposition of any legacy wastes; the disposal of operating wastes during this initial period is not considered a decommissioning expense.

Scrap and Salvage

The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. Xcel Energy will make economically reasonable efforts to salvage equipment following final plant shutdown. However, dismantling techniques assumed by TLG for equipment in this analysis are not consistent with removal techniques required for salvage (resale) of equipment. Experience has indicated that some buyers wanted equipment stripped down to very specific requirements before they would consider purchase. This required expensive rework after the equipment had been removed from its installed location. Since placing a salvage value on this machinery and equipment would be speculative, and the value would be small in comparison to the overall decommissioning expenses, this analysis does not attempt to quantify the possible salvage value that Xcel Energy may realize based upon those efforts.

It is assumed, for purposes of this analysis, that any value received from the sale of scrap generated in the dismantling process would be offset by the on-site processing costs. The dismantling techniques assumed in the decommissioning estimates do not include the additional cost for size reduction and preparation to meet "furnace ready" conditions. For example, the recovery of copper from electrical cabling may require the removal and disposition of any contaminated insulation, an added expense. With a volatile market, the potential profit margin in scrap recovery is highly speculative, regardless of the ability to free release this material. This assumption is an implicit recognition of scrap value in the disposal of clean metallic waste at no additional cost to the project.

Furniture, tools, mobile equipment such as forklifts, trucks, bulldozers, and other property will be removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts will also be made available for alternative use.

The concrete debris resulting from building demolition activities is crushed on site to reduce the size of the debris. The resulting crushed concrete is disposed offsite as construction debris. The rebar removed from the concrete crushing process is disposed of as scrap steel in a similar fashion as other scrap metal as discussed previously.

Energy

For estimating purposes, the plant is assumed to be de-energized, except for those facilities associated with spent fuel storage. Replacement power costs are used for the cost of energy consumption during decommissioning for tooling, lighting, ventilation, and essential services.

Emergency Planning

FEMA and state fees associated with emergency planning are assumed to continue for approximately 12 months following the cessation of operations. At this time, the FEMA fees are discontinued. The timing is based upon the anticipated condition of the spent fuel (i.e., the hottest spent fuel assemblies are assumed to be cool enough that no substantial Zircaloy oxidation and off-site event would occur with the loss of spent fuel pool water). State and local fees are continued until all spent fuel is transferred out of the spent fuel pool. Local fees are continued until all spent fuel has been removed from the site.

Insurance

Costs for continuing coverage (nuclear liability and property insurance) following cessation of plant operations and during decommissioning are included and based upon current operating premiums. Reductions in premiums, throughout the decommissioning process, are based upon the guidance provided in SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning."[42] The NRC's financial protection requirements are based on various reactor (and spent fuel) configurations.

Site Non-Labor Overhead

These estimates include costs for site non-labor overhead charges. These costs include telephones, copy machines, computers, IT infrastructure, office supplies, janitorial supplies, training expenses, etc. Xcel Energy provided a two-part cost to address these costs. A variable charge of $7,389 per person per year of the Xcel Energy staff is included

throughout the estimate. A fixed annual overhead charge is also included, starting at $2.6 million at the time of unit shut down and decreasing at various intervals to approximately $215 thousand per reactor.

Severance Program

Severance for personnel retained for the decommissioning organization is included in this estimate.

Taxes

Property taxes are included for all decommissioning periods. Xcel Energy provided a schedule of decreasing tax payments against the current tax assessment. These payments are maintained for the balance of the decommissioning program.

NRC Fees

These estimates include charges from the NRC to support the Monticello decommissioning program. Charges are included for the yearly license held by Xcel Energy for the Part 50 license, as well as engineering support charges by the NRC to review activities at the site. The Part 50 license fee for a reactor in a decommissioning or possession-only status and which has spent fuel onsite is $188 thousand per year. Once the reactor has been decommissioned, the site Part 50 license continues at the same fee until final removal of the spent fuel. The hourly rate for NRC review is $279.00. The level of effort of NRC participation is commensurate with the decommissioning alternative and schedule.

Disposal of Processed Water

This estimate assumes that processed water which meets state and federal release limits can be disposed of without additional cost.

Site Modifications

The perimeter fence and in-plant security barriers will be moved, as appropriate, to conform to the Site Security Plan in force during the various stages of the project.

Morris Facility Payments

This estimate includes a yearly cost of $63 thousand to pay for the storage of spent fuel at the Morris facility.

Minnesota state regulations regarding concrete

This estimate complies with the Minnesota state regulations regarding the removal of all subterranean concrete during demolition, plus the survey and confirmation of the suitability of the clean fill used for backfill of the subgrade structures following concrete removal.

3.6 COST ESTIMATE SUMMARY

The estimates presented in this document reflects the total cost to decontaminate the nuclear unit, manage the spent fuel until the DOE is able to complete the transfer to a federal facility, dismantle the plant and restore the site for alternative use.

Schedules of expenditures are provided in Tables 3.1 through 3.4. The tables delineate the cost contributors by year of expenditures as well as cost contributor (e.g., labor, materials, and waste disposal).

Additional tables in Appendices C through F provide detailed costs elements. The cost elements are also assigned to one of three subcategories: "License Termination," "Spent Fuel Management," and "Site Restoration." The subcategory "License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). In situations where the long-term management of spent fuel is not an issue, the cost reported for this subcategory is generally sufficient to terminate the unit's operating license, recognizing that there may be some additional cost impact from spent fuel management.

The "Spent Fuel Management" subcategory contains costs associated with the containerization and transfer of spent fuel from the pool to the ISFSI for interim storage, and the transfer of the multipurpose canisters from the ISFSI to the DOE. Costs are also included for the operations of the pool and management of the ISFSI until such time that the transfer of all fuel from this facility to an off-site location (e.g., interim storage facility) is complete.

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive

materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are completely removed, including foundations and basemats and backfilled to conform to local grade.

As discussed in Section 3.4.1, it is assumed that the DOE will not accept the GTCC waste prior to completing the transfer of spent fuel. Therefore, the cost of GTCC disposal is shown in the final year of ISFSI operation (for the DECON alternative). While designated for disposal at a federal facility along with the spent fuel, GTCC waste is still classified as low-level radioactive waste and, as such, included as a "License Termination" expense.

Decommissioning costs are reported in 2020 dollars. Costs are not inflated, escalated, or discounted over the period of expenditure (or projected lifetime of the plant).

TABLE 3.1
SCENARIO 1: DECON WITH 42 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2040	23,126	2,441	658	20	7,605	33,849
2041	78,419	11,551	2,747	1,362	34,057	128,136
2042	84,919	36,588	2,387	59,462	32,141	215,498
2043	95,736	65,581	1,831	56,853	27,814	247,814
2044	97,793	77,421	1,341	29,727	22,841	229,122
2045	52,983	4,350	601	11,794	5,833	75,560
2046	37,181	10,198	249	9	4,036	51,673
2047	32,119	11,301	193	0	3,937	47,551
2048	7,112	2,158	0	0	2,557	11,827
2049	6,375	0	0	0	2,550	8,925
2050	6,375	0	0	0	2,550	8,925
2051	6,375	0	0	0	2,550	8,925
2052	6,496	311	0	0	2,557	9,364
2053	6,686	934	0	0	2,550	10,170
2054	6,583	623	0	0	2,550	9,755
2055	6,583	623	0	0	2,550	9,755
2056	7,015	1,868	0	0	2,557	11,440
2057	6,894	1,557	0	0	2,550	11,001
2058	6,894	1,557	0	0	2,550	11,001
2059	6,894	1,557	0	0	2,550	11,001
2060	6,704	934	0	0	2,557	10,195
2061	6,583	623	0	0	2,550	9,755
2062	6,686	934	0	0	2,550	10,170
2063	6,583	623	0	0	2,550	9,755
2064	6,600	623	0	0	2,557	9,780
2065	6,686	934	0	0	2,550	10,170
2066	6,583	623	0	0	2,550	9,755
2067	6,583	623	0	0	2,550	9,755
2068	6,704	934	0	0	2,557	10,195
2069	6,790	1,245	0	0	2,550	10,585

TABLE 3.1 (continued)
SCENARIO 1: DECON WITH 42 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2070	6,583	623	0	0	2,550	9,755
2071	6,790	1,245	0	0	2,550	10,585
2072	6,704	934	0	0	2,557	10,195
2073	6,479	311	0	0	2,550	9,340
2074	6,479	311	0	0	2,550	9,340
2075	6,583	623	0	0	2,550	9,755
2076	6,496	311	0	0	2,557	9,364
2077	6,479	311	0	0	2,550	9,340
2078	6,583	623	0	0	2,550	9,755
2079	6,479	311	0	0	2,550	9,340
2080	6,496	311	0	0	2,557	9,364
2081	6,583	623	0	0	2,550	9,755
2082	6,583	1,976	0	0	7,500	16,059
2083	2,096	1,639	22	7,406	4,949	16,112
Total	736,471	248,869	10,030	166,633	237,468	1,399,471

Note: Columns may not add due to rounding

TABLE 3.2
SCENARIO 2: DECON WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2040	22,676	1,092	658	20	7,605	32,050
2041	77,447	8,635	2,747	1,362	34,057	124,248
2042	84,937	36,642	2,387	59,462	32,141	215,570
2043	95,756	65,640	1,831	56,853	27,814	247,894
2044	97,812	77,479	1,341	29,727	22,841	229,199
2045	52,998	4,394	601	11,794	5,833	75,619
2046	37,199	10,252	249	9	4,036	51,745
2047	32,137	11,355	193	0	3,931	47,617
2048	7,130	2,212	0	0	2,472	11,814
2049	6,393	54	0	0	2,465	8,912
2050	8,012	4,910	0	0	2,465	15,387
2051	8,012	4,910	0	0	2,465	15,387
2052	8,749	7,070	0	0	2,472	18,291
2053	9,272	8,690	0	0	2,465	20,427
2054	8,192	5,450	0	0	2,465	16,107
2055	9,092	8,150	0	0	2,465	19,707
2056	9,469	9,230	0	0	2,472	21,171
2057	6,375	0	0	0	2,465	8,840
2058	6,375	0	0	0	2,465	8,840
2059	6,375	0	0	0	2,465	8,840
2060	6,393	0	0	0	2,472	8,864
2061	6,375	0	0	0	2,465	8,840
2062	6,375	0	0	0	2,465	8,840
2063	6,375	0	0	0	2,465	8,840
2064	6,393	0	0	0	2,472	8,864
2065	6,375	0	0	0	2,465	8,840
2066	6,375	0	0	0	2,465	8,840
2067	6,375	0	0	0	2,465	8,840
2068	6,393	0	0	0	2,472	8,864
2069	6,375	0	0	0	2,465	8,840

TABLE 3.2 (continued)
SCENARIO 2: DECON WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2070	6,375	0	0	0	2,465	8,840
2071	6,375	0	0	0	2,465	8,840
2072	6,393	0	0	0	2,472	8,864
2073	6,375	0	0	0	2,465	8,840
2074	6,375	0	0	0	2,465	8,840
2075	6,375	0	0	0	2,465	8,840
2076	6,393	0	0	0	2,472	8,864
2077	6,375	0	0	0	2,465	8,840
2078	6,894	1,557	0	0	2,465	10,916
2079	6,998	1,868	0	0	2,465	11,331
2080	6,911	1,557	0	0	2,472	10,940
2081	6,894	1,557	0	0	2,465	10,916
2082	6,894	1,557	0	0	2,465	10,916
2083	6,998	1,868	0	0	2,465	11,331
2084	6,911	1,557	0	0	2,472	10,940
2085	6,894	1,557	0	0	2,465	10,916
2086	6,894	1,557	0	0	2,465	10,916
2087	6,998	1,868	0	0	2,465	11,331
2088	7,631	3,715	0	0	2,472	13,818
2089	6,894	1,557	0	0	2,465	10,916
2090	6,479	311	0	0	2,465	9,255
2091	6,479	311	0	0	2,465	9,255
2092	6,496	311	0	0	2,472	9,279
2093	6,583	623	0	0	2,465	9,670
2094	6,479	311	0	0	2,465	9,255
2095	6,479	311	0	0	2,465	9,255
2096	6,600	623	0	0	2,472	9,694
2097	6,479	311	0	0	2,465	9,255
2098	6,479	311	0	0	2,465	9,255
2099	6,583	623	0	0	2,465	9,670

TABLE 3.2 (continued)
SCENARIO 2: DECON WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2100	6,583	1,976	0	0	7,419	15,978
2101	2,096	1,639	22	7,406	4,949	16,112
Total	866,871	295,605	10,030	166,633	278,884	1,618,023

Note: Columns may not add due to rounding

TABLE 3.3
SCENARIO 3: DECON WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2040	22,676	1,092	658	20	7,605	32,050
2041	77,873	9,916	2,747	1,362	34,057	125,955
2042	86,878	42,467	2,387	59,462	32,141	223,336
2043	97,068	69,577	1,831	56,853	27,814	253,143
2044	97,812	77,479	1,341	29,727	22,841	229,199
2045	52,998	4,394	601	11,794	5,833	75,619
2046	37,374	10,365	249	3,296	4,592	55,875
2047	32,437	11,481	193	3,765	4,567	52,443
2048	8,502	2,212	0	0	2,458	13,173
2049	7,761	54	0	0	2,451	10,267
2050	9,380	4,911	0	0	2,451	16,742
2051	9,380	4,911	0	0	2,451	16,742
2052	9,401	4,911	0	0	2,458	16,770
2053	9,380	4,911	0	0	2,451	16,742
2054	9,380	4,911	0	0	2,451	16,742
2055	9,380	4,911	0	0	2,451	16,742
2056	9,401	4,911	0	0	2,458	16,770
2057	9,380	4,911	0	0	2,451	16,742
2058	16,558	26,445	0	0	2,451	45,455
2059	9,380	4,911	0	0	2,451	16,742
2060	9,401	4,911	0	0	2,458	16,770
2061	9,380	4,911	0	0	2,451	16,742
2062	9,380	4,911	0	0	2,451	16,742
2063	12,969	15,678	0	0	2,451	31,098
2064	9,401	4,911	0	0	2,458	16,770
2065	9,380	4,911	0	0	2,451	16,742
2066	10,098	7,064	0	0	2,451	19,613
2067	9,380	4,911	0	0	2,451	16,742
2068	19,451	35,059	0	0	2,458	56,968
2069	9,380	4,911	0	0	2,451	16,742

TABLE 3.3 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2070	9,380	4,911	0	0	2,451	16,742
2071	9,380	4,911	0	0	2,451	16,742
2072	9,401	4,911	0	0	2,458	16,770
2073	9,380	4,911	0	0	2,451	16,742
2074	9,380	4,911	0	0	2,451	16,742
2075	9,380	4,911	0	0	2,451	16,742
2076	9,401	4,911	0	0	2,458	16,770
2077	9,380	4,911	0	0	2,451	16,742
2078	9,380	4,911	0	0	2,451	16,742
2079	9,380	4,911	0	0	2,451	16,742
2080	12,990	15,678	0	0	2,458	31,126
2081	9,380	4,911	0	0	2,451	16,742
2082	9,380	4,911	0	0	2,451	16,742
2083	9,380	4,911	0	0	2,451	16,742
2084	9,401	4,911	0	0	2,458	16,770
2085	12,969	15,678	0	0	2,451	31,098
2086	9,380	4,911	0	0	2,451	16,742
2087	11,534	11,371	0	0	2,451	25,356
2088	10,121	7,069	0	0	2,458	19,648
2089	9,380	4,911	0	0	2,451	16,742
2090	9,380	4,911	0	0	2,451	16,742
2091	9,380	4,911	0	0	2,451	16,742
2092	10,121	7,070	0	0	2,458	19,650
2093	10,640	8,690	0	0	2,451	21,781
2094	34,684	80,821	0	0	2,451	117,956
2095	10,460	8,150	0	0	2,451	21,062
2096	10,841	9,230	0	0	2,458	22,529
2097	7,743	0	0	0	2,451	10,195
2098	7,743	0	0	0	2,451	10,195
2099	7,743	0	0	0	2,451	10,195

TABLE 3.3 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2100	7,743	0	0	0	2,451	10,195
2101	7,743	0	0	0	2,451	10,195
2102	7,743	0	0	0	2,451	10,195
2103	7,743	0	0	0	2,451	10,195
2104	7,765	0	0	0	2,458	10,223
2105	7,743	0	0	0	2,451	10,195
2106	7,743	0	0	0	2,451	10,195
2107	7,743	0	0	0	2,451	10,195
2108	14,943	21,534	0	0	2,458	38,935
2109	7,743	0	0	0	2,451	10,195
2110	7,743	0	0	0	2,451	10,195
2111	7,743	0	0	0	2,451	10,195
2112	7,765	0	0	0	2,458	10,223
2113	11,332	10,767	0	0	2,451	24,551
2114	7,743	0	0	0	2,451	10,195
2115	7,743	0	0	0	2,451	10,195
2116	8,482	2,153	0	0	2,458	13,094
2117	7,743	0	0	0	2,451	10,195
2118	18,312	31,705	0	0	2,451	52,468
2119	8,366	1,868	0	0	2,451	12,686
2120	8,283	1,557	0	0	2,458	12,299
2121	8,262	1,557	0	0	2,451	12,271
2122	8,262	1,557	0	0	2,451	12,271
2123	8,366	1,868	0	0	2,451	12,686
2124	8,283	1,557	0	0	2,458	12,299
2125	8,262	1,557	0	0	2,451	12,271
2126	8,262	1,557	0	0	2,451	12,271
2127	8,366	1,868	0	0	2,451	12,686
2128	9,003	3,715	0	0	2,458	15,176
2129	8,262	1,557	0	0	2,451	12,271

TABLE 3.3 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2130	11,436	11,079	0	0	2,451	24,966
2131	7,847	311	0	0	2,451	10,610
2132	7,868	311	0	0	2,458	10,638
2133	7,951	623	0	0	2,451	11,025
2134	7,847	311	0	0	2,451	10,610
2135	11,436	11,079	0	0	2,451	24,966
2136	7,972	623	0	0	2,458	11,053
2137	10,001	6,772	0	0	2,451	19,224
2138	7,847	311	0	0	2,451	10,610
2139	7,951	623	0	0	2,451	11,025
2140	7,920	1,977	0	0	7,412	17,309
2141	2,074	1,449	22	354	3,830	7,729
Total	1,406,512	765,842	10,030	166,633	376,375	2,725,391

Note: Columns may not add due to rounding

TABLE 3.4
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2040	22,676	1,092	658	20	7,605	32,050
2041	77,873	9,916	2,747	1,362	34,057	125,955
2042	86,878	42,467	2,387	59,462	32,141	223,336
2043	97,068	69,577	1,831	56,853	27,814	253,143
2044	97,812	77,479	1,341	29,727	22,841	229,199
2045	52,998	4,394	601	11,794	5,833	75,619
2046	37,374	10,365	249	3,296	4,592	55,875
2047	32,437	11,481	193	3,765	4,566	52,443
2048	8,502	2,212	0	0	2,449	13,163
2049	7,761	54	0	0	2,442	10,258
2050	9,380	4,911	0	0	2,442	16,733
2051	9,380	4,911	0	0	2,442	16,733
2052	9,401	4,911	0	0	2,449	16,761
2053	9,380	4,911	0	0	2,442	16,733
2054	9,380	4,911	0	0	2,442	16,733
2055	9,380	4,911	0	0	2,442	16,733
2056	9,401	4,911	0	0	2,449	16,761
2057	9,380	4,911	0	0	2,442	16,733
2058	16,558	26,445	0	0	2,442	45,445
2059	9,380	4,911	0	0	2,442	16,733
2060	9,401	4,911	0	0	2,449	16,761
2061	9,380	4,911	0	0	2,442	16,733
2062	9,380	4,911	0	0	2,442	16,733
2063	12,969	15,678	0	0	2,442	31,089
2064	9,401	4,911	0	0	2,449	16,761
2065	9,380	4,911	0	0	2,442	16,733
2066	10,098	7,064	0	0	2,442	19,604
2067	9,380	4,911	0	0	2,442	16,733
2068	19,451	35,059	0	0	2,449	56,958
2069	9,380	4,911	0	0	2,442	16,733

TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2070	9,380	4,911	0	0	2,442	16,733
2071	9,380	4,911	0	0	2,442	16,733
2072	9,401	4,911	0	0	2,449	16,761
2073	9,380	4,911	0	0	2,442	16,733
2074	9,380	4,911	0	0	2,442	16,733
2075	9,380	4,911	0	0	2,442	16,733
2076	9,401	4,911	0	0	2,449	16,761
2077	9,380	4,911	0	0	2,442	16,733
2078	9,380	4,911	0	0	2,442	16,733
2079	9,380	4,911	0	0	2,442	16,733
2080	12,990	15,678	0	0	2,449	31,117
2081	9,380	4,911	0	0	2,442	16,733
2082	9,380	4,911	0	0	2,442	16,733
2083	9,380	4,911	0	0	2,442	16,733
2084	9,401	4,911	0	0	2,449	16,761
2085	12,969	15,678	0	0	2,442	31,089
2086	9,380	4,911	0	0	2,442	16,733
2087	11,534	11,371	0	0	2,442	25,347
2088	10,121	7,069	0	0	2,449	19,639
2089	9,380	4,911	0	0	2,442	16,733
2090	9,380	4,911	0	0	2,442	16,733
2091	9,380	4,911	0	0	2,442	16,733
2092	9,401	4,911	0	0	2,449	16,761
2093	9,380	4,911	0	0	2,442	16,733
2094	34,504	80,281	0	0	2,442	117,226
2095	9,380	4,911	0	0	2,442	16,733
2096	9,401	4,911	0	0	2,449	16,761
2097	9,380	4,911	0	0	2,442	16,733
2098	9,380	4,911	0	0	2,442	16,733
2099	9,380	4,911	0	0	2,442	16,733

TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2100	9,380	4,911	0	0	2,442	16,733
2101	9,380	4,911	0	0	2,442	16,733
2102	9,380	4,911	0	0	2,442	16,733
2103	9,380	4,911	0	0	2,442	16,733
2104	9,401	4,911	0	0	2,449	16,761
2105	9,380	4,911	0	0	2,442	16,733
2106	9,380	4,911	0	0	2,442	16,733
2107	9,380	4,911	0	0	2,442	16,733
2108	16,579	26,445	0	0	2,449	45,473
2109	9,380	4,911	0	0	2,442	16,733
2110	9,380	4,911	0	0	2,442	16,733
2111	9,380	4,911	0	0	2,442	16,733
2112	9,401	4,911	0	0	2,449	16,761
2113	12,969	15,678	0	0	2,442	31,089
2114	9,380	4,911	0	0	2,442	16,733
2115	9,380	4,911	0	0	2,442	16,733
2116	10,119	7,064	0	0	2,449	19,632
2117	9,380	4,911	0	0	2,442	16,733
2118	19,430	35,059	0	0	2,442	56,930
2119	9,380	4,911	0	0	2,442	16,733
2120	9,401	4,911	0	0	2,449	16,761
2121	9,380	4,911	0	0	2,442	16,733
2122	9,380	4,911	0	0	2,442	16,733
2123	9,380	4,911	0	0	2,442	16,733
2124	9,401	4,911	0	0	2,449	16,761
2125	9,380	4,911	0	0	2,442	16,733
2126	9,380	4,911	0	0	2,442	16,733
2127	9,380	4,911	0	0	2,442	16,733
2128	10,121	7,069	0	0	2,449	19,639
2129	9,380	4,911	0	0	2,442	16,733

TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2130	12,969	15,678	0	0	2,442	31,089
2131	9,380	4,911	0	0	2,442	16,733
2132	9,401	4,911	0	0	2,449	16,761
2133	9,380	4,911	0	0	2,442	16,733
2134	9,380	4,911	0	0	2,442	16,733
2135	12,969	15,678	0	0	2,442	31,089
2136	9,401	4,911	0	0	2,449	16,761
2137	11,534	11,371	0	0	2,442	25,347
2138	9,380	4,911	0	0	2,442	16,733
2139	9,380	4,911	0	0	2,442	16,733
2140	9,401	4,911	0	0	2,449	16,761
2141	9,380	4,911	0	0	2,442	16,733
2142	9,380	4,911	0	0	2,442	16,733
2143	9,380	4,911	0	0	2,442	16,733
2144	34,525	80,281	0	0	2,449	117,254
2145	9,380	4,911	0	0	2,442	16,733
2146	9,380	4,911	0	0	2,442	16,733
2147	9,380	4,911	0	0	2,442	16,733
2148	9,401	4,911	0	0	2,449	16,761
2149	9,380	4,911	0	0	2,442	16,733
2150	9,380	4,911	0	0	2,442	16,733
2151	9,380	4,911	0	0	2,442	16,733
2152	9,401	4,911	0	0	2,449	16,761
2153	9,380	4,911	0	0	2,442	16,733
2154	9,380	4,911	0	0	2,442	16,733
2155	9,380	4,911	0	0	2,442	16,733
2156	9,401	4,911	0	0	2,449	16,761
2157	9,380	4,911	0	0	2,442	16,733
2158	16,558	26,445	0	0	2,442	45,445
2159	9,380	4,911	0	0	2,442	16,733

TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2160	9,401	4,911	0	0	2,449	16,761
2161	9,380	4,911	0	0	2,442	16,733
2162	9,380	4,911	0	0	2,442	16,733
2163	12,969	15,678	0	0	2,442	31,089
2164	9,401	4,911	0	0	2,449	16,761
2165	9,380	4,911	0	0	2,442	16,733
2166	10,098	7,064	0	0	2,442	19,604
2167	9,380	4,911	0	0	2,442	16,733
2168	20,170	37,217	0	0	2,449	59,836
2169	9,380	4,911	0	0	2,442	16,733
2170	9,380	4,911	0	0	2,442	16,733
2171	9,380	4,911	0	0	2,442	16,733
2172	9,401	4,911	0	0	2,449	16,761
2173	9,380	4,911	0	0	2,442	16,733
2174	9,380	4,911	0	0	2,442	16,733
2175	9,380	4,911	0	0	2,442	16,733
2176	9,401	4,911	0	0	2,449	16,761
2177	9,380	4,911	0	0	2,442	16,733
2178	9,380	4,911	0	0	2,442	16,733
2179	9,380	4,911	0	0	2,442	16,733
2180	12,990	15,678	0	0	2,449	31,117
2181	9,380	4,911	0	0	2,442	16,733
2182	9,380	4,911	0	0	2,442	16,733
2183	9,380	4,911	0	0	2,442	16,733
2184	9,401	4,911	0	0	2,449	16,761
2185	12,969	15,678	0	0	2,442	31,089
2186	9,380	4,911	0	0	2,442	16,733
2187	11,534	11,371	0	0	2,442	25,347
2188	9,401	4,911	0	0	2,449	16,761
2189	9,380	4,911	0	0	2,442	16,733

TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

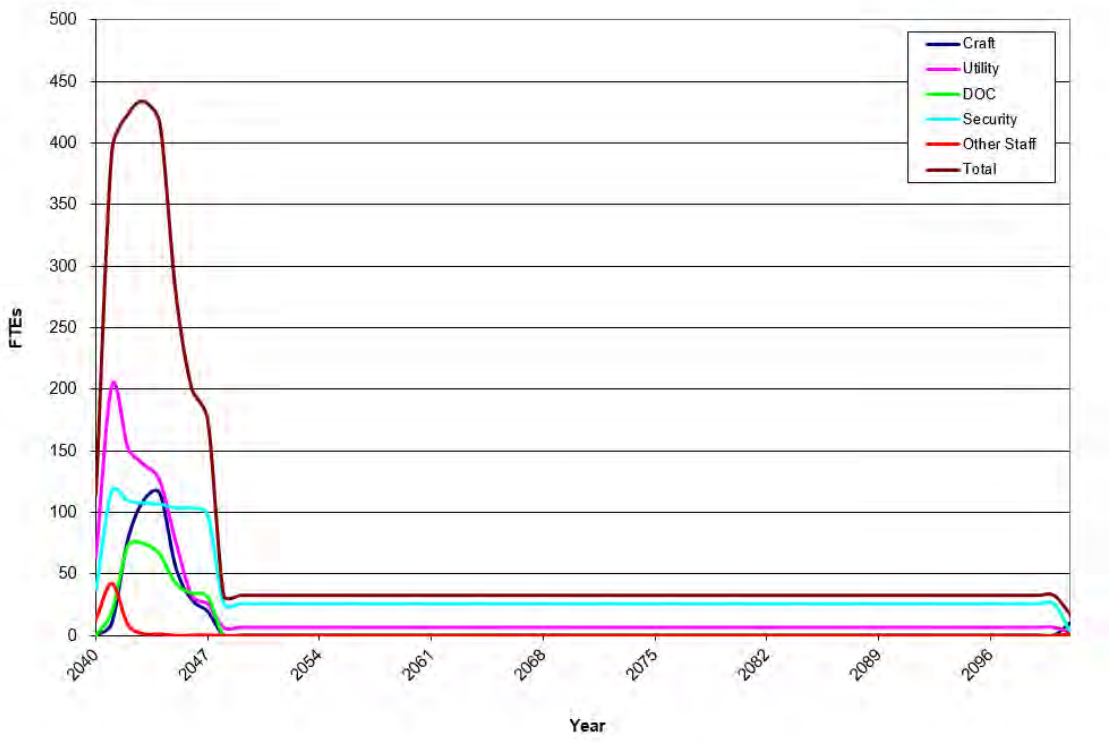
Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2190	9,380	4,911	0	0	2,442	16,733
2191	9,380	4,911	0	0	2,442	16,733
2192	10,121	7,070	0	0	2,449	19,641
2193	10,640	8,690	0	0	2,442	21,772
2194	34,684	80,821	0	0	2,442	117,946
2195	10,460	8,150	0	0	2,442	21,052
2196	10,841	9,230	0	0	2,449	22,520
2197	7,743	0	0	0	2,442	10,186
2198	7,743	0	0	0	2,442	10,186
2199	7,743	0	0	0	2,442	10,186
2200	7,743	0	0	0	2,442	10,186
2201	7,743	0	0	0	2,442	10,186
2202	7,743	0	0	0	2,442	10,186
2203	7,743	0	0	0	2,442	10,186
2204	7,765	0	0	0	2,449	10,214
2205	7,743	0	0	0	2,442	10,186
2206	7,743	0	0	0	2,442	10,186
2207	7,743	0	0	0	2,442	10,186
2208	15,662	23,693	0	0	2,449	41,804
2209	7,743	0	0	0	2,442	10,186
2210	7,743	0	0	0	2,442	10,186
2211	7,743	0	0	0	2,442	10,186
2212	7,765	0	0	0	2,449	10,214
2213	11,332	10,767	0	0	2,442	24,542
2214	7,743	0	0	0	2,442	10,186
2215	7,743	0	0	0	2,442	10,186
2216	8,482	2,153	0	0	2,449	13,085
2217	7,743	0	0	0	2,442	10,186
2218	18,312	31,705	0	0	2,442	52,459
2219	8,366	1,868	0	0	2,442	12,677

TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2220	8,283	1,557	0	0	2,449	12,289
2221	8,262	1,557	0	0	2,442	12,261
2222	8,262	1,557	0	0	2,442	12,261
2223	8,366	1,868	0	0	2,442	12,677
2224	8,283	1,557	0	0	2,449	12,289
2225	8,262	1,557	0	0	2,442	12,261
2226	8,262	1,557	0	0	2,442	12,261
2227	8,366	1,868	0	0	2,442	12,677
2228	8,283	1,557	0	0	2,449	12,289
2229	8,262	1,557	0	0	2,442	12,261
2230	11,436	11,079	0	0	2,442	24,957
2231	7,847	311	0	0	2,442	10,601
2232	7,868	311	0	0	2,449	10,629
2233	7,951	623	0	0	2,442	11,016
2234	7,847	311	0	0	2,442	10,601
2235	11,436	11,079	0	0	2,442	24,957
2236	7,972	623	0	0	2,449	11,044
2237	10,001	6,772	0	0	2,442	19,215
2238	7,847	311	0	0	2,442	10,601
2239	7,951	623	0	0	2,442	11,016
2240	7,920	1,976	0	0	7,404	17,300
2241	2,074	1,449	22	354	3,830	7,729
Total	2,458,456	1,597,144	10,030	166,633	619,914	4,852,176

Note: Columns may not add due to rounding

FIGURE 3.1
SCENARIO 2: DECON WITH 60 YEAR DFS
MONTICELLO NUCLEAR GENERATING PLANT
MANPOWER LEVELS



Note that the labor hour basis of this chart was taken from Appendix D; however not all line items in Appendix D have labor hour values available (e.g. spent fuel canister loading estimates from Xcel Energy)

4. SCHEDULE ESTIMATE

The schedules for the decommissioning scenarios considered in this study follow the sequence presented in the AIF/NESP-036 study, with minor changes to reflect recent experience and site-specific constraints. In addition, the scheduling has been revised to reflect the spent fuel management plans described in Section 3.4.1.

A schedule or sequence of activities is presented in Figure 4.1. The schedule is also representative of the work activities identified in the delayed dismantling scenarios, absent any spent fuel constraints. The scheduling sequence is based on the fuel being removed from the spent fuel pool within the first four years after operations cease. The key activities listed in the schedule do not reflect a one-to-one correspondence with those activities in the cost tables, but reflect dividing some activities for clarity and combining others for convenience. The schedule was prepared using the "Microsoft Project Professional" computer software. [43]

4.1 SCHEDULE ESTIMATE ASSUMPTIONS

The schedule reflects the results of a precedence network developed for the site decommissioning activities, i.e., a PERT (Program Evaluation and Review Technique) Software Package. The work activity durations used in the precedence network reflect the actual man-hour estimates from the cost table, adjusted by stretching certain activities over their slack range and shifting the start and end dates of others. The following assumptions were made in the development of the decommissioning schedule:

- The reactor building is isolated until such time that all spent fuel has been discharged from the storage pool to the ISFSI. Decontamination and dismantling of the spent fuel storage pool is initiated once the transfer of spent fuel is complete.
- All work (except vessel and internals removal) is performed during an 8-hour workday, 5 days per week, with no overtime. There are eleven paid holidays per year.
- Reactor and internals removal activities are performed by using separate crews for different activities working on different shifts, with a corresponding backshift charge for the second shift.
- Multiple crews work parallel activities to the maximum extent possible, consistent with optimum efficiency, adequate access for cutting, removal and laydown space, and with the stringent safety measures necessary during demolition of heavy components and structures.

- For plant systems removal, the systems with the longest removal durations in areas on the critical path are considered to determine the duration of the activity.

4.2 PROJECT SCHEDULE

The period-dependent costs presented in the detailed cost tables are based upon the durations developed in the schedules for decommissioning Monticello. Durations are established between several milestones in each project period; these durations are used to establish a critical path for the entire project. In turn, the critical path duration for each period is used as the basis for determining the period-dependent costs. A second parallel path is also shown for the spent fuel cooling period, which determines the release of the reactor building for final decontamination.

Project timelines are provided in Figures 4.2 through 4.5, with milestone dates based on a 2040 shutdown date. The spent fuel pool is emptied approximately four years after shutdown, while ISFSI operations continue until the DOE completes the transfer of assemblies.

FIGURE 4.1
DECON ACTIVITY SCHEDULE

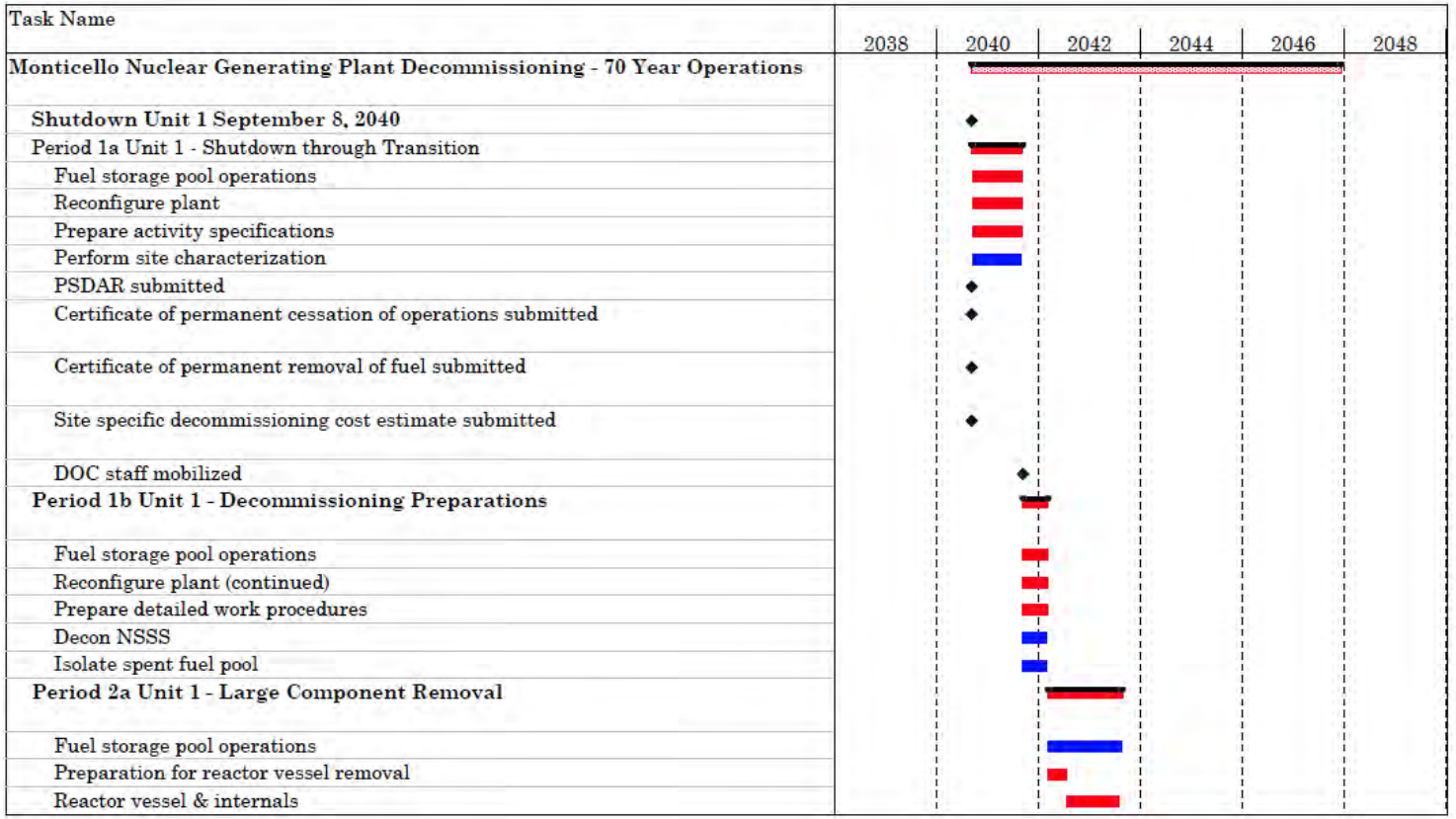
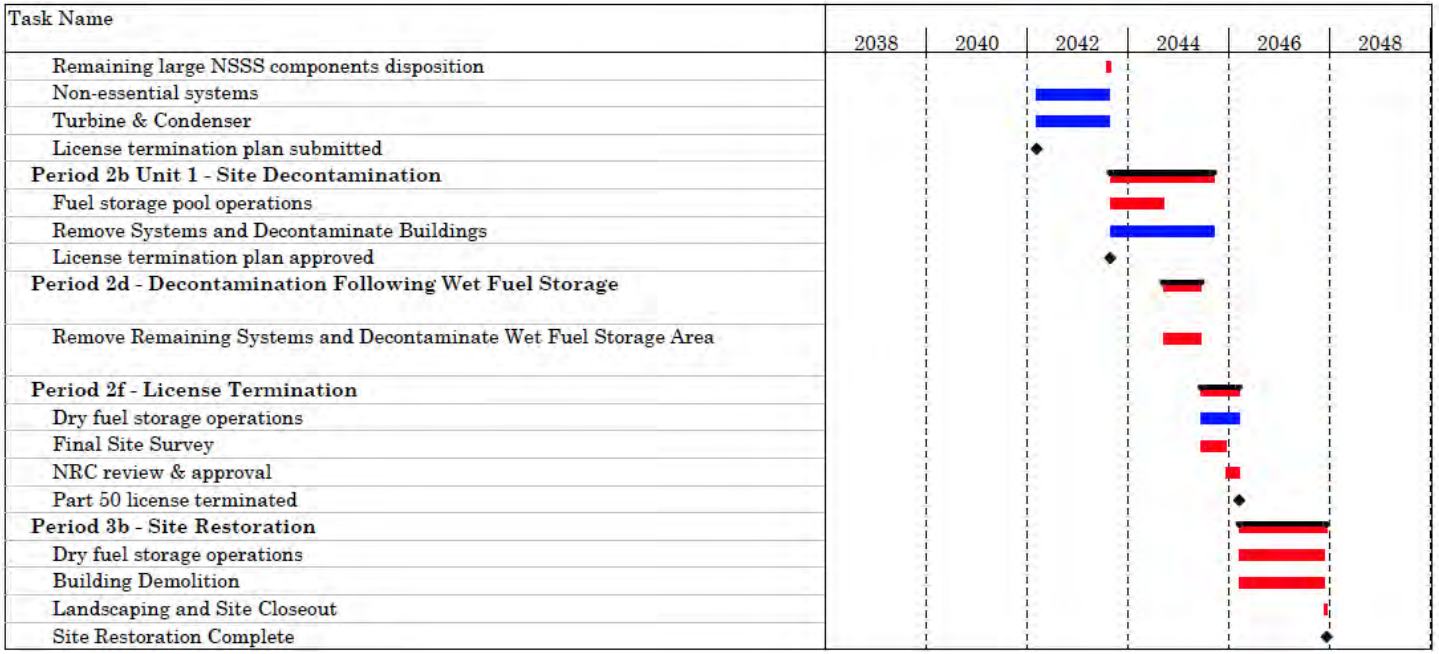


FIGURE 4.1 (continued)
DECON ACTIVITY SCHEDULE



1. Red scheduling bars indicate critical path activities
2. Blue scheduling bars associated with non-critical path activities
3. Diamond symbols indicate major milestones

FIGURE 4.2
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

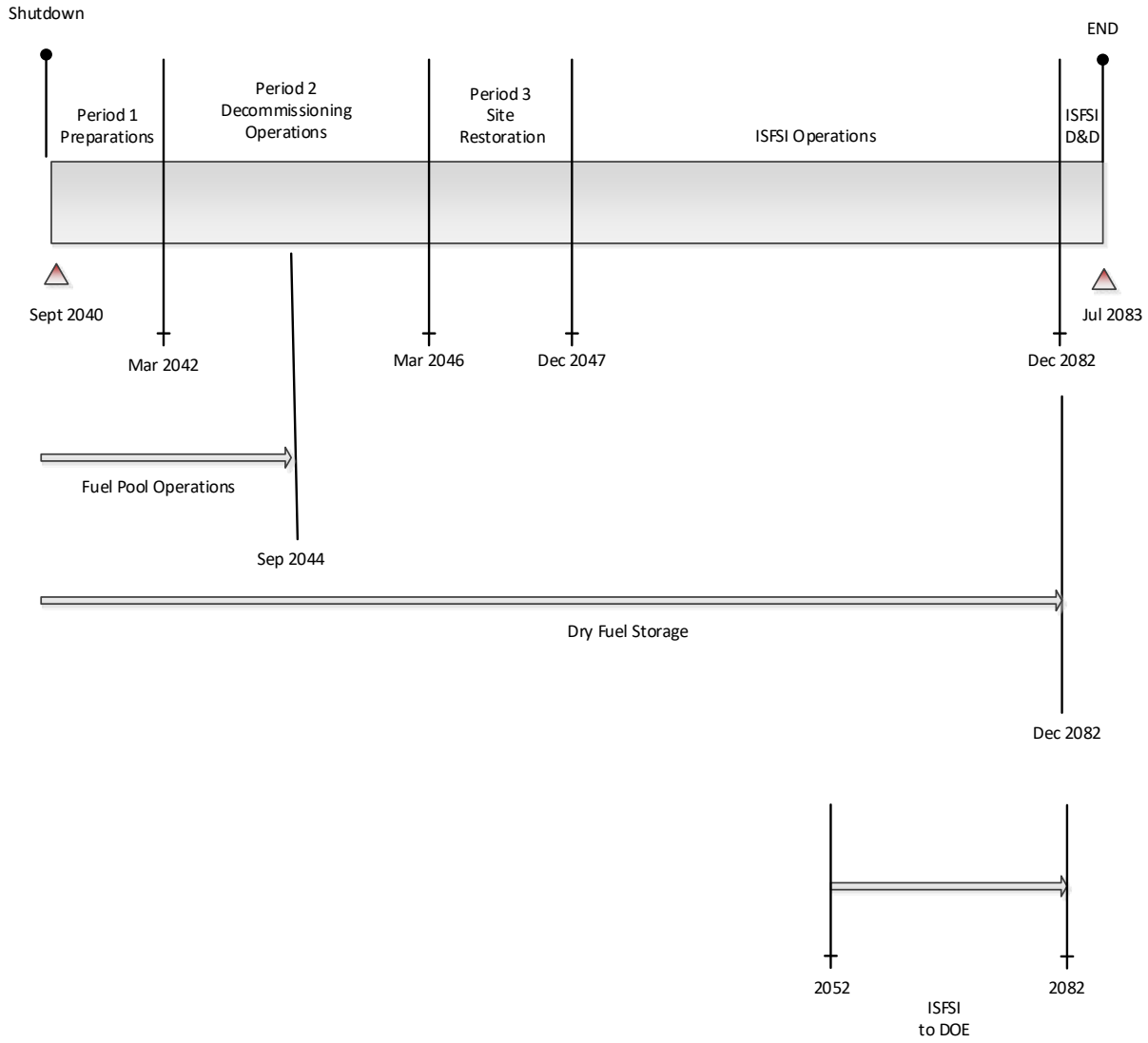


FIGURE 4.3
SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

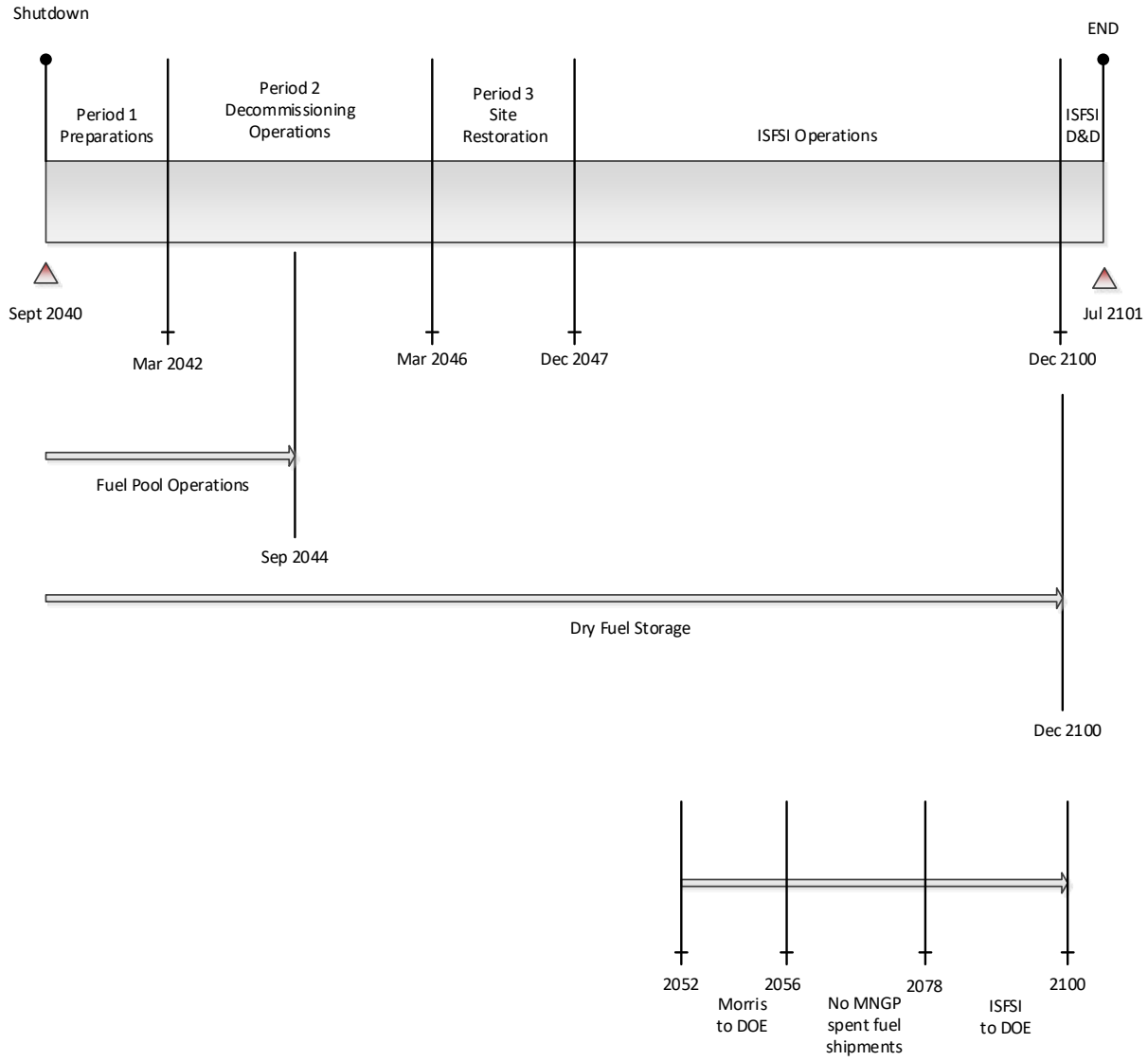


FIGURE 4.4
SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

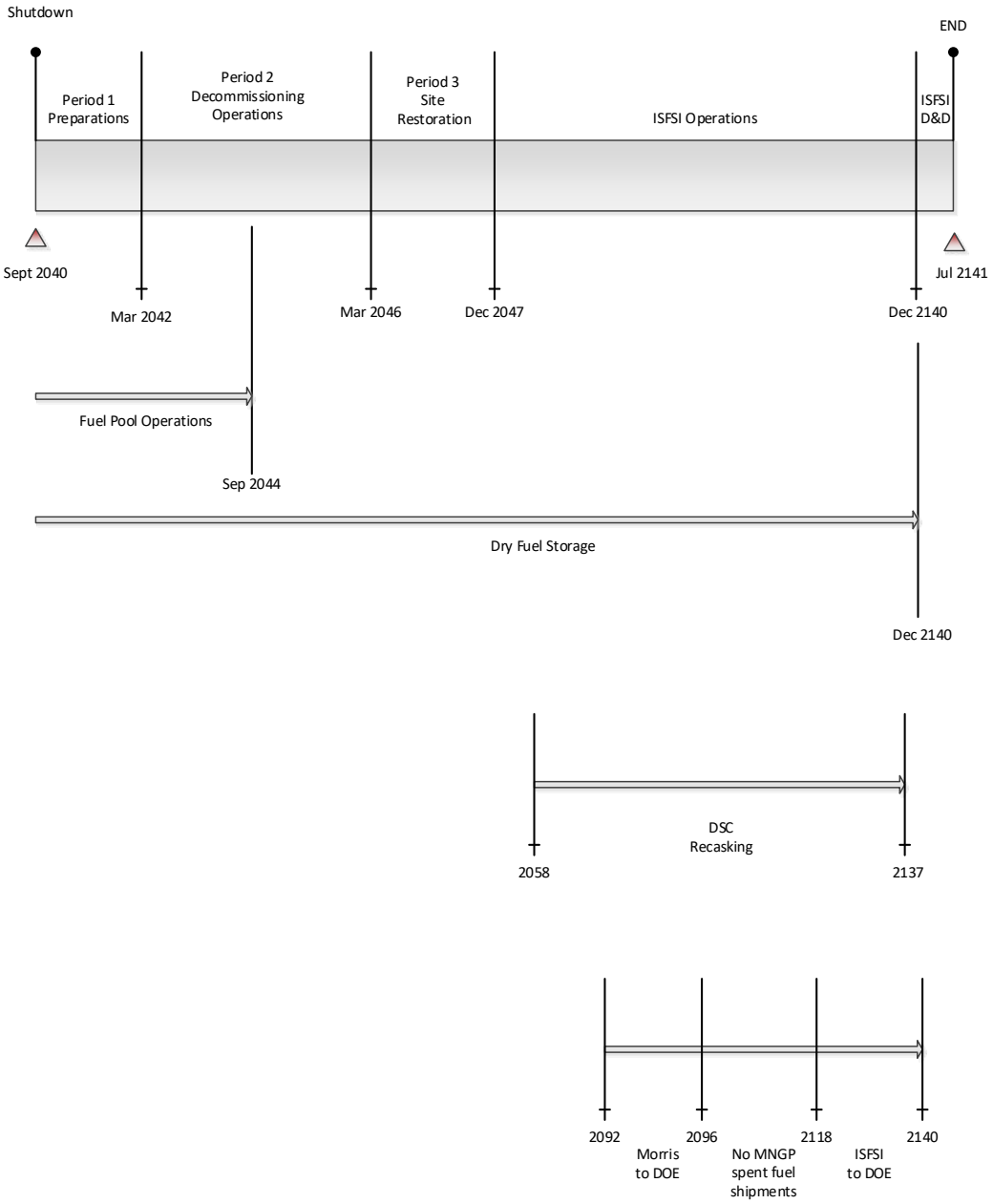
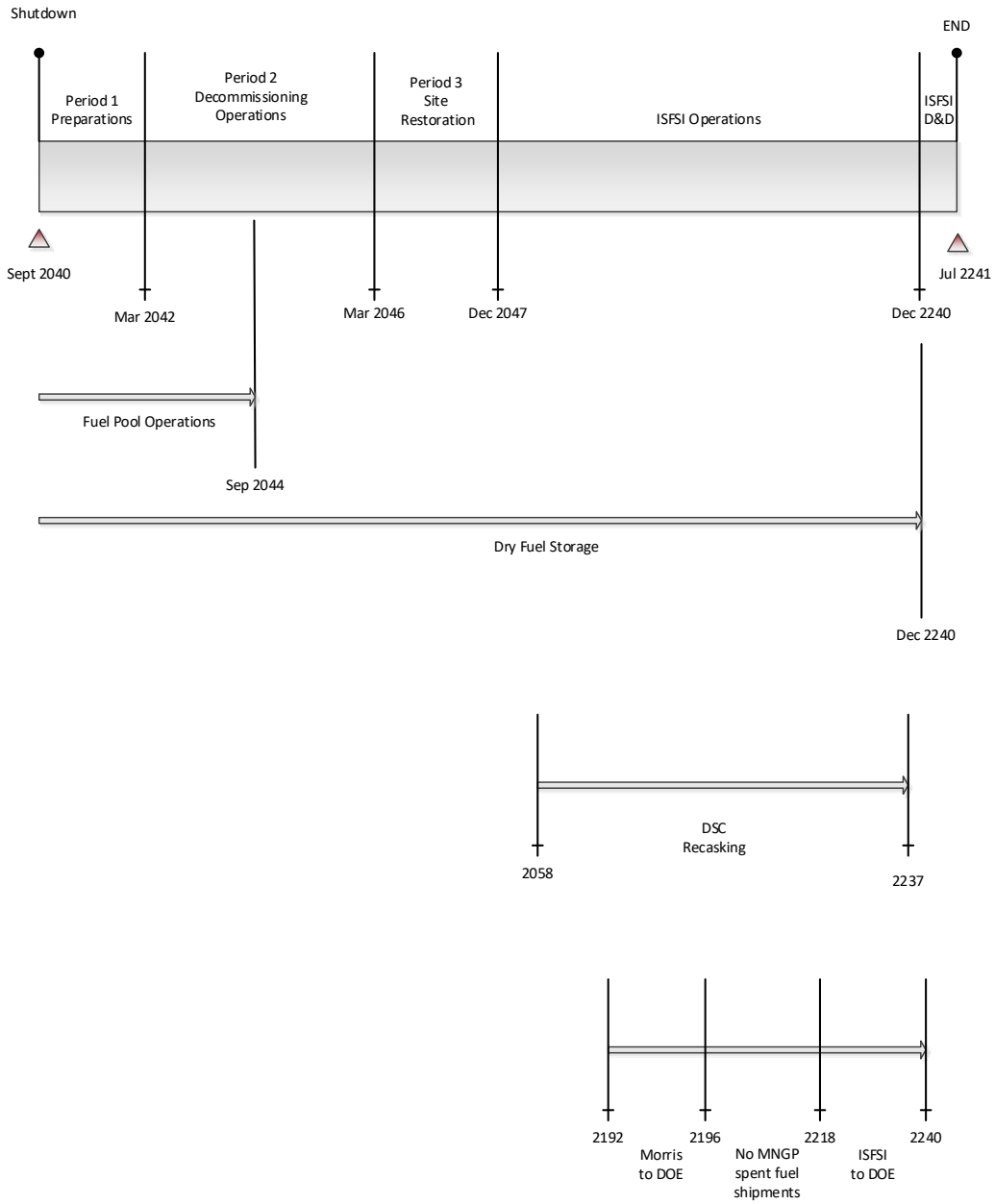


FIGURE 4.5
SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)



5. RADIOACTIVE WASTES

The objectives of the decommissioning process are the removal of all radioactive material from the site that would restrict its future use and the termination of the NRC license. This currently requires the remediation of all radioactive material at the site in excess of applicable legal limits. Under the Atomic Energy Act, [44] the NRC is responsible for protecting the public from sources of ionizing radiation. Title 10 of the Code of Federal Regulations delineates the production, utilization, and disposal of radioactive materials and processes. In particular, Part 71 defines radioactive material as it pertains to transportation and Part 61 specifies its disposition.

Most of the materials being transported for controlled burial are categorized as Low Specific Activity (LSA) or Surface Contaminated Object (SCO) materials containing Type A quantities, as defined in 49 CFR Parts 173-178. Shipping containers are required to be Industrial Packages (IP-1, IP-2 or IP-3, as defined in 10 CFR §173.411). For this study, commercially available steel containers are presumed to be used for the disposal of piping, small components, and concrete. Larger components can serve as their own containers, with proper closure of all openings, access ways, and penetrations.

The destinations for the various waste streams from decommissioning are identified in Figures 5.1 and 5.2. The volumes of radioactive waste generated during the various decommissioning activities at the site are shown on a line-item basis in Appendices C through F and summarized in Tables 5.1 through 5.4. The quantified waste volume summaries shown in these tables are consistent with §61 classifications. The volumes are calculated based on the exterior dimensions for containerized material and on the displaced volume of components serving as their own waste containers.

The reactor vessel and internals are categorized as large quantity shipments and, accordingly, will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume, as well as the special handling requirements of the payload. Packaging efficiencies are lower for the highly activated materials (greater than Type A quantity waste), where high concentrations of gamma-emitting radionuclides limit the capacity of the shipping canisters.

No process system containing/handling radioactive substances at shutdown is presumed to meet material release criteria by decay alone, i.e., systems radioactive at shutdown will still be radioactive over the time period during which the decommissioning is accomplished, due to the presence of long-lived radionuclides.

While the dose rates decrease with time, radionuclides such as ^{137}Cs will still control the disposition requirements.

The waste material generated in the decontamination and dismantling of Monticello is primarily generated during Period 2. Material that is considered potentially contaminated when removed from the radiologically controlled area is sent to processing facilities in Tennessee for conditioning and disposal. Heavily contaminated components and activated materials are routed for controlled disposal. The disposal volumes reported in the tables reflect the savings resulting from reprocessing and recycling.

Disposal fees are calculated using representative costs, with surcharges added for the highly activated components, for example, generated in the segmentation of the reactor vessel. The cost to dispose of the majority of the material generated from the decontamination and dismantling activities is based upon representative rates.

Energy*Solutions* is not able to accept the higher activity waste (Class B and C) generated in the decontamination of the NSSS and segmentation of the components closest to the core. Waste disposal costs for the higher activity waste (Class B and C) are based upon preliminary and indicative information on the cost for such from WCS.

A small quantity of material generated during the Monticello decommissioning will not be considered suitable for near-surface disposal, and is assumed to be disposed of in a geologic repository, in a manner similar to that envisioned for spent fuel disposal. Such material, known as Greater-Than-Class-C or GTCC material, is estimated to require four spent fuel storage canisters (or the equivalent) to dispose of the most radioactive portions of the reactor vessel internals. The volume and weight reported in Tables 5.1 through 5.4 represent the packaged weight and volume of the spent fuel storage canisters.

FIGURE 5.1
RADIOACTIVE WASTE DISPOSITION

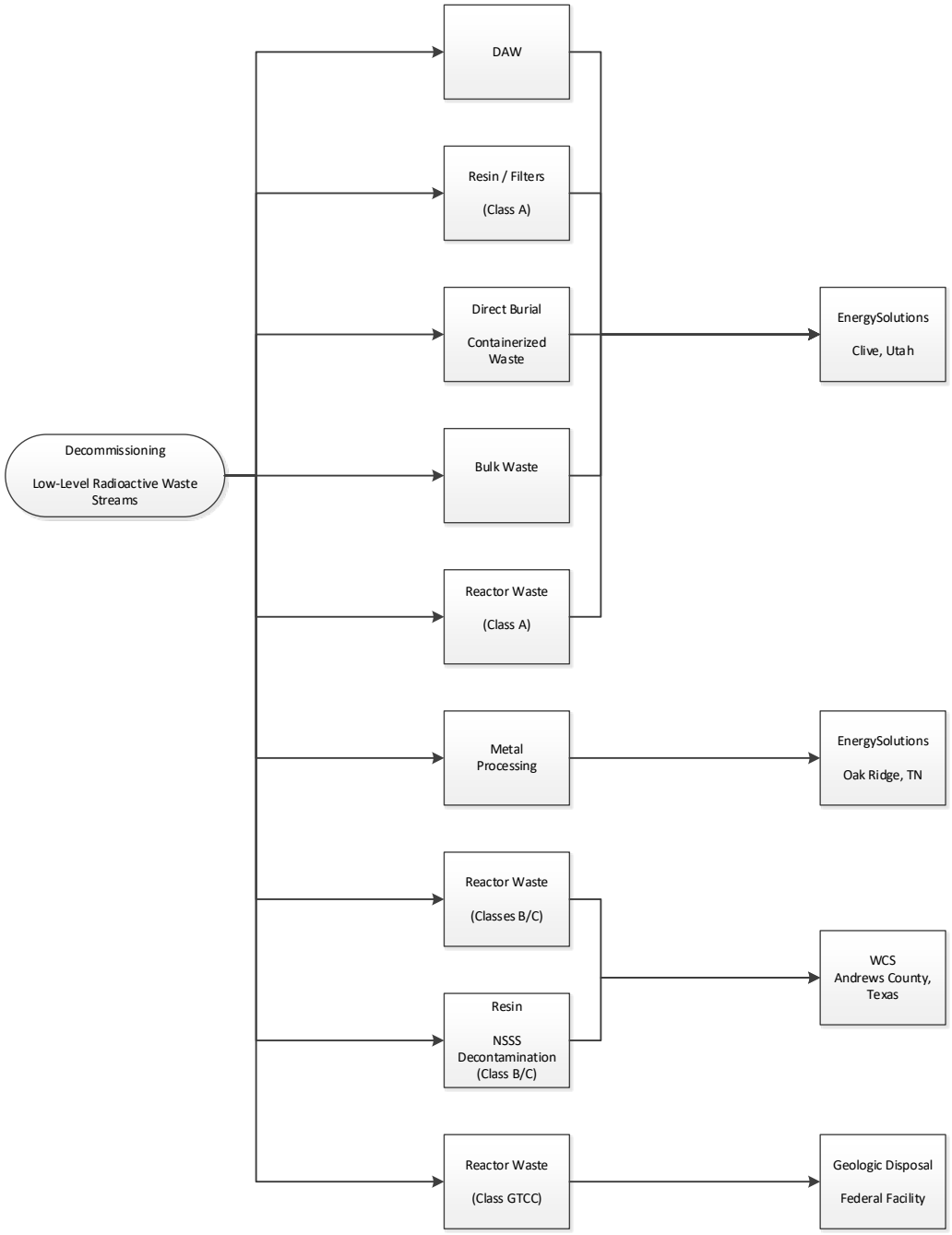
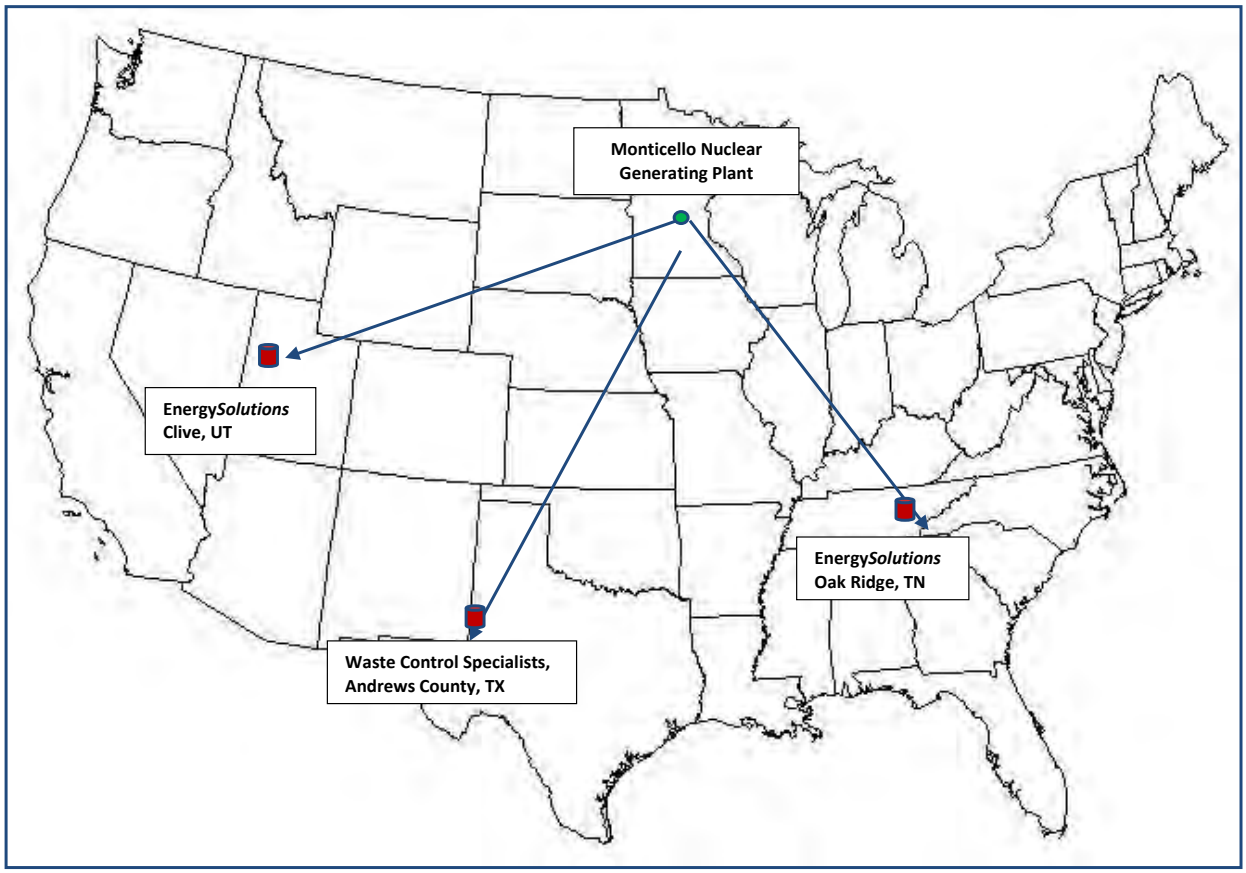


FIGURE 5.2
DECOMMISSIONING WASTE DESTINATIONS
RADIOLOGICAL



The figure indicates the destinations for the low-level radioactive waste designated for direct disposal (Clive, Utah) and processing/recovery (Oak Ridge, Tennessee).

Disposition of the Class B and C low-level radioactive waste will be at the Waste Control Specialists site in Andrews County, Texas.

Disposal options (and destinations) for GTCC are still being evaluated.

TABLE 5.1
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	122,218	7,165,609
	Energy*Solutions* Bulk	A	75,053	4,661,497
	Future LLRW Disposal Facility (Proxy)	B	1,711	185,173
	Future LLRW Disposal Facility (Proxy)	C	1,178	110,575
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,160	225,765
Total [2]			201,320	12,348,620
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	288,203	12,125,960
Scrap Metal				46,246,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.2
SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	122,218	7,165,609
	Energy*Solutions* Bulk	A	75,053	4,661,497
	Future LLRW Disposal Facility (Proxy)	B	1,711	185,173
	Future LLRW Disposal Facility (Proxy)	C	1,178	110,575
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,160	225,765
Total [2]			201,320	12,348,620
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	288,203	12,125,960
Scrap Metal				46,246,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.3
SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	122,218	7,169,509
	Energy*Solutions* Bulk	A	75,048	4,661,403
	Future LLRW Disposal Facility (Proxy)	B	1,711	185,173
	Future LLRW Disposal Facility (Proxy)	C	1,178	110,575
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,160	225,765
Total [2]			201,315	12,352,426
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	288,203	12,125,960
Scrap Metal				46,246,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.4
SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	122,218	7,169,509
	Energy*Solutions* Bulk	A	75,048	4,661,403
	Future LLRW Disposal Facility (Proxy)	B	1,711	185,173
	Future LLRW Disposal Facility (Proxy)	C	1,178	110,575
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	1,160	225,765
Total [2]			201,315	12,352,426
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	288,203	12,125,960
Scrap Metal				46,246,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

6. RESULTS

This report presents estimates of the cost to decommission Monticello for the selected decommissioning scenarios following the cessation of plant operations. The estimates are based on numerous fundamental assumptions, including regulatory requirements, project contingencies, low-level radioactive waste disposal practices, high-level radioactive waste management options, and site restoration requirements. While not an engineering study, the estimates provide Xcel Energy with sufficient information to assess their financial obligations, as they pertain to the eventual decommissioning of the nuclear station.

The decommissioning scenarios assume continued operation of the station's spent fuel pool for a minimum of four years following the cessation of operations for continued cooling of the assemblies. The existing ISFSI is expanded to accommodate the spent fuel, once sufficiently cooled, until such time that the DOE can complete the transfer of the assemblies to its repository.

Using Scenario 2 as the base case, the cost projected to promptly decommission the station, restore the site, and manage the spent fuel is estimated to be $1.618 billion (2020 dollars). The majority of this cost (approximately 48.0%) is associated with the physical decontamination and dismantling of the nuclear plant so that the operating license can be terminated. Another 47.5% is associated with the management, interim storage, and eventual transfer of the spent fuel. The remaining 4.5% is for the demolition of the designated structures and limited restoration of the site.

The primary cost contributors, identified in Tables 6.1 through 6.4, are either labor-related or associated with the management and disposition of the spent fuel or radioactive waste. Program management (including security) is the largest single contributor to the overall cost. The magnitude of the expense is a function of both the size of the organization required to manage the decommissioning, as well as the duration of the program. It is assumed, for purposes of this analysis, that Xcel Energy will hire a contractor to manage the decommissioning labor force. The size and composition of the management organizations varies with the decommissioning phase and associated site activities. However, once the operating license is amended or terminated, the staff is substantially reduced for the conventional demolition and restoration of the site, and the long-term care of the spent fuel

As described in this report, the spent fuel pool will remain operational for a minimum of four years following the cessation of operations. The pool will be isolated and an independent spent fuel island created. This will allow decommissioning operations to proceed in and around the pool areas. Over the four

year period, the spent fuel will be packaged into transportable canisters for future loading into a DOE-provided transport cask or relocation to the ISFSI. The canisters will be stored in horizontal storage casks at the ISFSI until the DOE is able to receive them. Dry storage of the fuel provides additional flexibility in the event the DOE is not able to meet the current timetable for completing the transfer of assemblies to an off-site facility and minimizes the associated caretaking expenses.

The cost for waste disposal includes only those costs associated with the controlled disposition of the low-level radioactive waste generated from decontamination and dismantling activities, including plant equipment and components, structural material, filters, resins and dry-active waste. As described in Section 5, disposition of the majority of the low-level radioactive material requiring controlled disposal is at the Energy*Solutions* facility, with higher-activity waste sent to the WCS facility. Highly activated components, requiring additional isolation from the environment (GTCC), are packaged for geologic disposal. The cost of geologic disposal is based upon a cost equivalent for spent fuel.

A significant portion of the metallic waste is designated for additional processing and treatment at an off-site facility. Processing reduces the volume of material requiring controlled disposal through such techniques and processes as survey and sorting, decontamination, and volume reduction. The material that cannot be unconditionally released is packaged for controlled disposal at one of the currently operating facilities. The cost identified in the summary tables for processing is all-inclusive, incorporating the ultimate disposition of the material.

Removal costs reflect the labor-intensive nature of the decommissioning process, as well as the management controls required to ensure a safe and successful program. Decontamination and packaging costs also have a large labor component that is based upon prevailing wages. Non-radiological demolition is a natural extension of the decommissioning process. The methods employed in decontamination and dismantling are generally destructive and indiscriminate in inflicting collateral damage. With a work force mobilized to support decommissioning operations, non-radiological demolition can be an integrated activity and a logical expansion of the work being performed in the process of terminating the operating license.

The reported cost for transport includes the tariffs and surcharges associated with moving large components and/or overweight shielded casks overland, as well as the general expense, e.g., labor and fuel, of transporting material to the destinations identified in this report. For purposes of this analysis, material is moved overland by truck.

Decontamination is used to reduce the plant's radiation fields and minimize worker exposure. Slightly contaminated material or material located within a contaminated area is sent to an off-site processing center, i.e., this analysis does not assume that contaminated plant components and equipment can be decontaminated for uncontrolled release in-situ. Centralized processing centers have proven to be a more economical means of handling the large volumes of material produced in the dismantling of a nuclear plant.

License termination survey costs are associated with the labor intensive and complex activity of verifying that contamination has been removed from the site to the levels specified by the regulating agency. This process involves a systematic survey of all remaining plant surface areas and surrounding environs, sampling, isotopic analysis, and documentation of the findings. The status of any plant components and materials not removed in the decommissioning process will also require confirmation and will add to the expense of surveying the facilities alone.

The remaining costs include allocations for heavy equipment and temporary services, as well as for other expenses such as regulatory fees and the premiums for nuclear insurance. While site operating costs are greatly reduced following the final cessation of plant operations, certain administrative functions do need to be maintained either at a basic functional or regulatory level.

TABLE 6.1
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total	Percentage
Decontamination	24,330	1.7%
Removal	125,270	9.0%
Packaging	26,543	1.9%
Transportation	14,145	1.0%
Waste Disposal	114,148	8.2%
Off-site Waste Processing	57,444	4.1%
Program Management [1]	291,789	20.8%
Security	300,346	21.5%
Spent Fuel Pool Isolation	14,576	1.0%
Spent Fuel Storage (Direct Costs) [2]	237,381	17.0%
Insurance and Regulatory Fees	39,753	2.8%
Energy	10,030	0.7%
Characterization and Licensing Surveys	23,012	1.6%
Property Taxes	55,377	4.0%
Miscellaneous Equipment	7,411	0.5%
Railroad Track Maintenance	6,914	0.5%
Retention and Severance	41,002	2.9%
Security Modifications	10,000	0.7%
Total [3]	1,399,471	100.0%

Cost Element	Total	Percentage
NRC License Termination	776,355	55.5%
Spent Fuel Management	549,339	39.3%
Site Restoration	73,776	5.3%
Total [3]	1,399,471	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.2
SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total	Percentage
Decontamination	24,330	1.5%
Removal	125,270	7.7%
Packaging	26,543	1.6%
Transportation	14,145	0.9%
Waste Disposal	114,148	7.1%
Off-site Waste Processing	57,444	3.6%
Program Management [1]	317,530	19.6%
Security	389,426	24.1%
Spent Fuel Pool Isolation	14,576	0.9%
Spent Fuel Storage (Direct Costs) [2]	306,597	18.9%
Insurance and Regulatory Fees	53,687	3.3%
Energy	10,030	0.6%
Characterization and Licensing Surveys	23,012	1.4%
Property Taxes	73,368	4.5%
Miscellaneous Equipment	7,411	0.5%
Railroad Track Maintenance	9,504	0.6%
Retention and Severance	41,002	2.5%
Security Modifications	10,000	0.6%
Total [3]	1,618,023	100.0%

Cost Element	Total	Percentage
NRC License Termination	776,355	48.0%
Spent Fuel Management	767,892	47.5%
Site Restoration	73,776	4.6%
Total [3]	1,618,023	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.3
SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total	Percentage
Decontamination	24,330	0.9%
Removal	125,359	4.6%
Packaging	26,543	1.0%
Transportation	14,145	0.5%
Waste Disposal	114,148	4.2%
Off-site Waste Processing	57,444	2.1%
Program Management [1]	502,435	18.4%
Security	587,397	21.6%
Spent Fuel Pool Isolation	14,576	0.5%
Spent Fuel Storage (Direct Costs) [2]	954,297	35.0%
Insurance and Regulatory Fees	84,655	3.1%
Energy	10,030	0.4%
Characterization and Licensing Surveys	23,012	0.8%
Property Taxes	113,348	4.2%
Miscellaneous Equipment	7,411	0.3%
Railroad Track Maintenance	15,260	0.6%
Retention and Severance	41,002	1.5%
Security Modifications	10,000	0.4%
Total [3]	2,725,392	100.0%

Cost Element	Total	Percentage
NRC License Termination	776,400	28.5%
Spent Fuel Management	1,874,865	68.8%
Site Restoration	74,127	2.7%
Total [3]	2,725,392	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.4
SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Total	Percentage
Decontamination	24,330	0.5%
Removal	125,359	2.6%
Packaging	26,543	0.5%
Transportation	14,145	0.3%
Waste Disposal	114,148	2.4%
Off-site Waste Processing	57,444	1.2%
Program Management [1]	782,364	16.1%
Security	1,082,311	22.3%
Spent Fuel Pool Isolation	14,576	0.3%
Spent Fuel Storage (Direct Costs) [2]	2,114,481	43.6%
Insurance and Regulatory Fees	162,073	3.3%
Energy	10,030	0.2%
Characterization and Licensing Surveys	23,012	0.5%
Property Taxes	213,298	4.4%
Miscellaneous Equipment	7,411	0.2%
Railroad Track Maintenance	29,650	0.6%
Retention and Severance	41,002	0.8%
Security Modifications	10,000	0.2%
Total [3]	4,852,175	100.0%

Cost Element	Total	Percentage
NRC License Termination	776,400	16.0%
Spent Fuel Management	4,001,648	82.5%
Site Restoration	74,127	1.5%
Total [3]	4,852,175	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

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APPENDIX A

UNIT COST FACTOR DEVELOPMENT

APPENDIX A
UNIT COST FACTOR DEVELOPMENT

Example: Unit Factor for Removal of Contaminated Heat Exchanger < 3,000 lbs.

1. SCOPE

Heat exchangers weighing < 3,000 lbs. will be removed in one piece using a crane or small hoist. They will be disconnected from the inlet and outlet piping. The heat exchanger will be sent to the waste processing area.

2. CALCULATIONS

Act ID	Activity Description	Activity Duration (minutes)	Critical Duration (minutes)*
a	Remove insulation	60	(b)
b	Mount pipe cutters	60	60
c	Install contamination controls	20	(b)
d	Disconnect inlet and outlet lines	60	60
e	Cap openings	20	(d)
f	Rig for removal	30	30
g	Unbolt from mounts	30	30
h	Remove contamination controls	15	15
i	Remove, wrap, send to waste processing area	60	60
	Totals (Activity/Critical)	355	255
	Duration adjustment(s):		
	+ Respiratory protection adjustment (50 of critical duration)		128
	+ Radiation/ALARA adjustment (37.1 of critical duration)		95
	Adjusted work duration		478
	+ Protective clothing adjustment (30 of adjusted duration)		143
	Productive work duration		621
	+ Work break adjustment (8.33 of productive duration)		52
	Total work duration (minutes)		673

***** Total duration = 11.217 hr *****

* alpha designators indicate activities that can be performed in parallel

APPENDIX A
(continued)

3. LABOR REQUIRED

Crew	Number	Duration (hours)	Rate ($/hr)	Cost
Laborers	3.00	11.217	$61.19	$2,059.10
Craftsmen	2.00	11.217	$76.95	$1,726.30
Foreman	1.00	11.217	$80.53	$903.30
General Foreman	0.25	11.217	$82.80	$232.19
Fire Watch	0.05	11.217	$61.19	$34.32
Health Physics Technician	1.00	11.217	$53.89	$604.48
Total Labor Cost				$5,559.69

4. EQUIPMENT & CONSUMABLES COSTS

Equipment Costs	none
Consumables/Materials Costs	
• Universal Sorbent 50 @ $0.63 sq ft {1}	$31.50
• Tarpaulins (oil resistant/fire retardant) 50 @ $0.47/sq ft {2}	$23.50
• Gas torch consumables 1 @ $20.79/hr x 1 hr {3}	$20.79
Subtotal cost of equipment and materials	$75.79
Overhead & profit on equipment and materials @ 16.88%	$12.79
Total costs, equipment & material	$88.58

TOTAL COST:

Removal of contaminated heat exchanger <3000 pounds:	**$5,648.27**
Total labor cost:	$5,559.69
Total equipment/material costs:	$88.58
Total craft labor man-hours required per unit:	81.88

5. NOTES AND REFERENCES

- Work difficulty factors were developed in conjunction with the Atomic Industrial Forum's (now NEI) program to standardize nuclear decommissioning cost estimates and are delineated in Volume 1, Chapter 5 of the "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986.

- References for equipment & consumables costs:

    1. www.mcmaster.com online catalog, McMaster Carr Spill Control (7193T88)
    2. R.S. Means (2020) Division 01 56, Section 13.60-0600, page 23
    3. R.S. Means (2020) Division 01 54 33, Section 40-6360, page 736

- Material and consumable costs were adjusted using the regional indices for Minneapolis, Minnesota.

APPENDIX B

UNIT COST FACTOR LISTING
(DECON: Power Block Structures Only)

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of clean instrument and sampling tubing, $/linear foot	0.66
Removal of clean pipe 0.25 to 2 inches diameter, $/linear foot	7.12
Removal of clean pipe >2 to 4 inches diameter, $/linear foot	10.10
Removal of clean pipe >4 to 8 inches diameter, $/linear foot	19.57
Removal of clean pipe >8 to 14 inches diameter, $/linear foot	37.90
Removal of clean pipe >14 to 20 inches diameter, $/linear foot	49.31
Removal of clean pipe >20 to 36 inches diameter, $/linear foot	72.54
Removal of clean pipe >36 inches diameter, $/linear foot	86.18
Removal of clean valve >2 to 4 inches	129.74
Removal of clean valve >4 to 8 inches	195.68
Removal of clean valve >8 to 14 inches	379.05
Removal of clean valve >14 to 20 inches	493.07
Removal of clean valve >20 to 36 inches	725.39
Removal of clean valve >36 inches	861.75
Removal of clean pipe hanger for small bore piping	44.86
Removal of clean pipe hanger for large bore piping	160.35
Removal of clean pump, <300 pound	330.70
Removal of clean pump, 300-1000 pound	912.70
Removal of clean pump, 1000-10,000 pound	3,609.83
Removal of clean pump, >10,000 pound	6,983.56
Removal of clean pump motor, 300-1000 pound	381.49
Removal of clean pump motor, 1000-10,000 pound	1,499.79
Removal of clean pump motor, >10,000 pound	3,374.52
Removal of clean heat exchanger <3000 pound	1,938.45
Removal of clean heat exchanger >3000 pound	4,882.77
Removal of clean feedwater heater/deaerator	13,764.03
Removal of clean moisture separator/reheater	28,295.13
Removal of clean tank, <300 gallons	425.32
Removal of clean tank, 300-3000 gallon	1,339.93
Removal of clean tank, >3000 gallons, $/square foot surface area	11.21

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of clean electrical equipment, <300 pound	179.21
Removal of clean electrical equipment, 300-1000 pound	621.10
Removal of clean electrical equipment, 1000-10,000 pound	1,242.20
Removal of clean electrical equipment, >10,000 pound	2,944.57
Removal of clean electrical transformer < 30 tons	2,044.97
Removal of clean electrical transformer > 30 tons	5,889.16
Removal of clean standby diesel generator, <100 kW	2,088.76
Removal of clean standby diesel generator, 100 kW to 1 MW	4,662.25
Removal of clean standby diesel generator, >1 MW	9,651.80
Removal of clean electrical cable tray, $/linear foot	16.85
Removal of clean electrical conduit, $/linear foot	7.36
Removal of clean mechanical equipment, <300 pound	179.21
Removal of clean mechanical equipment, 300-1000 pound	621.10
Removal of clean mechanical equipment, 1000-10,000 pound	1,242.20
Removal of clean mechanical equipment, >10,000 pound	2,944.57
Removal of clean HVAC equipment, <300 pound	216.70
Removal of clean HVAC equipment, 300-1000 pound	746.29
Removal of clean HVAC equipment, 1000-10,000 pound	1,487.38
Removal of clean HVAC equipment, >10,000 pound	2,944.57
Removal of clean HVAC ductwork, $/pound	0.70
Removal of contaminated instrument and sampling tubing, $/linear foot	1.95
Removal of contaminated pipe 0.25 to 2 inches diameter, $/linear foot	27.83
Removal of contaminated pipe >2 to 4 inches diameter, $/linear foot	47.82
Removal of contaminated pipe >4 to 8 inches diameter, $/linear foot	74.96
Removal of contaminated pipe >8 to 14 inches diameter, $/linear foot	148.03
Removal of contaminated pipe >14 to 20 inches diameter, $/linear foot	177.89
Removal of contaminated pipe >20 to 36 inches diameter, $/linear foot	246.18
Removal of contaminated pipe >36 inches diameter, $/linear foot	290.94
Removal of contaminated valve >2 to 4 inches	566.42
Removal of contaminated valve >4 to 8 inches	683.47

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of contaminated valve >8 to 14 inches	1,416.07
Removal of contaminated valve >14 to 20 inches	1,800.35
Removal of contaminated valve >20 to 36 inches	2,397.55
Removal of contaminated valve >36 inches	2,845.15
Removal of contaminated pipe hanger for small bore piping	185.78
Removal of contaminated pipe hanger for large bore piping	626.83
Removal of contaminated pump, <300 pound	1,220.05
Removal of contaminated pump, 300-1000 pound	2,838.23
Removal of contaminated pump, 1000-10,000 pound	9,385.29
Removal of contaminated pump, >10,000 pound	22,861.69
Removal of contaminated pump motor, 300-1000 pound	1,207.33
Removal of contaminated pump motor, 1000-10,000 pound	3,818.35
Removal of contaminated pump motor, >10,000 pound	8,572.65
Removal of contaminated heat exchanger <3000 pound	5,648.27
Removal of contaminated heat exchanger >3000 pound	16,376.90
Removal of contaminated feedwater heater/deaerator	40,348.66
Removal of contaminated moisture separator/reheater	88,508.97
Removal of contaminated tank, <300 gallons	2,028.12
Removal of contaminated tank, >300 gallons, $/square foot	39.80
Removal of contaminated electrical equipment, <300 pound	945.59
Removal of contaminated electrical equipment, 300-1000 pound	2,314.13
Removal of contaminated electrical equipment, 1000-10,000 pound	4,457.30
Removal of contaminated electrical equipment, >10,000 pound	8,759.01
Removal of contaminated electrical cable tray, $/linear foot	45.76
Removal of contaminated electrical conduit, $/linear foot	22.38
Removal of contaminated mechanical equipment, <300 pound	1,051.94
Removal of contaminated mechanical equipment, 300-1000 pound	2,555.55
Removal of contaminated mechanical equipment, 1000-10,000 pound	4,914.24
Removal of contaminated mechanical equipment, >10,000 pound	8,759.01
Removal of contaminated HVAC equipment, <300 pound	1,051.94

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of contaminated HVAC equipment, 300-1000 pound	2,555.55
Removal of contaminated HVAC equipment, 1000-10,000 pound	4,914.24
Removal of contaminated HVAC equipment, >10,000 pound	8,759.01
Removal of contaminated HVAC ductwork, $/pound	2.68
Removal/plasma arc cut of contaminated thin metal components, $/linear in.	5.11
Additional decontamination of surface by washing, $/square foot	10.44
Additional decontamination of surfaces by hydrolasing, $/square foot	45.11
Decontamination rig hook up and flush, $/ 250 foot length	8,866.81
Chemical flush of components/systems, $/gallon	21.45
Removal of clean standard reinforced concrete, $/cubic yard	79.60
Removal of grade slab concrete, $/cubic yard	90.54
Removal of clean concrete floors, $/cubic yard	462.42
Removal of sections of clean concrete floors, $/cubic yard	1,391.16
Removal of clean heavily rein concrete w/#9 rebar, $/cubic yard	115.00
Removal of contaminated heavily rein concrete w/#9 rebar, $/cubic yard	2,709.95
Removal of clean heavily rein concrete w/#18 rebar, $/cubic yard	155.86
Removal of contaminated heavily rein concrete w/#18 rebar, $/cubic yard	3,585.12
Removal heavily rein concrete w/#18 rebar & steel embedments, $/cubic yard	568.99
Removal of below-grade suspended floors, $/cubic yard	218.59
Removal of clean monolithic concrete structures, $/cubic yard	1,160.31
Removal of contaminated monolithic concrete structures, $/cubic yard	2,697.57
Removal of clean foundation concrete, $/cubic yard	910.72
Removal of contaminated foundation concrete, $/cubic yard	2,512.94
Explosive demolition of bulk concrete, $/cubic yard	61.21
Removal of clean hollow masonry block wall, $/cubic yard	27.85
Removal of contaminated hollow masonry block wall, $/cubic yard	72.42
Removal of clean solid masonry block wall, $/cubic yard	27.85
Removal of contaminated solid masonry block wall, $/cubic yard	72.42
Backfill of below-grade voids, $/cubic yard	36.73
Removal of subterranean tunnels/voids, $/linear foot	143.27

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Placement of concrete for below-grade voids, $/cubic yard	142.83
Excavation of clean material, $/cubic yard	3.38
Excavation of contaminated material, $/cubic yard	48.84
Removal of clean concrete rubble (tipping fee included), $/cubic yard	28.05
Removal of contaminated concrete rubble, $/cubic yard	30.62
Removal of building by volume, $/cubic foot	0.35
Removal of clean building metal siding, $/square foot	1.77
Removal of contaminated building metal siding, $/square foot	5.62
Removal of standard asphalt roofing, $/square foot	3.11
Removal of transite panels, $/square foot	2.87
Scarifying contaminated concrete surfaces (drill & spall), $/square foot	15.31
Scabbling contaminated concrete floors, $/square foot	9.92
Scabbling contaminated concrete walls, $/square foot	26.57
Scabbling contaminated ceilings, $/square foot	91.52
Scabbling structural steel, $/square foot	7.85
Removal of clean overhead crane/monorail < 10 ton capacity	863.54
Removal of contaminated overhead crane/monorail < 10 ton capacity	2,333.05
Removal of clean overhead crane/monorail >10-50 ton capacity	2,072.50
Removal of contaminated overhead crane/monorail >10-50 ton capacity	5,598.35
Removal of polar crane > 50 ton capacity	8,635.54
Removal of gantry crane > 50 ton capacity	32,881.12
Removal of structural steel, $/pound	0.25
Removal of clean steel floor grating, $/square foot	6.20
Removal of contaminated steel floor grating, $/square foot	17.35
Removal of clean free standing steel liner, $/square foot	16.80
Removal of contaminated free standing steel liner, $/square foot	46.58
Removal of clean concrete-anchored steel liner, $/square foot	8.40
Removal of contaminated concrete-anchored steel liner, $/square foot	54.29
Placement of scaffolding in clean areas, $/square foot	18.98
Placement of scaffolding in contaminated areas, $/square foot	31.88

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Landscaping with topsoil, $/acre	25,605.38
Cost of CPC B-88 LSA box & preparation for use	2,185.34
Cost of CPC B-25 LSA box & preparation for use	1,785.69
Cost of CPC B-12V 12 gauge LSA box & preparation for use	1,711.39
Cost of CPC B-144 LSA box & preparation for use	10,802.17
Cost of LSA drum & preparation for use	260.76
Cost of cask liner for CNSI 8 120A cask (resins)	12,914.97
Cost of cask liner for CNSI 8 120A cask (filters)	9,404.01
Decontamination of surfaces with vacuuming, $/square foot	1.04

APPENDIX C

DETAILED COST ANALYSIS

SCENARIO 1: DECON with 42 Year DFS

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	632	95	727	654	-	73	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Sacrificial shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Moisture separators/reheaters	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.10	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.11	Pressure suppression structure	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.17.12	Drywell	-	-	-	-	-	-	206	31	236	236	-	-	-	-	-	-	-	-	-	1,600
1a.1.17.13	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
1a.1.17.14	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.15	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	5,486	823	6,308	5,759	-	550	-	-	-	-	-	-	-	42,683
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	16,569	2,485	19,054	18,505	-	550	-	-	-	-	-	-	-	83,013
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	6,288	943	7,232	-	7,232	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	9,892	1,484	11,376	11,376	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	16,180	2,427	18,607	11,376	7,232	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,328	233	2,561	2,561	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,570	357	3,927	3,927	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	6	-	50	-	15	83	83	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,137	114	1,251	1,251	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,428	343	3,770	-	3,770	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	845	127	971	-	971	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	16,372	2,456	18,827	18,827	-	-	-	-	-	-	-	-	-	245,440
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	27,285	4,093	31,378	31,378	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	6	-	50	59,634	8,703	69,772	64,902	4,870	-	-	610	-	-	-	12,190	20	667,680

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	6	-	50	92,383	13,615	107,434	94,783	12,102	550	-	610	-	-	-	12,190	20	750,693
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	514	77	591	591	-	-	-	-	-	-	-	-	-	4,000
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD housings & NIs	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Removal primary containment	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
1b.1.1.10	Sacrificial shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.11	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
1b.1.1.12	Main Turbine	-	-	-	-	-	-	267	40	307	307	-	-	-	-	-	-	-	-	-	2,080
1b.1.1.13	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1b.1.1.14	Moisture separators & reheaters	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.15	Radwaste building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1.16	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,336	650	4,987	4,524	-	463	-	-	-	-	-	-	-	33,741
1b.1.2	Decon NSSS	296	-	-	-	-	-	-	148	444	444	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	296	-	-	-	-	-	4,336	798	5,431	4,968	-	463	-	-	-	-	-	-	1,067	33,741
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2.2	Site Characterization	-	-	-	-	-	-	5,930	1,779	7,708	7,708	-	-	-	-	-	-	-	-	30,500	10,852
1b.2.3	Mixed & RCRA Waste	-	-	28	29	14	-	-	9	80	80	-	-	43	-	-	-	-	5,253	161	-
1b.2	Subtotal Period 1b Additional Costs	-	-	28	29	14	-	18,605	3,689	22,365	22,365	-	-	43	-	-	-	-	5,253	30,661	10,852
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	38	-	25	45	-	102	-	53	263	263	-	-	-	233	-	-	-	13,991	45	-
1b.3.4	Process decommissioning chemical flush waste	1	-	24	77	-	1,526	-	396	2,024	2,024	-	-	-	-	231	-	-	24,599	43	-
1b.3.5	Small tool allowance	-	2	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	360	54	414	-	414	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	6,340	951	7,291	7,291	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,197	1,202	49	122	-	1,628	7,964	2,298	16,460	16,046	414	-	-	233	231	-	-	38,589	89	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	39	-	-	-	-	-	-	10	48	48	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	1,161	116	1,277	1,277	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,710	171	1,881	1,881	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	344	-	-	-	-	-	86	430	430	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	4	-	29	-	9	49	49	-	-	-	356	-	-	-	7,122	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,812	272	2,083	2,083	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	323	32	355	355	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,416	142	1,557	-	1,557	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	1,305	196	1,500	1,500	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	421	63	484	-	484	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	62	9	72	72	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	8,163	1,225	9,388	9,388	-	-	-	-	-	-	-	-	-	122,384
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,846	877	6,723	6,723	-	-	-	-	-	-	-	-	-	63,266
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	13,682	2,052	15,734	15,734	-	-	-	-	-	-	-	-	-	211,579
1b.4	Subtotal Period 1b Period-Dependent Costs	39	719	7	4	-	29	35,956	5,323	42,078	39,972	2,106	-	-	356	-	-	-	7,122	12	397,229
1b.0	TOTAL PERIOD 1b COST	3,531	1,921	84	154	14	1,657	66,862	12,109	86,333	83,350	2,520	463	43	589	231	-	-	50,964	31,828	441,822
PERIOD 1 TOTALS		3,531	3,288	96	160	14	1,707	159,245	25,725	193,767	178,133	14,622	1,012	43	1,199	231	-	-	63,155	31,848	1,192,515

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Recirculation System Piping & Valves	111	94	27	50	-	528	-	221	1,031	1,031	-	-	-	1,430	-	-	-	99,742	2,905	-
2a.1.1.2	Recirculation Pumps & Motors	40	63	16	51	42	539	-	186	938	938	-	-	96	945	-	-	-	112,200	1,563	-
2a.1.1.3	CRDMs & NIs Removal	194	1,020	415	135	-	1,130	-	696	3,591	3,591	-	-	-	3,741	-	-	-	213,700	17,768	-
2a.1.1.4	Reactor Vessel Internals	244	6,722	12,852	2,696	-	29,845	364	24,027	76,749	76,749	-	-	-	1,252	1,481	1,178	-	343,150	30,515	1,379
2a.1.1.5	Reactor Vessel	113	9,121	2,672	1,167	-	5,861	364	10,842	30,140	30,140	-	-	-	16,169	-	-	-	1,105,210	30,515	1,379
2a.1.1	Totals	702	17,020	15,982	4,099	42	37,903	728	35,973	112,449	112,449	-	-	96	23,536	1,481	1,178	-	1,874,002	83,267	2,758
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	385	1,356	521	6,139	439	-	1,341	10,182	10,182	-	-	24,835	1,383	-	-	-	1,577,959	5,438	-
2a.1.3	Main Condensers	-	1,347	360	194	3,225	244	-	947	6,317	6,317	-	-	17,396	727	-	-	-	828,955	18,831	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor Building	-	332	-	-	-	-	-	50	381	381	-	-	-	-	-	-	-	-	2,217	-
2a.1.4.2	Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	127	-
2a.1.4.3	Turbine	-	127	-	-	-	-	-	19	146	146	-	-	-	-	-	-	-	-	1,254	-
2a.1.4	Totals	-	483	-	-	-	-	-	72	556	556	-	-	-	-	-	-	-	-	3,598	-
Disposal of Plant Systems																					
2a.1.5.1	Automatic Press Relief	-	118	7	12	134	70	-	70	410	410	-	-	803	206	-	-	-	45,852	1,656	-
2a.1.5.2	Chemistry Sampling	-	27	1	2	26	13	-	14	83	83	-	-	156	37	-	-	-	8,681	400	-
2a.1.5.3	Chemistry Sampling - Insulated	-	2	0	0	-	0	-	1	3	3	-	-	-	1	-	-	-	72	28	-
2a.1.5.4	Circulating Water - RCA	-	207	14	62	1,114	-	-	230	1,626	1,626	-	-	6,656	-	-	-	-	270,307	2,860	-
2a.1.5.5	Combustible Gas Control - Insul - RCA	-	29	0	2	36	-	-	13	80	80	-	-	212	-	-	-	-	8,617	378	-
2a.1.5.6	Combustible Gas Control - RCA	-	18	1	3	48	-	-	12	81	81	-	-	285	-	-	-	-	11,577	245	-
2a.1.5.7	Condensate & Feedwater	-	987	183	329	3,337	2,464	-	1,431	8,731	8,731	-	-	19,947	7,319	-	-	-	1,275,810	14,196	-
2a.1.5.8	Condensate & Feedwater - Insulated	-	492	34	63	699	408	-	343	2,038	2,038	-	-	4,176	1,207	-	-	-	246,693	6,964	-
2a.1.5.9	Condensate Demin	-	545	30	51	560	339	-	316	1,840	1,840	-	-	3,346	1,000	-	-	-	199,936	7,618	-
2a.1.5.10	Condensate Storage	-	726	33	82	1,193	270	-	444	2,748	2,748	-	-	7,131	795	-	-	-	340,568	10,345	-
2a.1.5.11	Control Rod Drive	-	3	0	0	3	1	-	2	9	9	-	-	19	4	-	-	-	1,009	41	-
2a.1.5.12	Control Rod Drive Hydraulic	-	416	16	26	277	190	-	199	1,124	1,124	-	-	1,658	562	-	-	-	103,306	5,898	-
2a.1.5.13	Core Spray	-	79	20	51	734	176	-	184	1,244	1,244	-	-	4,384	521	-	-	-	211,329	1,163	-
2a.1.5.14	Core Spray - Insulated	-	145	8	13	137	90	-	82	474	474	-	-	818	264	-	-	-	50,149	2,033	-
2a.1.5.15	Demin Water - Insulated - RCA	-	15	0	1	14	-	-	6	36	36	-	-	85	-	-	-	-	3,445	181	-
2a.1.5.16	Demin Water - RCA	-	41	1	2	42	-	-	17	104	104	-	-	253	-	-	-	-	10,278	508	-
2a.1.5.17	Diesel Oil - RCA	-	2	0	0	4	-	-	1	7	7	-	-	23	-	-	-	-	931	25	-
2a.1.5.18	Drywell Atmosphere Cooling - RCA	-	38	1	5	92	-	-	24	159	159	-	-	548	-	-	-	-	22,244	550	-
2a.1.5.19	EDG Emerg Service Water - Insul - RCA	-	0	0	0	0	-	-	0	1	1	-	-	2	-	-	-	-	84	4	-
2a.1.5.20	Electrical - Clean	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	182	-
2a.1.5.21	Emergency Service Water - Insul - RCA	-	21	0	1	23	-	-	9	55	55	-	-	137	-	-	-	-	5,544	281	-
2a.1.5.22	Emergency Service Water - RCA	-	2	0	0	2	-	-	1	5	5	-	-	13	-	-	-	-	512	22	-
2a.1.5.23	GEZIP - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2a.1.5.24	Generator Physical Design - RCA	-	5	0	0	5	-	-	2	12	12	-	-	31	-	-	-	-	1,250	67	-
2a.1.5.25	H2-O2 Control Analyzing	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.26	H2-O2 Control Analyzing - Insulated	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.27	High Pressure Coolant Injection	-	67	6	13	163	70	-	61	381	381	-	-	972	209	-	-	-	52,792	966	-
2a.1.5.28	High Pressure Coolant Injection - Insula	-	219	14	24	267	163	-	141	830	830	-	-	1,598	481	-	-	-	95,733	3,079	-
2a.1.5.29	Hydrogen Cooling	-	8	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	118	-
2a.1.5.30	Hydrogen Cooling - RCA	-	7	0	0	7	-	-	3	17	17	-	-	39	-	-	-	-	1,600	79	-
2a.1.5.31	Hydrogen Seal Oil - RCA	-	17	0	2	32	-	-	9	60	60	-	-	189	-	-	-	-	7,669	212	-
2a.1.5.32	Hydrogen Water Chemistry - RCA	-	24	0	1	23	-	-	10	59	59	-	-	140	-	-	-	-	5,672	304	-
2a.1.5.33	Instrument & Service Air - RCA	-	225	4	17	296	-	-	103	644	644	-	-	1,768	-	-	-	-	71,810	2,733	-
2a.1.5.34	Main Condenser	-	196	12	20	223	139	-	122	712	712	-	-	1,333	411	-	-	-	80,439	2,746	-
2a.1.5.35	Main Steam	-	249	17	32	359	201	-	173	1,029	1,029	-	-	2,148	594	-	-	-	125,135	3,512	-
2a.1.5.36	Main Turbine	-	1,012	205	353	3,306	2,921	-	1,553	9,350	9,350	-	-	19,760	8,687	-	-	-	1,354,661	14,733	-
2a.1.5.37	Main Turbine - Insulated	-	214	18	37	423	225	-	180	1,097	1,097	-	-	2,530	667	-	-	-	145,208	3,069	-
2a.1.5.38	Miscellaneous	-	43	1	3	51	-	-	19	115	115	-	-	302	-	-	-	-	12,283	622	-
2a.1.5.39	Off Gas Recombiner	-	189	19	32	300	257	-	163	960	960	-	-	1,795	764	-	-	-	121,554	2,708	-
2a.1.5.40	Off Gas Recombiner - Insulated	-	387	19	27	229	240	-	197	1,100	1,100	-	-	1,366	709	-	-	-	100,933	5,385	-
2a.1.5.41	Post Accident Sampling	-	25	1	1	9	11	-	11	58	58	-	-	53	33	-	-	-	4,318	345	-
2a.1.5.42	Post Accident Sampling - Insulated	-	17	1	1	3	13	-	8	43	43	-	-	17	37	-	-	-	3,116	212	-
2a.1.5.43	RHR Service Water - Insulated - RCA	-	83	3	14	248	-	-	60	409	409	-	-	1,485	-	-	-	-	60,293	1,125	-
2a.1.5.44	RHR Service Water - RCA	-	4	0	0	6	-	-	2	12	12	-	-	35	-	-	-	-	1,410	57	-
2a.1.5.45	Reactor Feedwater Pump Seal	-	56	2	4	32	33	-	28	155	155	-	-	193	96	-	-	-	14,009	773	-

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
2a.1.5.46	Residual Heat Removal	362	252	172	178	1,072	2,051	-	962	5,049	5,049	-	-	6,406	6,012	-	-	-	647,941	4,135	-
2a.1.5.47	Residual Heat Removal - Insulated	622	554	61	82	563	880	-	772	3,535	3,535	-	-	3,367	2,607	-	-	-	303,087	10,340	-
2a.1.5.48	Rx Core Isolation Cooling	-	49	2	4	43	26	-	26	150	150	-	-	259	76	-	-	-	15,396	691	-
2a.1.5.49	Rx Core Isolation Cooling - Insulated	-	107	5	7	48	67	-	52	287	287	-	-	288	198	-	-	-	24,419	1,479	-
2a.1.5.50	Rx Recirculation	56	58	6	4	7	65	-	61	258	258	-	-	43	190	-	-	-	14,095	1,580	-
2a.1.5.51	Snubbers	-	169	2	5	63	30	-	60	331	331	-	-	377	90	-	-	-	21,009	2,548	-
2a.1.5.52	Standby Liquid Control - Insul - RCA	-	4	0	0	4	-	-	2	9	9	-	-	22	-	-	-	-	904	48	-
2a.1.5.53	Standby Liquid Control - RCA	-	26	1	2	41	-	-	13	83	83	-	-	245	-	-	-	-	9,969	341	-
2a.1.5.54	Stator Cooling - RCA	-	7	0	1	21	-	-	5	35	35	-	-	126	-	-	-	-	5,135	98	-
2a.1.5.55	Traversing Incore Probe	0	4	0	0	0	2	-	1	7	7	-	-	1	5	-	-	-	386	51	-
2a.1.5	Totals	1,040	8,221	924	1,572	16,339	11,425	-	8,209	47,730	47,706	-	24	97,654	33,808	-	-	-	6,125,515	119,943	-
2a.1.6	Scaffolding in support of decommissioning	-	2,265	22	12	191	31	-	607	3,127	3,127	-	-	1,030	91	-	-	-	52,111	22,564	-
2a.1	Subtotal Period 2a Activity Costs	1,742	29,721	18,645	6,398	25,937	50,042	728	47,148	180,360	180,336	-	24	141,010	59,545	1,481	1,178	-	10,458,540	253,640	2,758
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	85	-	57	102	-	232	-	122	598	598	-	-	-	532	-	-	-	31,942	104	-
2a.3.2	Process decommissioning chemical flush waste	5	-	216	702	-	1,619	-	534	3,077	3,077	-	-	-	2,093	-	-	-	223,008	392	-
2a.3.3	Small tool allowance	-	324	-	-	-	-	-	49	373	336	-	37	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	13,627	2,044	15,671	-	15,671	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	13,145	1,972	15,117	15,117	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	91	324	274	804	-	1,851	26,772	4,720	34,835	19,127	15,671	37	-	2,625	-	-	-	254,950	495	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	112	-	-	-	-	-	-	28	140	140	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	1,019	102	1,121	1,121	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	4,383	438	4,821	4,821	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,356	-	-	-	-	-	589	2,945	2,945	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,627	-	-	-	-	-	544	4,171	4,171	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	110	57	-	457	-	134	758	758	-	-	-	5,551	-	-	-	111,023	181	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,501	375	2,876	2,876	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	856	86	942	942	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	4,115	412	4,527	-	4,527	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	3,071	461	3,532	3,532	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	1,224	184	1,408	-	1,408	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	162	24	187	-	187	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	181	27	208	208	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,624	244	1,867	1,867	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	21,881	3,282	25,164	25,164	-	-	-	-	-	-	-	-	-	325,574
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	21,021	3,153	24,174	24,174	-	-	-	-	-	-	-	-	-	229,108
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	27,906	4,186	32,092	32,092	-	-	-	-	-	-	-	-	-	426,562
2a.4	Subtotal Period 2a Period-Dependent Costs	112	5,982	110	57	-	457	89,944	14,268	110,931	104,810	6,121	-	-	5,551	-	-	-	111,023	181	981,244
2a.0	TOTAL PERIOD 2a COST	1,945	36,028	19,028	7,259	25,937	52,350	117,444	66,136	326,126	304,273	21,791	62	141,010	67,722	1,481	1,178	-	10,824,520	254,317	984,002
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	ALARA/Radiological	-	18	0	1	6	3	-	6	35	35	-	-	35	10	-	-	-	2,060	277	-
2b.1.1.2	Alternate N2 - RCA	-	16	0	1	16	-	-	7	40	40	-	-	93	-	-	-	-	3,765	185	-
2b.1.1.3	Decontamination Projects	-	1	0	0	0	0	-	0	2	2	-	-	2	0	-	-	-	129	17	-
2b.1.1.4	Electrical - Contaminated	-	445	6	24	400	30	-	183	1,089	1,089	-	-	2,389	90	-	-	-	102,726	6,325	-
2b.1.1.5	Electrical - Decontaminated	-	2,698	48	218	3,906	-	-	1,298	8,167	8,167	-	-	23,344	-	-	-	-	948,013	37,107	-
2b.1.1.6	Fire - RCA	-	101	1	6	103	-	-	42	253	253	-	-	614	-	-	-	-	24,917	1,324	-
2b.1.1.7	HVAC Ductwork	-	305	7	27	446	34	-	156	975	975	-	-	2,665	100	-	-	-	114,598	4,111	-
2b.1.1.8	HVAC/Chilled Water - RCA	-	324	6	26	461	-	-	155	971	971	-	-	2,752	-	-	-	-	111,779	3,985	-
2b.1.1.9	Heating & Ventilation	-	483	16	61	1,007	76	-	302	1,945	1,945	-	-	6,018	227	-	-	-	258,789	7,101	-
2b.1.1.10	Heating Boiler - Insulated - RCA	-	3	0	0	4	-	-	1	9	9	-	-	26	-	-	-	-	1,058	35	-
2b.1.1.11	Liquid Radwaste	588	687	48	63	514	586	-	703	3,188	3,188	-	-	3,073	1,728	-	-	-	235,484	17,194	-
2b.1.1.12	Makeup Demin - RCA	-	103	3	14	246	-	-	65	431	431	-	-	1,471	-	-	-	-	59,747	1,412	-
2b.1.1.13	Non-Essential Diesel Generator - RCA	-	27	3	13	238	-	-	45	327	327	-	-	1,424	-	-	-	-	57,832	395	-
2b.1.1.14	Off Gas Holdup	-	342	21	38	461	214	-	216	1,291	1,291	-	-	2,755	630	-	-	-	152,277	4,769	-
2b.1.1.15	Primary Containment	-	455	42	87	1,038	507	-	414	2,543	2,543	-	-	6,201	1,506	-	-	-	347,704	6,454	-
2b.1.1.16	Process Radiation Monitors	-	46	2	2	24	18	-	20	111	111	-	-	142	52	-	-	-	9,115	649	-

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
2b.1.1.17	Rx Bldg Closed Clng Water - Insul - RCA	-	114	2	9	163	-	-	54	343	343	-	-	977	-	-	-	-	39,675	1,484	-
2b.1.1.18	Rx Bldg Closed Clng Water - RCA	-	184	15	66	1,187	-	-	235	1,687	1,687	-	-	7,093	-	-	-	-	288,031	2,489	-
2b.1.1.19	Rx Component Handling Equip	27	142	18	27	194	279	-	154	840	840	-	-	1,158	829	-	-	-	99,730	2,462	-
2b.1.1.20	Rx Pressure Vessel	28	47	6	5	13	78	-	48	225	225	-	-	75	230	-	-	-	17,816	1,051	-
2b.1.1.21	Rx Water Cleanup	172	265	19	16	22	251	-	222	965	965	-	-	130	737	-	-	-	52,670	5,736	-
2b.1.1.22	Secondary Containment	-	124	7	14	170	86	-	81	483	483	-	-	1,017	255	-	-	-	57,567	1,763	-
2b.1.1.23	Service & Seal Water - Insulated - RCA	-	120	2	11	197	-	-	62	392	392	-	-	1,180	-	-	-	-	47,917	1,565	-
2b.1.1.24	Service & Seal Water - RCA	-	159	4	17	303	-	-	88	570	570	-	-	1,809	-	-	-	-	73,453	2,016	-
2b.1.1.25	Service Air Blower - RCA	-	15	0	2	34	-	-	9	62	62	-	-	206	-	-	-	-	8,364	206	-
2b.1.1.26	Solid Radwaste	338	494	36	49	399	467	-	480	2,264	2,264	-	-	2,387	1,380	-	-	-	185,221	10,820	-
2b.1.1.27	Structures & Buildings	-	78	2	5	60	29	-	37	210	210	-	-	357	85	-	-	-	19,933	1,128	-
2b.1.1.28	Wells & Domestic Water	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	144	-
2b.1.1.29	Wells & Domestic Water - RCA	-	52	1	3	57	-	-	22	136	136	-	-	342	-	-	-	-	13,874	633	-
2b.1.1	Totals	1,153	7,860	315	804	11,668	2,657	-	5,107	29,563	29,552	-	11	69,735	7,859	-	-	-	3,334,244	122,835	-
2b.1.2	Scaffolding in support of decommissioning	-	2,831	28	16	239	38	-	758	3,909	3,909	-	-	1,287	114	-	-	-	65,139	28,205	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor Building	5,202	2,903	178	516	8,044	1,181	-	4,924	22,948	22,948	-	-	48,077	7,014	-	-	-	2,317,670	112,518	-
2b.1.3.2	Admin	106	6	0	3	-	15	-	59	189	189	-	-	-	145	-	-	-	6,840	1,600	-
2b.1.3.3	HPCI Room	29	28	1	3	20	14	-	29	123	123	-	-	118	125	-	-	-	10,759	789	-
2b.1.3.4	Hot Shop	17	4	0	2	-	11	-	12	46	46	-	-	-	103	-	-	-	4,860	286	-
2b.1.3.5	LLRW Storage & Shipping	58	24	2	8	5	45	-	48	191	191	-	-	31	433	-	-	-	21,708	1,127	-
2b.1.3.6	Offgas Stack	372	269	7	23	225	82	-	312	1,289	1,289	-	-	1,343	669	-	-	-	87,045	8,860	-
2b.1.3.7	Offgas Storage & Compressor	41	17	1	6	4	33	-	34	136	136	-	-	25	316	-	-	-	15,948	785	-
2b.1.3.8	Radwaste	121	61	3	17	29	96	-	107	435	435	-	-	172	910	-	-	-	49,943	2,503	-
2b.1.3.9	Radwaste Material Storage Warehouse	64	24	2	9	-	52	-	52	202	202	-	-	-	495	-	-	-	23,400	1,197	-
2b.1.3.10	Recombiner	27	25	1	5	33	24	-	32	148	148	-	-	199	216	-	-	-	18,405	695	-
2b.1.3.11	Turbine	705	353	21	104	215	564	-	632	2,594	2,594	-	-	1,283	5,299	-	-	-	303,150	14,443	-
2b.1.3.12	Turbine Building Addition	58	21	1	8	-	45	-	47	181	181	-	-	-	434	-	-	-	20,478	1,087	-
2b.1.3	Totals	6,799	3,736	218	704	8,574	2,164	-	6,288	28,483	28,483	-	-	51,247	16,159	-	-	-	2,880,206	145,889	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	7,952	14,427	560	1,524	20,481	4,859	526	12,232	62,561	62,549	-	11	122,269	24,132	-	-	-	6,279,589	296,929	4,096
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	23	92	1,211	-	-	198	1,524	1,524	-	-	11,760	-	-	-	-	294,000	32	-
2b.2.2	Excavation of Underground Services	-	1,972	-	-	-	-	376	550	2,898	2,898	-	-	-	-	-	-	-	-	12,493	-
2b.2.3	Security Modifications	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,972	23	92	1,211	-	9,072	2,052	14,422	14,422	-	-	11,760	-	-	-	-	294,000	12,525	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	198	-	135	240	-	546	-	285	1,404	1,404	-	-	-	1,253	-	-	-	75,186	244	-
2b.3.2	Process decommissioning chemical flush waste	1	-	43	138	-	319	-	105	607	607	-	-	-	413	-	-	-	43,978	77	-
2b.3.3	Small tool allowance	-	364	-	-	-	-	-	55	418	418	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	117,112	17,567	134,679	-	134,679	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	6,277	942	7,218	7,218	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	199	364	178	378	-	865	123,389	18,953	144,326	9,647	134,679	-	-	1,666	-	-	-	119,165	322	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,440	-	-	-	-	-	-	360	1,799	1,799	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	742	74	816	816	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	2,698	270	2,967	2,967	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,376	-	-	-	-	-	594	2,970	2,970	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,711	-	-	-	-	-	407	3,117	3,117	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	101	52	-	419	-	123	694	694	-	-	-	5,084	-	-	-	101,679	166	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,437	216	1,653	1,653	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	623	62	685	685	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,995	299	3,294	-	3,294	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	2,235	335	2,570	2,570	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	891	134	1,024	-	1,024	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	224	34	258	258	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	118	18	136	-	136	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	458	69	527	527	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,182	177	1,359	1,359	-	-	-	-	-	-	-	-	-	-

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2b Period-Dependent Costs (continued)																					
2b.4.16	Security Staff Cost	-	-	-	-	-	-	15,925	2,389	18,314	18,314	-	-	-	-	-	-	-	-	-	236,949
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	14,772	2,216	16,988	16,988	-	-	-	-	-	-	-	-	-	160,160
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	19,442	2,916	22,358	22,358	-	-	-	-	-	-	-	-	-	297,283
2b.4	Subtotal Period 2b Period-Dependent Costs	1,440	5,087	101	52	-	419	63,741	10,691	81,530	77,076	4,455	-	-	5,084	-	-	-	101,679	166	694,392
2b.0	TOTAL PERIOD 2b COST	9,591	21,850	861	2,046	21,692	6,143	196,728	43,928	302,839	163,694	139,134	11	134,029	30,882	-	-	-	6,794,433	309,941	698,488
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	654	58	103	149	-	2,572	-	1,017	4,553	4,553	-	-	-	7,653	-	-	-	486,170	906	-
Disposal of Plant Systems																					
2d.1.2.1	Cranes/Heavy Loads/Rigging - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2d.1.2.2	Electrical - Contaminated Fuel Pool	-	47	1	2	40	3	-	19	112	112	-	-	240	9	-	-	-	10,334	665	-
2d.1.2.3	Electrical - Decontam. Fuel Pool Area	-	297	5	23	411	-	-	140	876	876	-	-	2,457	-	-	-	-	99,783	4,090	-
2d.1.2.4	Fire - RCA - Fuel Pool Area	-	11	0	1	10	-	-	4	26	26	-	-	62	-	-	-	-	2,499	143	-
2d.1.2.5	Fuel Pool Cooling & Cleanup	246	428	34	37	197	455	-	382	1,781	1,781	-	-	1,179	1,341	-	-	-	133,939	8,380	-
2d.1.2.6	Fuel Pool Cooling & Cleanup - Insulated	27	41	3	3	11	40	-	36	161	161	-	-	67	117	-	-	-	10,220	848	-
2d.1.2.7	HVAC Ductwork - Fuel Pool Area	-	34	1	3	50	4	-	17	108	108	-	-	296	11	-	-	-	12,733	457	-
2d.1.2.8	HVAC/Chilled Water - RCA Fuel Pool Area	-	33	0	2	37	-	-	14	87	87	-	-	223	-	-	-	-	9,072	397	-
2d.1.2.9	Instrument & Service Air-RCA-Fuel Pool	-	29	1	2	45	-	-	14	91	91	-	-	267	-	-	-	-	10,841	357	-
2d.1.2	Totals	273	924	45	75	819	502	-	631	3,268	3,268	-	-	4,894	1,479	-	-	-	293,606	15,385	-
Decontamination of Site Buildings																					
2d.1.3.1	Reactor (Post Fuel)	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.3	Totals	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.4	Scaffolding in support of decommissioning	-	566	6	3	48	8	-	152	782	782	-	-	257	23	-	-	-	13,028	5,641	-
2d.1	Subtotal Period 2d Activity Costs	1,872	4,147	326	1,139	1,196	13,298	-	5,680	27,659	27,659	-	-	7,120	71,852	-	-	-	3,525,210	67,635	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	79	-	54	96	-	220	-	114	563	563	-	-	-	504	-	-	-	30,239	98	-
2d.3.2	Process decommissioning chemical flush waste	1	-	26	84	-	193	-	64	366	366	-	-	-	249	-	-	-	26,553	47	-
2d.3.3	Small tool allowance	-	91	-	-	-	-	-	14	105	105	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	82	1,112	178	-	237	1,739	1,739	-	-	6,000	529	-	-	-	303,608	147	-
2d.3	Subtotal Period 2d Collateral Costs	80	91	210	262	1,112	590	-	428	2,773	2,773	-	-	6,000	1,282	-	-	-	360,400	292	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	244	-	-	-	-	-	-	61	305	305	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	1,662	166	1,828	1,828	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	806	-	-	-	-	-	202	1,008	1,008	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	1,936	-	-	-	-	-	290	2,227	2,227	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	40	21	-	167	-	49	277	277	-	-	-	2,030	-	-	-	40,600	66	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	547	82	630	630	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	424	42	466	466	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	320	48	368	368	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	844	127	971	971	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	7,311	1,097	8,408	8,408	-	-	-	-	-	-	-	-	-	78,356
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	10,052	1,508	11,560	10,670	890	-	-	-	-	-	-	-	-	149,660
2d.4	Subtotal Period 2d Period-Dependent Costs	244	2,743	40	21	-	167	34,577	5,652	43,444	38,602	4,842	-	-	2,030	-	-	-	40,600	66	390,997
2d.0	TOTAL PERIOD 2d COST	2,196	6,981	576	1,422	2,308	14,055	36,035	12,198	75,772	70,930	4,842	-	13,120	75,164	-	-	-	3,926,210	67,993	403,477

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,471	147	1,618	1,618	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	708	-	-	-	-	-	177	884	884	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	4	-	29	-	9	48	48	-	-	-	355	-	-	-	7,097	12	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	274	41	315	315	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	426	43	468	468	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	5,393	809	6,201	6,201	-	-	-	-	-	-	-	-	-	57,200
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	5,762	864	6,626	5,738	888	-	-	-	-	-	-	-	-	80,707
2f.4	Subtotal Period 2f Period-Dependent Costs	-	708	7	4	-	29	26,741	4,070	31,558	26,719	4,839	-	-	355	-	-	-	7,097	12	300,888
2f.0	TOTAL PERIOD 2f COST	-	708	7	4	-	29	35,090	6,385	42,223	37,383	4,839	-	-	355	-	-	-	7,097	95,059	307,128
PERIOD 2 TOTALS		13,731	65,566	20,473	10,731	49,937	72,577	385,298	128,647	746,960	576,281	170,606	73	288,160	174,123	1,481	1,178	-	21,552,260	727,310	2,393,096
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor Building	-	1,971	-	-	-	-	-	296	2,267	-	-	2,267	-	-	-	-	-	-	13,911	-
3b.1.1.2	Condensate Tanks Foundation	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	50	-
3b.1.1.3	Discharge Retention Basin	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	25	-
3b.1.1.4	HPCI Room	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	97	-
3b.1.1.5	Hot Shop	-	16	-	-	-	-	-	2	19	-	-	19	-	-	-	-	-	-	177	-
3b.1.1.6	Hydrogen & Oxygen Storage	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	19	-
3b.1.1.7	LLRW Storage & Shipping	-	83	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	662	-
3b.1.1.8	MSIV	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	42	-
3b.1.1.9	Misc Structures 2017	-	1,410	-	-	-	-	-	212	1,622	-	-	1,622	-	-	-	-	-	-	13,042	-
3b.1.1.10	Offgas Stack	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	544	-
3b.1.1.11	Offgas Storage & Compressor	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	199	-
3b.1.1.12	Radwaste	-	228	-	-	-	-	-	34	262	-	-	262	-	-	-	-	-	-	1,220	-
3b.1.1.13	Recombiner	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	713	-
3b.1.1.14	Security Barrier	-	186	-	-	-	-	-	28	214	-	-	214	-	-	-	-	-	-	933	-
3b.1.1.15	Structures Greater than 3' Below Grade	-	2,461	-	-	-	-	-	369	2,830	-	-	2,830	-	-	-	-	-	-	12,649	-
3b.1.1.16	Tank Farm	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	21	-
3b.1.1.17	Turbine	-	1,259	-	-	-	-	-	189	1,448	-	-	1,448	-	-	-	-	-	-	13,036	-
3b.1.1.18	Turbine Building Addition	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	618	-
3b.1.1.19	Turbine Pedestal	-	182	-	-	-	-	-	27	209	-	-	209	-	-	-	-	-	-	926	-
3b.1.1	Totals	-	8,169	-	-	-	-	-	1,225	9,394	-	-	9,394	-	-	-	-	-	-	58,885	-
Site Closeout Activities																					
3b.1.2	Grade & landscape site	-	896	-	-	-	-	-	134	1,031	-	-	1,031	-	-	-	-	-	-	1,841	-
3b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	9,065	-	-	-	-	200	1,390	10,655	231	-	10,425	-	-	-	-	-	-	60,726	1,560
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	3,322	-	-	-	-	13	500	3,835	-	-	3,835	-	-	-	-	-	-	12	-

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3b Additional Costs (continued)																					
3b.2.2	Intake Structure Cofferdam	-	335	-	-	-	-	-	50	385	-	-	385	-	-	-	-	-	-	2,584	-
3b.2.3	Construction Debris	-	-	-	-	-	-	1,170	176	1,346	-	-	1,346	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	5,583	-	-	-	-	-	837	6,421	-	-	6,421	-	-	-	-	-	-	5,422	-
3b.2.5	Discharge Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
3b.2	Subtotal Period 3b Additional Costs	-	9,682	-	-	-	-	1,183	1,630	12,495	-	-	12,495	-	-	-	-	-	-	11,570	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	110	-	-	-	-	-	17	127	-	-	127	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	110	-	-	-	-	-	17	127	-	-	127	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	1,220	122	1,342	1,342	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	2,543	254	2,797	-	2,797	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	5,842	-	-	-	-	-	876	6,719	-	-	6,719	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	315	47	362	-	362	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	356	36	391	-	391	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	257	26	283	-	283	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,122	168	1,290	429	860	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	194	29	223	-	223	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	543	81	624	249	375	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	25,319	3,798	29,117	0	8,589	20,527	-	-	-	-	-	-	-	375,152
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	11,729	1,759	13,489	-	-	13,489	-	-	-	-	-	-	-	122,646
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	6,873	1,031	7,904	-	2,047	5,857	-	-	-	-	-	-	-	98,297
3b.4	Subtotal Period 3b Period-Dependent Costs	-	5,842	-	-	-	-	50,470	8,228	64,540	2,020	15,928	46,591	-	-	-	-	-	-	-	596,095
3b.0	TOTAL PERIOD 3b COST	-	24,700	-	-	-	-	51,853	11,264	87,817	2,251	15,928	69,638	-	-	-	-	-	-	72,296	597,655
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	30,633	4,595	35,228	-	35,228	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	30,633	4,595	35,228	-	35,228	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	24,659	2,466	27,125	-	27,125	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	31,863	3,186	35,049	-	35,049	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	10,863	1,086	11,950	-	11,950	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	5,198	520	5,718	-	5,718	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	7,552	1,133	8,685	-	8,685	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	3,924	589	4,513	-	4,513	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	4,384	658	5,042	-	5,042	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	150,786	22,618	173,404	-	173,404	-	-	-	-	-	-	-	-	1,896,060
3c.4.10	Utility Staff Cost	-	-	-	-	-	-	36,020	5,403	41,423	-	41,423	-	-	-	-	-	-	-	-	492,246
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	275,250	37,658	312,908	-	312,908	-	-	-	-	-	-	-	-	2,388,306
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	305,883	42,253	348,136	-	348,136	-	-	-	-	-	-	-	-	2,388,306
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	-	1,160	225,765	-	-
3d.1.1	Totals	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	-	1,160	225,765	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	-	1,160	225,765	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	27	3	30	30	-	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	35	3	38	38	-	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8	1	9	-	9	-	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	6	1	6	-	6	-	-	-	-	-	-	-	-	-	-

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3d Period-Dependent Costs (continued)																					
3d.4.6	Fixed Overhead	-	-	-	-	-	-	8	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	165	25	190	190	-	-	-	-	-	-	-	-	-	2,074
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	39	6	45	45	-	-	-	-	-	-	-	-	-	539
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	293	40	333	318	15	-	-	-	-	-	-	-	-	2,613
3d.0	TOTAL PERIOD 3d COST	-	-	1,083	-	-	4,313	321	962	6,678	6,632	47	-	-	-	-	-	1,160	225,765	-	2,613
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	57	188	987	-	5,925	2,185	2,336	11,678	11,678	-	-	-	21,949	-	-	-	2,633,402	11,541	2,249
3e.2	Subtotal Period 3e Additional Costs	-	57	188	987	-	5,925	2,185	2,336	11,678	11,678	-	-	-	21,949	-	-	-	2,633,402	11,541	2,249
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	118	30	148	148	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	249	62	312	312	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	12	3	15	15	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	71	18	89	89	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	41	10	52	52	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	352	88	440	440	-	-	-	-	-	-	-	-	-	4,999
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	261	65	326	326	-	-	-	-	-	-	-	-	-	3,792
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	1,105	276	1,381	1,381	-	-	-	-	-	-	-	-	-	8,792
3e.0	TOTAL PERIOD 3e COST	-	57	188	987	-	5,925	3,290	2,612	13,059	13,059	-	-	-	21,949	-	-	-	2,633,402	11,541	11,041
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	1,786	-	-	-	-	270	308	2,365	-	-	2,365	-	-	-	-	-	-	8,361	160
3f.2	Subtotal Period 3f Additional Costs	-	1,786	-	-	-	-	270	308	2,365	-	-	2,365	-	-	-	-	-	-	8,361	160
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	12	-	-	-	-	-	2	14	-	-	14	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	12	-	-	-	-	-	2	14	-	-	14	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	126	13	138	-	-	138	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	117	-	-	-	-	-	17	134	-	-	134	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	7	-	-	7	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	36	5	41	-	-	41	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	21	3	24	-	-	24	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	177	27	204	-	-	204	-	-	-	-	-	-	-	2,520
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	109	16	126	-	-	126	-	-	-	-	-	-	-	1,564
3f.4	Subtotal Period 3f Period-Dependent Costs	-	117	-	-	-	-	475	82	674	-	-	674	-	-	-	-	-	-	-	4,084
3f.0	TOTAL PERIOD 3f COST	-	1,915	-	-	-	-	745	393	3,053	-	-	3,053	-	-	-	-	-	-	8,361	4,244
PERIOD 3 TOTALS		-	26,671	1,271	987	-	10,238	362,092	57,484	458,744	21,942	364,111	72,691	-	21,949	-	-	1,160	2,859,167	92,198	3,003,859
TOTAL COST TO DECOMMISSION		17,263	95,526	21,839	11,878	49,952	84,523	906,635	211,856	1,399,471	776,355	549,339	73,776	288,203	197,270	1,711	1,178	1,160	24,474,580	851,356	6,589,469

Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
TOTAL COST TO DECOMMISSION WITH 17.82% CONTINGENCY:						**$1,399,471**	**thousands of 2020 dollars**														
TOTAL NRC LICENSE TERMINATION COST IS 55.32% OR:						**$776,355**	**thousands of 2020 dollars**														
SPENT FUEL MANAGEMENT COST IS 39.42% OR:						**$549,339**	**thousands of 2020 dollars**														
NON-NUCLEAR DEMOLITION COST IS 5.26% OR:						**$73,776**	**thousands of 2020 dollars**														
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):						**200,160**	**Cubic Feet**														
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:						**1,160**	**Cubic Feet**														
TOTAL SCRAP METAL REMOVED:						**23,123**	**Tons**														
TOTAL CRAFT LABOR REQUIREMENTS:						**851,356**	**Man-hours**														

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX D

DETAILED COST ANALYSIS

SCENARIO 2: DECON with 60 Year DFS

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	632	95	727	654	-	73	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Sacrificial shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Moisture separators/reheaters	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.10	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.11	Pressure suppression structure	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.17.12	Drywell	-	-	-	-	-	-	206	31	236	236	-	-	-	-	-	-	-	-	-	1,600
1a.1.17.13	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
1a.1.17.14	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.15	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	5,486	823	6,308	5,759	-	550	-	-	-	-	-	-	-	42,683
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	16,569	2,485	19,054	18,505	-	550	-	-	-	-	-	-	-	83,013
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,323	198	1,522	-	1,522	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	9,892	1,484	11,376	11,376	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	11,215	1,682	12,897	11,376	1,522	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,328	233	2,561	2,561	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,570	357	3,927	3,927	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	6	-	50	-	15	83	83	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,137	114	1,251	1,251	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,428	343	3,770	-	3,770	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	845	127	971	-	971	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	16,372	2,456	18,827	18,827	-	-	-	-	-	-	-	-	-	245,440
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	27,285	4,093	31,378	31,378	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	6	-	50	59,634	8,703	69,772	64,902	4,870	-	-	610	-	-	-	12,190	20	667,680

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	6	-	50	87,418	12,871	101,724	94,783	6,392	550	-	610	-	-	-	12,190	20	750,693
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	514	77	591	591	-	-	-	-	-	-	-	-	-	4,000
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD housings & NIs	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Removal primary containment	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
1b.1.1.10	Sacrificial shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.11	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
1b.1.1.12	Main Turbine	-	-	-	-	-	-	267	40	307	307	-	-	-	-	-	-	-	-	-	2,080
1b.1.1.13	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1b.1.1.14	Moisture separators & reheaters	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.15	Radwaste building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1.16	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,336	650	4,987	4,524	-	463	-	-	-	-	-	-	-	33,741
1b.1.2	Decon NSSS	296	-	-	-	-	-	-	148	444	444	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	296	-	-	-	-	-	4,336	798	5,431	4,968	-	463	-	-	-	-	-	-	1,067	33,741
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2.2	Site Characterization	-	-	-	-	-	-	5,930	1,779	7,708	7,708	-	-	-	-	-	-	-	-	30,500	10,852
1b.2.3	Mixed & RCRA Waste	-	-	28	29	14	-	-	9	80	80	-	-	43	-	-	-	-	5,253	161	-
1b.2	Subtotal Period 1b Additional Costs	-	-	28	29	14	-	18,605	3,689	22,365	22,365	-	-	43	-	-	-	-	5,253	30,661	10,852
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	38	-	25	45	-	102	-	53	263	263	-	-	-	233	-	-	-	13,991	45	-
1b.3.4	Process decommissioning chemical flush waste	1	-	24	77	-	1,526	-	396	2,024	2,024	-	-	-	-	231	-	-	24,599	43	-
1b.3.5	Small tool allowance	-	2	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	392	59	450	-	450	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	6,340	951	7,291	7,291	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,197	1,202	49	122	-	1,628	7,996	2,303	16,496	16,046	450	-	-	233	231	-	-	38,589	89	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	39	-	-	-	-	-	-	10	48	48	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	1,161	116	1,277	1,277	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,710	171	1,881	1,881	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	344	-	-	-	-	-	86	430	430	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	4	-	29	-	9	49	49	-	-	-	356	-	-	-	7,122	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,812	272	2,083	2,083	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	323	32	355	355	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,416	142	1,557	-	1,557	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	1,305	196	1,500	1,500	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	421	63	484	-	484	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	62	9	72	72	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	8,163	1,225	9,388	9,388	-	-	-	-	-	-	-	-	-	122,384
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,846	877	6,723	6,723	-	-	-	-	-	-	-	-	-	63,266
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	13,682	2,052	15,734	15,734	-	-	-	-	-	-	-	-	-	211,579
1b.4	Subtotal Period 1b Period-Dependent Costs	39	719	7	4	-	29	35,956	5,323	42,078	39,972	2,106	-	-	356	-	-	-	7,122	12	397,229
1b.0	TOTAL PERIOD 1b COST	3,531	1,921	84	154	14	1,657	66,893	12,114	86,369	83,350	2,556	463	43	589	231	-	-	50,964	31,828	441,822
PERIOD 1 TOTALS		3,531	3,288	96	160	14	1,707	154,311	24,985	188,093	178,133	8,948	1,012	43	1,199	231	-	-	63,155	31,848	1,192,515

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Recirculation System Piping & Valves	111	94	27	50	-	528	-	221	1,031	1,031	-	-	-	1,430	-	-	-	99,742	2,905	-
2a.1.1.2	Recirculation Pumps & Motors	40	63	16	51	42	539	-	186	938	938	-	-	96	945	-	-	-	112,200	1,563	-
2a.1.1.3	CRDMs & NIs Removal	194	1,020	415	135	-	1,130	-	696	3,591	3,591	-	-	-	3,741	-	-	-	213,700	17,768	-
2a.1.1.4	Reactor Vessel Internals	244	6,722	12,852	2,696	-	29,845	364	24,027	76,749	76,749	-	-	-	1,252	1,481	1,178	-	343,150	30,515	1,379
2a.1.1.5	Reactor Vessel	113	9,121	2,672	1,167	-	5,861	364	10,842	30,140	30,140	-	-	-	16,169	-	-	-	1,105,210	30,515	1,379
2a.1.1	Totals	702	17,020	15,982	4,099	42	37,903	728	35,973	112,449	112,449	-	-	96	23,536	1,481	1,178	-	1,874,002	83,267	2,758
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	385	1,356	521	6,139	439	-	1,341	10,182	10,182	-	-	24,835	1,383	-	-	-	1,577,959	5,438	-
2a.1.3	Main Condensers	-	1,347	360	194	3,225	244	-	947	6,317	6,317	-	-	17,396	727	-	-	-	828,955	18,831	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor Building	-	332	-	-	-	-	-	50	381	381	-	-	-	-	-	-	-	-	2,217	-
2a.1.4.2	Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	127	-
2a.1.4.3	Turbine	-	127	-	-	-	-	-	19	146	146	-	-	-	-	-	-	-	-	1,254	-
2a.1.4	Totals	-	483	-	-	-	-	-	72	556	556	-	-	-	-	-	-	-	-	3,598	-
Disposal of Plant Systems																					
2a.1.5.1	Automatic Press Relief	-	118	7	12	134	70	-	70	410	410	-	-	803	206	-	-	-	45,852	1,656	-
2a.1.5.2	Chemistry Sampling	-	27	1	2	26	13	-	14	83	83	-	-	156	37	-	-	-	8,681	400	-
2a.1.5.3	Chemistry Sampling - Insulated	-	2	0	0	-	0	-	1	3	3	-	-	-	1	-	-	-	72	28	-
2a.1.5.4	Circulating Water - RCA	-	207	14	62	1,114	-	-	230	1,626	1,626	-	-	6,656	-	-	-	-	270,307	2,860	-
2a.1.5.5	Combustible Gas Control - Insul - RCA	-	29	0	2	36	-	-	13	80	80	-	-	212	-	-	-	-	8,617	378	-
2a.1.5.6	Combustible Gas Control - RCA	-	18	1	3	48	-	-	12	81	81	-	-	285	-	-	-	-	11,577	245	-
2a.1.5.7	Condensate & Feedwater	-	987	183	329	3,337	2,464	-	1,431	8,731	8,731	-	-	19,947	7,319	-	-	-	1,275,810	14,196	-
2a.1.5.8	Condensate & Feedwater - Insulated	-	492	34	63	699	408	-	343	2,038	2,038	-	-	4,176	1,207	-	-	-	246,693	6,964	-
2a.1.5.9	Condensate Demin	-	545	30	51	560	339	-	316	1,840	1,840	-	-	3,346	1,000	-	-	-	199,936	7,618	-
2a.1.5.10	Condensate Storage	-	726	33	82	1,193	270	-	444	2,748	2,748	-	-	7,131	795	-	-	-	340,568	10,345	-
2a.1.5.11	Control Rod Drive	-	3	0	0	3	1	-	2	9	9	-	-	19	4	-	-	-	1,009	41	-
2a.1.5.12	Control Rod Drive Hydraulic	-	416	16	26	277	190	-	199	1,124	1,124	-	-	1,658	562	-	-	-	103,306	5,898	-
2a.1.5.13	Core Spray	-	79	20	51	734	176	-	184	1,244	1,244	-	-	4,384	521	-	-	-	211,329	1,163	-
2a.1.5.14	Core Spray - Insulated	-	145	8	13	137	90	-	82	474	474	-	-	818	264	-	-	-	50,149	2,033	-
2a.1.5.15	Demin Water - Insulated - RCA	-	15	0	1	14	-	-	6	36	36	-	-	85	-	-	-	-	3,445	181	-
2a.1.5.16	Demin Water - RCA	-	41	1	2	42	-	-	17	104	104	-	-	253	-	-	-	-	10,278	508	-
2a.1.5.17	Diesel Oil - RCA	-	2	0	0	4	-	-	1	7	7	-	-	23	-	-	-	-	931	25	-
2a.1.5.18	Drywell Atmosphere Cooling - RCA	-	38	1	5	92	-	-	24	159	159	-	-	548	-	-	-	-	22,244	550	-
2a.1.5.19	EDG Emerg Service Water - Insul - RCA	-	0	0	0	0	-	-	0	1	1	-	-	2	-	-	-	-	84	4	-
2a.1.5.20	Electrical - Clean	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	182	-
2a.1.5.21	Emergency Service Water - Insul - RCA	-	21	0	1	23	-	-	9	55	55	-	-	137	-	-	-	-	5,544	281	-
2a.1.5.22	Emergency Service Water - RCA	-	2	0	0	2	-	-	1	5	5	-	-	13	-	-	-	-	512	22	-
2a.1.5.23	GEZIP - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2a.1.5.24	Generator Physical Design - RCA	-	5	0	0	5	-	-	2	12	12	-	-	31	-	-	-	-	1,250	67	-
2a.1.5.25	H2-O2 Control Analyzing	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.26	H2-O2 Control Analyzing - Insulated	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.27	High Pressure Coolant Injection	-	67	6	13	163	70	-	61	381	381	-	-	972	209	-	-	-	52,792	966	-
2a.1.5.28	High Pressure Coolant Injection - Insula	-	219	14	24	267	163	-	141	830	830	-	-	1,598	481	-	-	-	95,733	3,079	-
2a.1.5.29	Hydrogen Cooling	-	8	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	118	-
2a.1.5.30	Hydrogen Cooling - RCA	-	7	0	0	7	-	-	3	17	17	-	-	39	-	-	-	-	1,600	79	-
2a.1.5.31	Hydrogen Seal Oil - RCA	-	17	0	2	32	-	-	9	60	60	-	-	189	-	-	-	-	7,669	212	-
2a.1.5.32	Hydrogen Water Chemistry - RCA	-	24	0	1	23	-	-	10	59	59	-	-	140	-	-	-	-	5,672	304	-
2a.1.5.33	Instrument & Service Air - RCA	-	225	4	17	296	-	-	103	644	644	-	-	1,768	-	-	-	-	71,810	2,733	-
2a.1.5.34	Main Condenser	-	196	12	20	223	139	-	122	712	712	-	-	1,333	411	-	-	-	80,439	2,746	-
2a.1.5.35	Main Steam	-	249	17	32	359	201	-	173	1,029	1,029	-	-	2,148	594	-	-	-	125,135	3,512	-
2a.1.5.36	Main Turbine	-	1,012	205	353	3,306	2,921	-	1,553	9,350	9,350	-	-	19,760	8,687	-	-	-	1,354,661	14,733	-
2a.1.5.37	Main Turbine - Insulated	-	214	18	37	423	225	-	180	1,097	1,097	-	-	2,530	667	-	-	-	145,208	3,069	-
2a.1.5.38	Miscellaneous	-	43	1	3	51	-	-	19	115	115	-	-	302	-	-	-	-	12,283	622	-
2a.1.5.39	Off Gas Recombiner	-	189	19	32	300	257	-	163	960	960	-	-	1,795	764	-	-	-	121,554	2,708	-
2a.1.5.40	Off Gas Recombiner - Insulated	-	387	19	27	229	240	-	197	1,100	1,100	-	-	1,366	709	-	-	-	100,933	5,385	-
2a.1.5.41	Post Accident Sampling	-	25	1	1	9	11	-	11	58	58	-	-	53	33	-	-	-	4,318	345	-
2a.1.5.42	Post Accident Sampling - Insulated	-	17	1	1	3	13	-	8	43	43	-	-	17	37	-	-	-	3,116	212	-
2a.1.5.43	RHR Service Water - Insulated - RCA	-	83	3	14	248	-	-	60	409	409	-	-	1,485	-	-	-	-	60,293	1,125	-
2a.1.5.44	RHR Service Water - RCA	-	4	0	0	6	-	-	2	12	12	-	-	35	-	-	-	-	1,410	57	-
2a.1.5.45	Reactor Feedwater Pump Seal	-	56	2	4	32	33	-	28	155	155	-	-	193	96	-	-	-	14,009	773	-

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
2a.1.5.46	Residual Heat Removal	362	252	172	178	1,072	2,051	-	962	5,049	5,049	-	-	6,406	6,012	-	-	-	647,941	4,135	-
2a.1.5.47	Residual Heat Removal - Insulated	622	554	61	82	563	880	-	772	3,535	3,535	-	-	3,367	2,607	-	-	-	303,087	10,340	-
2a.1.5.48	Rx Core Isolation Cooling	-	49	2	4	43	26	-	26	150	150	-	-	259	76	-	-	-	15,396	691	-
2a.1.5.49	Rx Core Isolation Cooling - Insulated	-	107	5	7	48	67	-	52	287	287	-	-	288	198	-	-	-	24,419	1,479	-
2a.1.5.50	Rx Recirculation	56	58	6	4	7	65	-	61	258	258	-	-	43	190	-	-	-	14,095	1,580	-
2a.1.5.51	Snubbers	-	169	2	5	63	30	-	60	331	331	-	-	377	90	-	-	-	21,009	2,548	-
2a.1.5.52	Standby Liquid Control - Insul - RCA	-	4	0	0	4	-	-	2	9	9	-	-	22	-	-	-	-	904	48	-
2a.1.5.53	Standby Liquid Control - RCA	-	26	1	2	41	-	-	13	83	83	-	-	245	-	-	-	-	9,969	341	-
2a.1.5.54	Stator Cooling - RCA	-	7	0	1	21	-	-	5	35	35	-	-	126	-	-	-	-	5,135	98	-
2a.1.5.55	Traversing Incore Probe	0	4	0	0	0	2	-	1	7	7	-	-	1	5	-	-	-	386	51	-
2a.1.5	Totals	1,040	8,221	924	1,572	16,339	11,425	-	8,209	47,730	47,706	-	24	97,654	33,808	-	-	-	6,125,515	119,943	-
2a.1.6	Scaffolding in support of decommissioning	-	2,265	22	12	191	31	-	607	3,127	3,127	-	-	1,030	91	-	-	-	52,111	22,564	-
2a.1	Subtotal Period 2a Activity Costs	1,742	29,721	18,645	6,398	25,937	50,042	728	47,148	180,360	180,336	-	24	141,010	59,545	1,481	1,178	-	10,458,540	253,640	2,758
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	85	-	57	102	-	232	-	122	598	598	-	-	-	532	-	-	-	31,942	104	-
2a.3.2	Process decommissioning chemical flush waste	5	-	216	702	-	1,619	-	534	3,077	3,077	-	-	-	2,093	-	-	-	223,008	392	-
2a.3.3	Small tool allowance	-	324	-	-	-	-	-	49	373	336	-	37	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	13,717	2,058	15,775	-	15,775	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	13,145	1,972	15,117	15,117	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	91	324	274	804	-	1,851	26,862	4,734	34,939	19,127	15,775	37	-	2,625	-	-	-	254,950	495	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	112	-	-	-	-	-	-	28	140	140	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	1,019	102	1,121	1,121	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	4,383	438	4,821	4,821	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,356	-	-	-	-	-	589	2,945	2,945	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,627	-	-	-	-	-	544	4,171	4,171	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	110	57	-	457	-	134	758	758	-	-	-	5,551	-	-	-	111,023	181	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,501	375	2,876	2,876	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	856	86	942	942	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	4,115	412	4,527	-	4,527	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	3,071	461	3,532	3,532	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	1,224	184	1,408	-	1,408	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	162	24	187	-	187	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	181	27	208	208	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,624	244	1,867	1,867	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	21,881	3,282	25,164	25,164	-	-	-	-	-	-	-	-	-	325,574
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	21,021	3,153	24,174	24,174	-	-	-	-	-	-	-	-	-	229,108
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	27,906	4,186	32,092	32,092	-	-	-	-	-	-	-	-	-	426,562
2a.4	Subtotal Period 2a Period-Dependent Costs	112	5,982	110	57	-	457	89,944	14,268	110,931	104,810	6,121	-	-	5,551	-	-	-	111,023	181	981,244
2a.0	TOTAL PERIOD 2a COST	1,945	36,028	19,028	7,259	25,937	52,350	117,535	66,150	326,231	304,273	21,896	62	141,010	67,722	1,481	1,178	-	10,824,520	254,317	984,002
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	ALARA/Radiological	-	18	0	1	6	3	-	6	35	35	-	-	35	10	-	-	-	2,060	277	-
2b.1.1.2	Alternate N2 - RCA	-	16	0	1	16	-	-	7	40	40	-	-	93	-	-	-	-	3,765	185	-
2b.1.1.3	Decontamination Projects	-	1	0	0	0	0	-	0	2	2	-	-	2	0	-	-	-	129	17	-
2b.1.1.4	Electrical - Contaminated	-	445	6	24	400	30	-	183	1,089	1,089	-	-	2,389	90	-	-	-	102,726	6,325	-
2b.1.1.5	Electrical - Decontaminated	-	2,698	48	218	3,906	-	-	1,298	8,167	8,167	-	-	23,344	-	-	-	-	948,013	37,107	-
2b.1.1.6	Fire - RCA	-	101	1	6	103	-	-	42	253	253	-	-	614	-	-	-	-	24,917	1,324	-
2b.1.1.7	HVAC Ductwork	-	305	7	27	446	34	-	156	975	975	-	-	2,665	100	-	-	-	114,598	4,111	-
2b.1.1.8	HVAC/Chilled Water - RCA	-	324	6	26	461	-	-	155	971	971	-	-	2,752	-	-	-	-	111,779	3,985	-
2b.1.1.9	Heating & Ventilation	-	483	16	61	1,007	76	-	302	1,945	1,945	-	-	6,018	227	-	-	-	258,789	7,101	-
2b.1.1.10	Heating Boiler - Insulated - RCA	-	3	0	0	4	-	-	1	9	9	-	-	26	-	-	-	-	1,058	35	-
2b.1.1.11	Liquid Radwaste	588	687	48	63	514	586	-	703	3,188	3,188	-	-	3,073	1,728	-	-	-	235,484	17,194	-
2b.1.1.12	Makeup Demin - RCA	-	103	3	14	246	-	-	65	431	431	-	-	1,471	-	-	-	-	59,747	1,412	-
2b.1.1.13	Non-Essential Diesel Generator - RCA	-	27	3	13	238	-	-	45	327	327	-	-	1,424	-	-	-	-	57,832	395	-
2b.1.1.14	Off Gas Holdup	-	342	21	38	461	214	-	216	1,291	1,291	-	-	2,755	630	-	-	-	152,277	4,769	-
2b.1.1.15	Primary Containment	-	455	42	87	1,038	507	-	414	2,543	2,543	-	-	6,201	1,506	-	-	-	347,704	6,454	-
2b.1.1.16	Process Radiation Monitors	-	46	2	2	24	18	-	20	111	111	-	-	142	52	-	-	-	9,115	649	-

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
2b.1.1.17	Rx Bldg Closed Clng Water - Insul - RCA	-	114	2	9	163	-	-	54	343	343	-	-	977	-	-	-	-	39,675	1,484	-
2b.1.1.18	Rx Bldg Closed Clng Water - RCA	-	184	15	66	1,187	-	-	235	1,687	1,687	-	-	7,093	-	-	-	-	288,031	2,489	-
2b.1.1.19	Rx Component Handling Equip	27	142	18	27	194	279	-	154	840	840	-	-	1,158	829	-	-	-	99,730	2,462	-
2b.1.1.20	Rx Pressure Vessel	28	47	6	5	13	78	-	48	225	225	-	-	75	230	-	-	-	17,816	1,051	-
2b.1.1.21	Rx Water Cleanup	172	265	19	16	22	251	-	222	965	965	-	-	130	737	-	-	-	52,670	5,736	-
2b.1.1.22	Secondary Containment	-	124	7	14	170	86	-	81	483	483	-	-	1,017	255	-	-	-	57,567	1,763	-
2b.1.1.23	Service & Seal Water - Insulated - RCA	-	120	2	11	197	-	-	62	392	392	-	-	1,180	-	-	-	-	47,917	1,565	-
2b.1.1.24	Service & Seal Water - RCA	-	159	4	17	303	-	-	88	570	570	-	-	1,809	-	-	-	-	73,453	2,016	-
2b.1.1.25	Service Air Blower - RCA	-	15	0	2	34	-	-	9	62	62	-	-	206	-	-	-	-	8,364	206	-
2b.1.1.26	Solid Radwaste	338	494	36	49	399	467	-	480	2,264	2,264	-	-	2,387	1,380	-	-	-	185,221	10,820	-
2b.1.1.27	Structures & Buildings	-	78	2	5	60	29	-	37	210	210	-	-	357	85	-	-	-	19,933	1,128	-
2b.1.1.28	Wells & Domestic Water	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	144	-
2b.1.1.29	Wells & Domestic Water - RCA	-	52	1	3	57	-	-	22	136	136	-	-	342	-	-	-	-	13,874	633	-
2b.1.1	Totals	1,153	7,860	315	804	11,668	2,657	-	5,107	29,563	29,552	-	11	69,735	7,859	-	-	-	3,334,244	122,835	-
2b.1.2	Scaffolding in support of decommissioning	-	2,831	28	16	239	38	-	758	3,909	3,909	-	-	1,287	114	-	-	-	65,139	28,205	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor Building	5,202	2,903	178	516	8,044	1,181	-	4,924	22,948	22,948	-	-	48,077	7,014	-	-	-	2,317,670	112,518	-
2b.1.3.2	Admin	106	6	0	3	-	15	-	59	189	189	-	-	-	145	-	-	-	6,840	1,600	-
2b.1.3.3	HPCI Room	29	28	1	3	20	14	-	29	123	123	-	-	118	125	-	-	-	10,759	789	-
2b.1.3.4	Hot Shop	17	4	0	2	-	11	-	12	46	46	-	-	-	103	-	-	-	4,860	286	-
2b.1.3.5	LLRW Storage & Shipping	58	24	2	8	5	45	-	48	191	191	-	-	31	433	-	-	-	21,708	1,127	-
2b.1.3.6	Offgas Stack	372	269	7	23	225	82	-	312	1,289	1,289	-	-	1,343	669	-	-	-	87,045	8,860	-
2b.1.3.7	Offgas Storage & Compressor	41	17	1	6	4	33	-	34	136	136	-	-	25	316	-	-	-	15,948	785	-
2b.1.3.8	Radwaste	121	61	3	17	29	96	-	107	435	435	-	-	172	910	-	-	-	49,943	2,503	-
2b.1.3.9	Radwaste Material Storage Warehouse	64	24	2	9	-	52	-	52	202	202	-	-	-	495	-	-	-	23,400	1,197	-
2b.1.3.10	Recombiner	27	25	1	5	33	24	-	32	148	148	-	-	199	216	-	-	-	18,405	695	-
2b.1.3.11	Turbine	705	353	21	104	215	564	-	632	2,594	2,594	-	-	1,283	5,299	-	-	-	303,150	14,443	-
2b.1.3.12	Turbine Building Addition	58	21	1	8	-	45	-	47	181	181	-	-	-	434	-	-	-	20,478	1,087	-
2b.1.3	Totals	6,799	3,736	218	704	8,574	2,164	-	6,288	28,483	28,483	-	-	51,247	16,159	-	-	-	2,880,206	145,889	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	7,952	14,427	560	1,524	20,481	4,859	526	12,232	62,561	62,549	-	11	122,269	24,132	-	-	-	6,279,589	296,929	4,096
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	23	92	1,211	-	-	198	1,524	1,524	-	-	11,760	-	-	-	-	294,000	32	-
2b.2.2	Excavation of Underground Services	-	1,972	-	-	-	-	376	550	2,898	2,898	-	-	-	-	-	-	-	-	12,493	-
2b.2.3	Security Modifications	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,972	23	92	1,211	-	9,072	2,052	14,422	14,422	-	-	11,760	-	-	-	-	294,000	12,525	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	198	-	135	240	-	546	-	285	1,404	1,404	-	-	-	1,253	-	-	-	75,186	244	-
2b.3.2	Process decommissioning chemical flush waste	1	-	43	138	-	319	-	105	607	607	-	-	-	413	-	-	-	43,978	77	-
2b.3.3	Small tool allowance	-	364	-	-	-	-	-	55	418	418	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	117,198	17,580	134,778	-	134,778	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	6,277	942	7,218	7,218	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	199	364	178	378	-	865	123,475	18,966	144,425	9,647	134,778	-	-	1,666	-	-	-	119,165	322	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,440	-	-	-	-	-	-	360	1,799	1,799	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	742	74	816	816	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	2,698	270	2,967	2,967	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,376	-	-	-	-	-	594	2,970	2,970	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,711	-	-	-	-	-	407	3,117	3,117	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	101	52	-	419	-	123	694	694	-	-	-	5,084	-	-	-	101,679	166	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,437	216	1,653	1,653	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	623	62	685	685	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,995	299	3,294	-	3,294	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	2,235	335	2,570	2,570	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	891	134	1,024	-	1,024	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	224	34	258	258	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	118	18	136	-	136	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	458	69	527	527	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,182	177	1,359	1,359	-	-	-	-	-	-	-	-	-	-

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2b Period-Dependent Costs (continued)																					
2b.4.16	Security Staff Cost	-	-	-	-	-	-	15,925	2,389	18,314	18,314	-	-	-	-	-	-	-	-	-	236,949
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	14,772	2,216	16,988	16,988	-	-	-	-	-	-	-	-	-	160,160
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	19,442	2,916	22,358	22,358	-	-	-	-	-	-	-	-	-	297,283
2b.4	Subtotal Period 2b Period-Dependent Costs	1,440	5,087	101	52	-	419	63,741	10,691	81,530	77,076	4,455	-	-	5,084	-	-	-	101,679	166	694,392
2b.0	TOTAL PERIOD 2b COST	9,591	21,850	861	2,046	21,692	6,143	196,814	43,941	302,937	163,694	139,232	11	134,029	30,882	-	-	-	6,794,433	309,941	698,488
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	654	58	103	149	-	2,572	-	1,017	4,553	4,553	-	-	-	7,653	-	-	-	486,170	906	-
Disposal of Plant Systems																					
2d.1.2.1	Cranes/Heavy Loads/Rigging - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2d.1.2.2	Electrical - Contaminated Fuel Pool	-	47	1	2	40	3	-	19	112	112	-	-	240	9	-	-	-	10,334	665	-
2d.1.2.3	Electrical - Decontam. Fuel Pool Area	-	297	5	23	411	-	-	140	876	876	-	-	2,457	-	-	-	-	99,783	4,090	-
2d.1.2.4	Fire - RCA - Fuel Pool Area	-	11	0	1	10	-	-	4	26	26	-	-	62	-	-	-	-	2,499	143	-
2d.1.2.5	Fuel Pool Cooling & Cleanup	246	428	34	37	197	455	-	382	1,781	1,781	-	-	1,179	1,341	-	-	-	133,939	8,380	-
2d.1.2.6	Fuel Pool Cooling & Cleanup - Insulated	27	41	3	3	11	40	-	36	161	161	-	-	67	117	-	-	-	10,220	848	-
2d.1.2.7	HVAC Ductwork - Fuel Pool Area	-	34	1	3	50	4	-	17	108	108	-	-	296	11	-	-	-	12,733	457	-
2d.1.2.8	HVAC/Chilled Water - RCA Fuel Pool Area	-	33	0	2	37	-	-	14	87	87	-	-	223	-	-	-	-	9,072	397	-
2d.1.2.9	Instrument & Service Air-RCA-Fuel Pool	-	29	1	2	45	-	-	14	91	91	-	-	267	-	-	-	-	10,841	357	-
2d.1.2	Totals	273	924	45	75	819	502	-	631	3,268	3,268	-	-	4,894	1,479	-	-	-	293,606	15,385	-
Decontamination of Site Buildings																					
2d.1.3.1	Reactor (Post Fuel)	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.3	Totals	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.4	Scaffolding in support of decommissioning	-	566	6	3	48	8	-	152	782	782	-	-	257	23	-	-	-	13,028	5,641	-
2d.1	Subtotal Period 2d Activity Costs	1,872	4,147	326	1,139	1,196	13,298	-	5,680	27,659	27,659	-	-	7,120	71,852	-	-	-	3,525,210	67,635	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	79	-	54	96	-	220	-	114	563	563	-	-	-	504	-	-	-	30,239	98	-
2d.3.2	Process decommissioning chemical flush waste	1	-	26	84	-	193	-	64	366	366	-	-	-	249	-	-	-	26,553	47	-
2d.3.3	Small tool allowance	-	91	-	-	-	-	-	14	105	105	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	82	1,112	178	-	237	1,739	1,739	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	27	4	32	-	32	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	80	91	210	262	1,112	590	27	432	2,805	2,773	32	-	6,000	1,282	-	-	-	360,400	292	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	244	-	-	-	-	-	-	61	305	305	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	1,662	166	1,828	1,828	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	806	-	-	-	-	-	202	1,008	1,008	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	1,936	-	-	-	-	-	290	2,227	2,227	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	40	21	-	167	-	49	277	277	-	-	-	2,030	-	-	-	40,600	66	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	547	82	630	630	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	424	42	466	466	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	320	48	368	368	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	844	127	971	971	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	7,311	1,097	8,408	8,408	-	-	-	-	-	-	-	-	-	78,356
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	10,052	1,508	11,560	10,670	890	-	-	-	-	-	-	-	-	149,660
2d.4	Subtotal Period 2d Period-Dependent Costs	244	2,743	40	21	-	167	34,577	5,652	43,444	38,602	4,842	-	-	2,030	-	-	-	40,600	66	390,997
2d.0	TOTAL PERIOD 2d COST	2,196	6,981	576	1,422	2,308	14,055	36,062	12,202	75,803	70,930	4,873	-	13,120	75,164	-	-	-	3,926,210	67,993	403,477

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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	47	7	54	-	54	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	1,311	197	1,508	1,454	54	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,471	147	1,618	1,618	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	708	-	-	-	-	-	177	884	884	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	4	-	29	-	9	48	48	-	-	-	355	-	-	-	7,097	12	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	274	41	315	315	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	426	43	468	468	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	5,393	809	6,201	6,201	-	-	-	-	-	-	-	-	-	57,200
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	5,762	864	6,626	5,738	888	-	-	-	-	-	-	-	-	80,707
2f.4	Subtotal Period 2f Period-Dependent Costs	-	708	7	4	-	29	26,741	4,070	31,558	26,719	4,839	-	-	355	-	-	-	7,097	12	300,888
2f.0	TOTAL PERIOD 2f COST	-	708	7	4	-	29	35,137	6,392	42,277	37,383	4,894	-	-	355	-	-	-	7,097	95,059	307,128
PERIOD 2 TOTALS		13,731	65,566	20,473	10,731	49,937	72,577	385,548	128,685	747,248	576,281	170,894	73	288,160	174,123	1,481	1,178	-	21,552,260	727,310	2,393,096
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor Building	-	1,971	-	-	-	-	-	296	2,267	-	-	2,267	-	-	-	-	-	-	13,911	-
3b.1.1.2	Condensate Tanks Foundation	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	50	-
3b.1.1.3	Discharge Retention Basin	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	25	-
3b.1.1.4	HPCI Room	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	97	-
3b.1.1.5	Hot Shop	-	16	-	-	-	-	-	2	19	-	-	19	-	-	-	-	-	-	177	-
3b.1.1.6	Hydrogen & Oxygen Storage	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	19	-
3b.1.1.7	LLRW Storage & Shipping	-	83	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	662	-
3b.1.1.8	MSIV	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	42	-
3b.1.1.9	Misc Structures 2017	-	1,410	-	-	-	-	-	212	1,622	-	-	1,622	-	-	-	-	-	-	13,042	-
3b.1.1.10	Offgas Stack	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	544	-
3b.1.1.11	Offgas Storage & Compressor	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	199	-
3b.1.1.12	Radwaste	-	228	-	-	-	-	-	34	262	-	-	262	-	-	-	-	-	-	1,220	-
3b.1.1.13	Recombiner	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	713	-
3b.1.1.14	Security Barrier	-	186	-	-	-	-	-	28	214	-	-	214	-	-	-	-	-	-	933	-
3b.1.1.15	Structures Greater than 3' Below Grade	-	2,461	-	-	-	-	-	369	2,830	-	-	2,830	-	-	-	-	-	-	12,649	-
3b.1.1.16	Tank Farm	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	21	-
3b.1.1.17	Turbine	-	1,259	-	-	-	-	-	189	1,448	-	-	1,448	-	-	-	-	-	-	13,036	-
3b.1.1.18	Turbine Building Addition	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	618	-
3b.1.1.19	Turbine Pedestal	-	182	-	-	-	-	-	27	209	-	-	209	-	-	-	-	-	-	926	-
3b.1.1	Totals	-	8,169	-	-	-	-	-	1,225	9,394	-	-	9,394	-	-	-	-	-	-	58,885	-
Site Closeout Activities																					
3b.1.2	Grade & landscape site	-	896	-	-	-	-	-	134	1,031	-	-	1,031	-	-	-	-	-	-	1,841	-
3b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	9,065	-	-	-	-	200	1,390	10,655	231	-	10,425	-	-	-	-	-	-	60,726	1,560

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	3,322	-	-	-	-	13	500	3,835	-	-	3,835	-	-	-	-	-	-	12	-
3b.2.2	Intake Structure Cofferdam	-	335	-	-	-	-	-	50	385	-	-	385	-	-	-	-	-	-	2,584	-
3b.2.3	Construction Debris	-	-	-	-	-	-	1,170	176	1,346	-	-	1,346	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	5,583	-	-	-	-	-	837	6,421	-	-	6,421	-	-	-	-	-	-	5,422	-
3b.2.5	Discharge Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
3b.2	Subtotal Period 3b Additional Costs	-	9,682	-	-	-	-	1,183	1,630	12,495	-	-	12,495	-	-	-	-	-	-	11,570	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	110	-	-	-	-	-	17	127	-	-	127	-	-	-	-	-	-	-	-
3b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	109	16	125	-	125	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	110	-	-	-	-	109	33	252	-	125	127	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	1,220	122	1,342	1,342	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	2,543	254	2,797	-	2,797	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	5,842	-	-	-	-	-	876	6,719	-	-	6,719	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	315	47	362	-	362	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	356	36	391	-	391	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	257	26	283	-	283	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,122	168	1,290	429	860	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	194	29	223	-	223	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	543	81	624	249	375	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	25,319	3,798	29,117	0	8,589	20,527	-	-	-	-	-	-	-	375,152
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	11,729	1,759	13,489	-	-	13,489	-	-	-	-	-	-	-	122,646
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	6,873	1,031	7,904	-	2,047	5,857	-	-	-	-	-	-	-	98,297
3b.4	Subtotal Period 3b Period-Dependent Costs	-	5,842	-	-	-	-	50,470	8,228	64,540	2,020	15,928	46,591	-	-	-	-	-	-	-	596,095
3b.0	TOTAL PERIOD 3b COST	-	24,700	-	-	-	-	51,962	11,280	87,942	2,251	16,053	69,638	-	-	-	-	-	-	72,296	597,655
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	89,394	13,409	102,804	-	102,804	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	89,394	13,409	102,804	-	102,804	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	37,327	3,733	41,060	-	41,060	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	48,218	4,822	53,040	-	53,040	-	-	-	-	-	-	-	-	-
3c.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	12,359	1,236	13,595	-	13,595	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	7,869	787	8,655	-	8,655	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	11,431	1,715	13,146	-	13,146	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	5,940	891	6,831	-	6,831	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	6,636	995	7,632	-	7,632	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	228,247	34,237	262,484	-	262,484	-	-	-	-	-	-	-	-	2,870,092
3c.4.10	Utility Staff Cost	-	-	-	-	-	-	54,525	8,179	62,703	-	62,703	-	-	-	-	-	-	-	-	745,120
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	412,552	56,594	469,146	-	469,146	-	-	-	-	-	-	-	-	3,615,213
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	501,946	70,003	571,949	-	571,949	-	-	-	-	-	-	-	-	3,615,213
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
3d.1.1	Totals	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	27	3	30	30	-	-	-	-	-	-	-	-	-	-

Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3d Period-Dependent Costs (continued)																					
3d.4.2	Property taxes	-	-	-	-	-	-	35	3	38	38	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8	1	9	-	9	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	6	1	6	-	6	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	8	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	165	25	190	190	-	-	-	-	-	-	-	-	-	2,074
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	39	6	45	45	-	-	-	-	-	-	-	-	-	539
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	293	40	333	318	15	-	-	-	-	-	-	-	-	2,613
3d.0	TOTAL PERIOD 3d COST	-	-	1,083	-	-	4,313	321	962	6,678	6,632	47	-	-	-	-	-	1,160	225,765	-	2,613
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	57	188	987	-	5,925	2,185	2,336	11,678	11,678	-	-	-	21,949	-	-	-	2,633,402	11,541	2,249
3e.2	Subtotal Period 3e Additional Costs	-	57	188	987	-	5,925	2,185	2,336	11,678	11,678	-	-	-	21,949	-	-	-	2,633,402	11,541	2,249
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	118	30	148	148	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	249	62	312	312	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	12	3	15	15	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	71	18	89	89	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	41	10	52	52	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	352	88	440	440	-	-	-	-	-	-	-	-	-	4,999
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	261	65	326	326	-	-	-	-	-	-	-	-	-	3,792
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	1,105	276	1,381	1,381	-	-	-	-	-	-	-	-	-	8,792
3e.0	TOTAL PERIOD 3e COST	-	57	188	987	-	5,925	3,290	2,612	13,059	13,059	-	-	-	21,949	-	-	-	2,633,402	11,541	11,041
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	1,786	-	-	-	-	270	308	2,365	-	-	2,365	-	-	-	-	-	-	8,361	160
3f.2	Subtotal Period 3f Additional Costs	-	1,786	-	-	-	-	270	308	2,365	-	-	2,365	-	-	-	-	-	-	8,361	160
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	12	-	-	-	-	-	2	14	-	-	14	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	12	-	-	-	-	-	2	14	-	-	14	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	126	13	138	-	-	138	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	117	-	-	-	-	-	17	134	-	-	134	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	7	-	-	7	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	36	5	41	-	-	41	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	21	3	24	-	-	24	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	177	27	204	-	-	204	-	-	-	-	-	-	-	2,520
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	109	16	126	-	-	126	-	-	-	-	-	-	-	1,564
3f.4	Subtotal Period 3f Period-Dependent Costs	-	117	-	-	-	-	475	82	674	-	-	674	-	-	-	-	-	-	-	4,084
3f.0	TOTAL PERIOD 3f COST	-	1,915	-	-	-	-	745	393	3,053	-	-	3,053	-	-	-	-	-	-	8,361	4,244
PERIOD 3 TOTALS		-	26,671	1,271	987	-	10,238	558,264	85,250	682,682	21,942	588,049	72,691	-	21,949	-	-	1,160	2,859,167	92,198	4,230,766
TOTAL COST TO DECOMMISSION		17,263	95,526	21,839	11,878	49,952	84,523	1,098,123	238,920	1,618,023	776,355	767,892	73,776	288,203	197,270	1,711	1,178	1,160	24,474,580	851,356	7,816,376

Monticello Nuclear Generating Plant
Decommissioning Cost Analysis

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Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			

TOTAL COST TO DECOMMISSION WITH 17.31% CONTINGENCY:	**$1,618,023**	**thousands of 2020 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 47.87% OR:	**$776,355**	**thousands of 2020 dollars**
SPENT FUEL MANAGEMENT COST IS 47.58% OR:	**$767,892**	**thousands of 2020 dollars**
NON-NUCLEAR DEMOLITION COST IS 4.55% OR:	**$73,776**	**thousands of 2020 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**200,160**	**Cubic Feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,160**	**Cubic Feet**
TOTAL SCRAP METAL REMOVED:	**23,123**	**Tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**851,356**	**Man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX E

DETAILED COST ANALYSIS

SCENARIO 3: DECON with 100 Year DFS

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	632	95	727	654	-	73	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Sacrificial shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Moisture separators/reheaters	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.10	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.11	Pressure suppression structure	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.17.12	Drywell	-	-	-	-	-	-	206	31	236	236	-	-	-	-	-	-	-	-	-	1,600
1a.1.17.13	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
1a.1.17.14	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.15	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	5,486	823	6,308	5,759	-	550	-	-	-	-	-	-	-	42,683
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	16,569	2,485	19,054	18,505	-	550	-	-	-	-	-	-	-	83,013
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,323	198	1,522	-	1,522	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	9,892	1,484	11,376	11,376	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	11,215	1,682	12,897	11,376	1,522	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,328	233	2,561	2,561	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,570	357	3,927	3,927	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	6	-	50	-	15	83	83	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,137	114	1,251	1,251	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,428	343	3,770	-	3,770	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	845	127	971	-	971	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	16,372	2,456	18,827	18,827	-	-	-	-	-	-	-	-	-	245,440
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	27,285	4,093	31,378	31,378	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	6	-	50	59,634	8,703	69,772	64,902	4,870	-	-	610	-	-	-	12,190	20	667,680

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	6	-	50	87,418	12,871	101,724	94,783	6,392	550	-	610	-	-	-	12,190	20	750,693
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	514	77	591	591	-	-	-	-	-	-	-	-	-	4,000
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD housings & NIs	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Removal primary containment	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
1b.1.1.10	Sacrificial shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.11	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
1b.1.1.12	Main Turbine	-	-	-	-	-	-	267	40	307	307	-	-	-	-	-	-	-	-	-	2,080
1b.1.1.13	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1b.1.1.14	Moisture separators & reheaters	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.15	Radwaste building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1.16	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,336	650	4,987	4,524	-	463	-	-	-	-	-	-	-	33,741
1b.1.2	Decon NSSS	296	-	-	-	-	-	-	148	444	444	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	296	-	-	-	-	-	4,336	798	5,431	4,968	-	463	-	-	-	-	-	-	1,067	33,741
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2.2	Site Characterization	-	-	-	-	-	-	5,930	1,779	7,708	7,708	-	-	-	-	-	-	-	-	30,500	10,852
1b.2.3	Mixed & RCRA Waste	-	-	28	29	14	-	-	9	80	80	-	-	43	-	-	-	-	5,253	161	-
1b.2	Subtotal Period 1b Additional Costs	-	-	28	29	14	-	18,605	3,689	22,365	22,365	-	-	43	-	-	-	-	5,253	30,661	10,852
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	38	-	25	45	-	102	-	53	263	263	-	-	-	233	-	-	-	13,991	45	-
1b.3.4	Process decommissioning chemical flush waste	1	-	24	77	-	1,526	-	396	2,024	2,024	-	-	-	-	231	-	-	24,599	43	-
1b.3.5	Small tool allowance	-	2	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,742	411	3,153	-	3,153	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	6,340	951	7,291	7,291	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,197	1,202	49	122	-	1,628	10,346	2,655	19,198	16,046	3,153	-	-	233	231	-	-	38,589	89	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	39	-	-	-	-	-	-	10	48	48	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	1,161	116	1,277	1,277	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,710	171	1,881	1,881	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	344	-	-	-	-	-	86	430	430	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	4	-	29	-	9	49	49	-	-	-	356	-	-	-	7,122	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,812	272	2,083	2,083	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	323	32	355	355	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,416	142	1,557	-	1,557	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	1,305	196	1,500	1,500	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	421	63	484	-	484	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	62	9	72	72	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	8,163	1,225	9,388	9,388	-	-	-	-	-	-	-	-	-	122,384
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,846	877	6,723	6,723	-	-	-	-	-	-	-	-	-	63,266
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	13,682	2,052	15,734	15,734	-	-	-	-	-	-	-	-	-	211,579
1b.4	Subtotal Period 1b Period-Dependent Costs	39	719	7	4	-	29	35,956	5,323	42,078	39,972	2,106	-	-	356	-	-	-	7,122	12	397,229
1b.0	TOTAL PERIOD 1b COST	3,531	1,921	84	154	14	1,657	69,243	12,466	89,072	83,350	5,259	463	43	589	231	-	-	50,964	31,828	441,822
PERIOD 1 TOTALS		3,531	3,288	96	160	14	1,707	156,661	25,337	190,796	178,133	11,650	1,012	43	1,199	231	-	-	63,155	31,848	1,192,515

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Monticello Nuclear Generating Plant
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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Recirculation System Piping & Valves	111	94	27	50	-	528	-	221	1,031	1,031	-	-	-	1,430	-	-	-	99,742	2,905	-
2a.1.1.2	Recirculation Pumps & Motors	40	63	16	51	42	539	-	186	938	938	-	-	96	945	-	-	-	112,200	1,563	-
2a.1.1.3	CRDMs & NIs Removal	194	1,020	415	135	-	1,130	-	696	3,591	3,591	-	-	-	3,741	-	-	-	213,700	17,768	-
2a.1.1.4	Reactor Vessel Internals	244	6,722	12,852	2,696	-	29,845	364	24,027	76,749	76,749	-	-	-	1,252	1,481	1,178	-	343,150	30,515	1,379
2a.1.1.5	Reactor Vessel	113	9,121	2,672	1,167	-	5,861	364	10,842	30,140	30,140	-	-	-	16,169	-	-	-	1,105,210	30,515	1,379
2a.1.1	Totals	702	17,020	15,982	4,099	42	37,903	728	35,973	112,449	112,449	-	-	96	23,536	1,481	1,178	-	1,874,002	83,267	2,758
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	385	1,356	521	6,139	439	-	1,341	10,182	10,182	-	-	24,835	1,383	-	-	-	1,577,959	5,438	-
2a.1.3	Main Condensers	-	1,347	360	194	3,225	244	-	947	6,317	6,317	-	-	17,396	727	-	-	-	828,955	18,831	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor Building	-	332	-	-	-	-	-	50	381	381	-	-	-	-	-	-	-	-	2,217	-
2a.1.4.2	Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	127	-
2a.1.4.3	Turbine	-	127	-	-	-	-	-	19	146	146	-	-	-	-	-	-	-	-	1,254	-
2a.1.4	Totals	-	483	-	-	-	-	-	72	556	556	-	-	-	-	-	-	-	-	3,598	-
Disposal of Plant Systems																					
2a.1.5.1	Automatic Press Relief	-	118	7	12	134	70	-	70	410	410	-	-	803	206	-	-	-	45,852	1,656	-
2a.1.5.2	Chemistry Sampling	-	27	1	2	26	13	-	14	83	83	-	-	156	37	-	-	-	8,681	400	-
2a.1.5.3	Chemistry Sampling - Insulated	-	2	0	0	-	0	-	1	3	3	-	-	-	1	-	-	-	72	28	-
2a.1.5.4	Circulating Water - RCA	-	207	14	62	1,114	-	-	230	1,626	1,626	-	-	6,656	-	-	-	-	270,307	2,860	-
2a.1.5.5	Combustible Gas Control - Insul - RCA	-	29	0	2	36	-	-	13	80	80	-	-	212	-	-	-	-	8,617	378	-
2a.1.5.6	Combustible Gas Control - RCA	-	18	1	3	48	-	-	12	81	81	-	-	285	-	-	-	-	11,577	245	-
2a.1.5.7	Condensate & Feedwater	-	987	183	329	3,337	2,464	-	1,431	8,731	8,731	-	-	19,947	7,319	-	-	-	1,275,810	14,196	-
2a.1.5.8	Condensate & Feedwater - Insulated	-	492	34	63	699	408	-	343	2,038	2,038	-	-	4,176	1,207	-	-	-	246,693	6,964	-
2a.1.5.9	Condensate Demin	-	545	30	51	560	339	-	316	1,840	1,840	-	-	3,346	1,000	-	-	-	199,936	7,618	-
2a.1.5.10	Condensate Storage	-	726	33	82	1,193	270	-	444	2,748	2,748	-	-	7,131	795	-	-	-	340,568	10,345	-
2a.1.5.11	Control Rod Drive	-	3	0	0	3	1	-	2	9	9	-	-	19	4	-	-	-	1,009	41	-
2a.1.5.12	Control Rod Drive Hydraulic	-	416	16	26	277	190	-	199	1,124	1,124	-	-	1,658	562	-	-	-	103,306	5,898	-
2a.1.5.13	Core Spray	-	79	20	51	734	176	-	184	1,244	1,244	-	-	4,384	521	-	-	-	211,329	1,163	-
2a.1.5.14	Core Spray - Insulated	-	145	8	13	137	90	-	82	474	474	-	-	818	264	-	-	-	50,149	2,033	-
2a.1.5.15	Demin Water - Insulated - RCA	-	15	0	1	14	-	-	6	36	36	-	-	85	-	-	-	-	3,445	181	-
2a.1.5.16	Demin Water - RCA	-	41	1	2	42	-	-	17	104	104	-	-	253	-	-	-	-	10,278	508	-
2a.1.5.17	Diesel Oil - RCA	-	2	0	0	4	-	-	1	7	7	-	-	23	-	-	-	-	931	25	-
2a.1.5.18	Drywell Atmosphere Cooling - RCA	-	38	1	5	92	-	-	24	159	159	-	-	548	-	-	-	-	22,244	550	-
2a.1.5.19	EDG Emerg Service Water - Insul - RCA	-	0	0	0	0	-	-	0	1	1	-	-	2	-	-	-	-	84	4	-
2a.1.5.20	Electrical - Clean	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	182	-
2a.1.5.21	Emergency Service Water - Insul - RCA	-	21	0	1	23	-	-	9	55	55	-	-	137	-	-	-	-	5,544	281	-
2a.1.5.22	Emergency Service Water - RCA	-	2	0	0	2	-	-	1	5	5	-	-	13	-	-	-	-	512	22	-
2a.1.5.23	GEZIP - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2a.1.5.24	Generator Physical Design - RCA	-	5	0	0	5	-	-	2	12	12	-	-	31	-	-	-	-	1,250	67	-
2a.1.5.25	H2-O2 Control Analyzing	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.26	H2-O2 Control Analyzing - Insulated	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.27	High Pressure Coolant Injection	-	67	6	13	163	70	-	61	381	381	-	-	972	209	-	-	-	52,792	966	-
2a.1.5.28	High Pressure Coolant Injection - Insula	-	219	14	24	267	163	-	141	830	830	-	-	1,598	481	-	-	-	95,733	3,079	-
2a.1.5.29	Hydrogen Cooling	-	8	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	118	-
2a.1.5.30	Hydrogen Cooling - RCA	-	7	0	0	7	-	-	3	17	17	-	-	39	-	-	-	-	1,600	79	-
2a.1.5.31	Hydrogen Seal Oil - RCA	-	17	0	2	32	-	-	9	60	60	-	-	189	-	-	-	-	7,669	212	-
2a.1.5.32	Hydrogen Water Chemistry - RCA	-	24	0	1	23	-	-	10	59	59	-	-	140	-	-	-	-	5,672	304	-
2a.1.5.33	Instrument & Service Air - RCA	-	225	4	17	296	-	-	103	644	644	-	-	1,768	-	-	-	-	71,810	2,733	-
2a.1.5.34	Main Condenser	-	196	12	20	223	139	-	122	712	712	-	-	1,333	411	-	-	-	80,439	2,746	-
2a.1.5.35	Main Steam	-	249	17	32	359	201	-	173	1,029	1,029	-	-	2,148	594	-	-	-	125,135	3,512	-
2a.1.5.36	Main Turbine	-	1,012	205	353	3,306	2,921	-	1,553	9,350	9,350	-	-	19,760	8,687	-	-	-	1,354,661	14,733	-
2a.1.5.37	Main Turbine - Insulated	-	214	18	37	423	225	-	180	1,097	1,097	-	-	2,530	667	-	-	-	145,208	3,069	-
2a.1.5.38	Miscellaneous	-	43	1	3	51	-	-	19	115	115	-	-	302	-	-	-	-	12,283	622	-
2a.1.5.39	Off Gas Recombiner	-	189	19	32	300	257	-	163	960	960	-	-	1,795	764	-	-	-	121,554	2,708	-
2a.1.5.40	Off Gas Recombiner - Insulated	-	387	19	27	229	240	-	197	1,100	1,100	-	-	1,366	709	-	-	-	100,933	5,385	-
2a.1.5.41	Post Accident Sampling	-	25	1	1	9	11	-	11	58	58	-	-	53	33	-	-	-	4,318	345	-
2a.1.5.42	Post Accident Sampling - Insulated	-	17	1	1	3	13	-	8	43	43	-	-	17	37	-	-	-	3,116	212	-
2a.1.5.43	RHR Service Water - Insulated - RCA	-	83	3	14	248	-	-	60	409	409	-	-	1,485	-	-	-	-	60,293	1,125	-
2a.1.5.44	RHR Service Water - RCA	-	4	0	0	6	-	-	2	12	12	-	-	35	-	-	-	-	1,410	57	-
2a.1.5.45	Reactor Feedwater Pump Seal	-	56	2	4	32	33	-	28	155	155	-	-	193	96	-	-	-	14,009	773	-

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
2a.1.5.46	Residual Heat Removal	362	252	172	178	1,072	2,051	-	962	5,049	5,049	-	-	6,406	6,012	-	-	-	647,941	4,135	-
2a.1.5.47	Residual Heat Removal - Insulated	622	554	61	82	563	880	-	772	3,535	3,535	-	-	3,367	2,607	-	-	-	303,087	10,340	-
2a.1.5.48	Rx Core Isolation Cooling	-	49	2	4	43	26	-	26	150	150	-	-	259	76	-	-	-	15,396	691	-
2a.1.5.49	Rx Core Isolation Cooling - Insulated	-	107	5	7	48	67	-	52	287	287	-	-	288	198	-	-	-	24,419	1,479	-
2a.1.5.50	Rx Recirculation	56	58	6	4	7	65	-	61	258	258	-	-	43	190	-	-	-	14,095	1,580	-
2a.1.5.51	Snubbers	-	169	2	5	63	30	-	60	331	331	-	-	377	90	-	-	-	21,009	2,548	-
2a.1.5.52	Standby Liquid Control - Insul - RCA	-	4	0	0	4	-	-	2	9	9	-	-	22	-	-	-	-	904	48	-
2a.1.5.53	Standby Liquid Control - RCA	-	26	1	2	41	-	-	13	83	83	-	-	245	-	-	-	-	9,969	341	-
2a.1.5.54	Stator Cooling - RCA	-	7	0	1	21	-	-	5	35	35	-	-	126	-	-	-	-	5,135	98	-
2a.1.5.55	Traversing Incore Probe	0	4	0	0	0	2	-	1	7	7	-	-	1	5	-	-	-	386	51	-
2a.1.5	Totals	1,040	8,221	924	1,572	16,339	11,425	-	8,209	47,730	47,706	-	24	97,654	33,808	-	-	-	6,125,515	119,943	-
2a.1.6	Scaffolding in support of decommissioning	-	2,265	22	12	191	31	-	607	3,127	3,127	-	-	1,030	91	-	-	-	52,111	22,564	-
2a.1	Subtotal Period 2a Activity Costs	1,742	29,721	18,645	6,398	25,937	50,042	728	47,148	180,360	180,336	-	24	141,010	59,545	1,481	1,178	-	10,458,540	253,640	2,758
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	85	-	57	102	-	232	-	122	598	598	-	-	-	532	-	-	-	31,942	104	-
2a.3.2	Process decommissioning chemical flush waste	5	-	216	702	-	1,619	-	534	3,077	3,077	-	-	-	2,093	-	-	-	223,008	392	-
2a.3.3	Small tool allowance	-	324	-	-	-	-	-	49	373	336	-	37	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	24,169	3,625	27,795	-	27,795	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	13,145	1,972	15,117	15,117	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	91	324	274	804	-	1,851	37,314	6,302	46,959	19,127	27,795	37	-	2,625	-	-	-	254,950	495	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	112	-	-	-	-	-	-	28	140	140	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	1,019	102	1,121	1,121	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	4,383	438	4,821	4,821	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,356	-	-	-	-	-	589	2,945	2,945	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,627	-	-	-	-	-	544	4,171	4,171	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	110	57	-	457	-	134	758	758	-	-	-	5,551	-	-	-	111,023	181	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,501	375	2,876	2,876	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	856	86	942	942	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	4,115	412	4,527	-	4,527	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	3,071	461	3,532	3,532	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	1,224	184	1,408	-	1,408	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	162	24	187	-	187	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	181	27	208	208	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,624	244	1,867	1,867	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	21,881	3,282	25,164	25,164	-	-	-	-	-	-	-	-	-	325,574
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	21,021	3,153	24,174	24,174	-	-	-	-	-	-	-	-	-	229,108
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	27,906	4,186	32,092	32,092	-	-	-	-	-	-	-	-	-	426,562
2a.4	Subtotal Period 2a Period-Dependent Costs	112	5,982	110	57	-	457	89,944	14,268	110,931	104,810	6,121	-	-	5,551	-	-	-	111,023	181	981,244
2a.0	TOTAL PERIOD 2a COST	1,945	36,028	19,028	7,259	25,937	52,350	127,987	67,717	338,250	304,273	33,915	62	141,010	67,722	1,481	1,178	-	10,824,520	254,317	984,002
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	ALARA/Radiological	-	18	0	1	6	3	-	6	35	35	-	-	35	10	-	-	-	2,060	277	-
2b.1.1.2	Alternate N2 - RCA	-	16	0	1	16	-	-	7	40	40	-	-	93	-	-	-	-	3,765	185	-
2b.1.1.3	Decontamination Projects	-	1	0	0	0	0	-	0	2	2	-	-	2	0	-	-	-	129	17	-
2b.1.1.4	Electrical - Contaminated	-	445	6	24	400	30	-	183	1,089	1,089	-	-	2,389	90	-	-	-	102,726	6,325	-
2b.1.1.5	Electrical - Decontaminated	-	2,698	48	218	3,906	-	-	1,298	8,167	8,167	-	-	23,344	-	-	-	-	948,013	37,107	-
2b.1.1.6	Fire - RCA	-	101	1	6	103	-	-	42	253	253	-	-	614	-	-	-	-	24,917	1,324	-
2b.1.1.7	HVAC Ductwork	-	305	7	27	446	34	-	156	975	975	-	-	2,665	100	-	-	-	114,598	4,111	-
2b.1.1.8	HVAC/Chilled Water - RCA	-	324	6	26	461	-	-	155	971	971	-	-	2,752	-	-	-	-	111,779	3,985	-
2b.1.1.9	Heating & Ventilation	-	483	16	61	1,007	76	-	302	1,945	1,945	-	-	6,018	227	-	-	-	258,789	7,101	-
2b.1.1.10	Heating Boiler - Insulated - RCA	-	3	0	0	4	-	-	1	9	9	-	-	26	-	-	-	-	1,058	35	-
2b.1.1.11	Liquid Radwaste	588	687	48	63	514	586	-	703	3,188	3,188	-	-	3,073	1,728	-	-	-	235,484	17,194	-
2b.1.1.12	Makeup Demin - RCA	-	103	3	14	246	-	-	65	431	431	-	-	1,471	-	-	-	-	59,747	1,412	-
2b.1.1.13	Non-Essential Diesel Generator - RCA	-	27	3	13	238	-	-	45	327	327	-	-	1,424	-	-	-	-	57,832	395	-
2b.1.1.14	Off Gas Holdup	-	342	21	38	461	214	-	216	1,291	1,291	-	-	2,755	630	-	-	-	152,277	4,769	-
2b.1.1.15	Primary Containment	-	455	42	87	1,038	507	-	414	2,543	2,543	-	-	6,201	1,506	-	-	-	347,704	6,454	-
2b.1.1.16	Process Radiation Monitors	-	46	2	2	24	18	-	20	111	111	-	-	142	52	-	-	-	9,115	649	-

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Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
2b.1.1.17	Rx Bldg Closed Clng Water - Insul - RCA	-	114	2	9	163	-	-	54	343	343	-	-	977	-	-	-	-	39,675	1,484	-
2b.1.1.18	Rx Bldg Closed Clng Water - RCA	-	184	15	66	1,187	-	-	235	1,687	1,687	-	-	7,093	-	-	-	-	288,031	2,489	-
2b.1.1.19	Rx Component Handling Equip	27	142	18	27	194	279	-	154	840	840	-	-	1,158	829	-	-	-	99,730	2,462	-
2b.1.1.20	Rx Pressure Vessel	28	47	6	5	13	78	-	48	225	225	-	-	75	230	-	-	-	17,816	1,051	-
2b.1.1.21	Rx Water Cleanup	172	265	19	16	22	251	-	222	965	965	-	-	130	737	-	-	-	52,670	5,736	-
2b.1.1.22	Secondary Containment	-	124	7	14	170	86	-	81	483	483	-	-	1,017	255	-	-	-	57,567	1,763	-
2b.1.1.23	Service & Seal Water - Insulated - RCA	-	120	2	11	197	-	-	62	392	392	-	-	1,180	-	-	-	-	47,917	1,565	-
2b.1.1.24	Service & Seal Water - RCA	-	159	4	17	303	-	-	88	570	570	-	-	1,809	-	-	-	-	73,453	2,016	-
2b.1.1.25	Service Air Blower - RCA	-	15	0	2	34	-	-	9	62	62	-	-	206	-	-	-	-	8,364	206	-
2b.1.1.26	Solid Radwaste	338	494	36	49	399	467	-	480	2,264	2,264	-	-	2,387	1,380	-	-	-	185,221	10,820	-
2b.1.1.27	Structures & Buildings	-	78	2	5	60	29	-	37	210	210	-	-	357	85	-	-	-	19,933	1,128	-
2b.1.1.28	Wells & Domestic Water	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	144	-
2b.1.1.29	Wells & Domestic Water - RCA	-	52	1	3	57	-	-	22	136	136	-	-	342	-	-	-	-	13,874	633	-
2b.1.1	Totals	1,153	7,860	315	804	11,668	2,657	-	5,107	29,563	29,552	-	11	69,735	7,859	-	-	-	3,334,244	122,835	-
2b.1.2	Scaffolding in support of decommissioning	-	2,831	28	16	239	38	-	758	3,909	3,909	-	-	1,287	114	-	-	-	65,139	28,205	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor Building	5,202	2,903	178	516	8,044	1,181	-	4,924	22,948	22,948	-	-	48,077	7,014	-	-	-	2,317,670	112,518	-
2b.1.3.2	Admin	106	6	0	3	-	15	-	59	189	189	-	-	-	145	-	-	-	6,840	1,600	-
2b.1.3.3	HPCI Room	29	28	1	3	20	14	-	29	123	123	-	-	118	125	-	-	-	10,759	789	-
2b.1.3.4	Hot Shop	17	4	0	2	-	11	-	12	46	46	-	-	-	103	-	-	-	4,860	286	-
2b.1.3.5	LLRW Storage & Shipping	58	24	2	8	5	45	-	48	191	191	-	-	31	433	-	-	-	21,708	1,127	-
2b.1.3.6	Offgas Stack	372	269	7	23	225	82	-	312	1,289	1,289	-	-	1,343	669	-	-	-	87,045	8,860	-
2b.1.3.7	Offgas Storage & Compressor	41	17	1	6	4	33	-	34	136	136	-	-	25	316	-	-	-	15,948	785	-
2b.1.3.8	Radwaste	121	61	3	17	29	96	-	107	435	435	-	-	172	910	-	-	-	49,943	2,503	-
2b.1.3.9	Radwaste Material Storage Warehouse	64	24	2	9	-	52	-	52	202	202	-	-	-	495	-	-	-	23,400	1,197	-
2b.1.3.10	Recombiner	27	25	1	5	33	24	-	32	148	148	-	-	199	216	-	-	-	18,405	695	-
2b.1.3.11	Turbine	705	353	21	104	215	564	-	632	2,594	2,594	-	-	1,283	5,299	-	-	-	303,150	14,443	-
2b.1.3.12	Turbine Building Addition	58	21	1	8	-	45	-	47	181	181	-	-	-	434	-	-	-	20,478	1,087	-
2b.1.3	Totals	6,799	3,736	218	704	8,574	2,164	-	6,288	28,483	28,483	-	-	51,247	16,159	-	-	-	2,880,206	145,889	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	7,952	14,427	560	1,524	20,481	4,859	526	12,232	62,561	62,549	-	11	122,269	24,132	-	-	-	6,279,589	296,929	4,096
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	23	92	1,211	-	-	198	1,524	1,524	-	-	11,760	-	-	-	-	294,000	32	-
2b.2.2	Excavation of Underground Services	-	1,972	-	-	-	-	376	550	2,898	2,898	-	-	-	-	-	-	-	-	12,493	-
2b.2.3	Security Modifications	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,972	23	92	1,211	-	9,072	2,052	14,422	14,422	-	-	11,760	-	-	-	-	294,000	12,525	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	198	-	135	240	-	546	-	285	1,404	1,404	-	-	-	1,253	-	-	-	75,186	244	-
2b.3.2	Process decommissioning chemical flush waste	1	-	43	138	-	319	-	105	607	607	-	-	-	413	-	-	-	43,978	77	-
2b.3.3	Small tool allowance	-	364	-	-	-	-	-	55	418	418	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	117,198	17,580	134,778	-	134,778	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	6,277	942	7,218	7,218	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	199	364	178	378	-	865	123,475	18,966	144,425	9,647	134,778	-	-	1,666	-	-	-	119,165	322	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,440	-	-	-	-	-	-	360	1,799	1,799	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	742	74	816	816	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	2,698	270	2,967	2,967	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,376	-	-	-	-	-	594	2,970	2,970	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,711	-	-	-	-	-	407	3,117	3,117	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	101	52	-	419	-	123	694	694	-	-	-	5,084	-	-	-	101,679	166	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,437	216	1,653	1,653	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	623	62	685	685	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,995	299	3,294	-	3,294	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	2,235	335	2,570	2,570	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	891	134	1,024	-	1,024	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	224	34	258	258	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	118	18	136	-	136	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	458	69	527	527	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,182	177	1,359	1,359	-	-	-	-	-	-	-	-	-	-

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2b Period-Dependent Costs (continued)																					
2b.4.16	Security Staff Cost	-	-	-	-	-	-	15,925	2,389	18,314	18,314	-	-	-	-	-	-	-	-	-	236,949
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	14,772	2,216	16,988	16,988	-	-	-	-	-	-	-	-	-	160,160
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	19,442	2,916	22,358	22,358	-	-	-	-	-	-	-	-	-	297,283
2b.4	Subtotal Period 2b Period-Dependent Costs	1,440	5,087	101	52	-	419	63,741	10,691	81,530	77,076	4,455	-	-	5,084	-	-	-	101,679	166	694,392
2b.0	TOTAL PERIOD 2b COST	9,591	21,850	861	2,046	21,692	6,143	196,814	43,941	302,937	163,694	139,232	11	134,029	30,882	-	-	-	6,794,433	309,941	698,488
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	654	58	103	149	-	2,572	-	1,017	4,553	4,553	-	-	-	7,653	-	-	-	486,170	906	-
Disposal of Plant Systems																					
2d.1.2.1	Cranes/Heavy Loads/Rigging - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2d.1.2.2	Electrical - Contaminated Fuel Pool	-	47	1	2	40	3	-	19	112	112	-	-	240	9	-	-	-	10,334	665	-
2d.1.2.3	Electrical - Decontam. Fuel Pool Area	-	297	5	23	411	-	-	140	876	876	-	-	2,457	-	-	-	-	99,783	4,090	-
2d.1.2.4	Fire - RCA - Fuel Pool Area	-	11	0	1	10	-	-	4	26	26	-	-	62	-	-	-	-	2,499	143	-
2d.1.2.5	Fuel Pool Cooling & Cleanup	246	428	34	37	197	455	-	382	1,781	1,781	-	-	1,179	1,341	-	-	-	133,939	8,380	-
2d.1.2.6	Fuel Pool Cooling & Cleanup - Insulated	27	41	3	3	11	40	-	36	161	161	-	-	67	117	-	-	-	10,220	848	-
2d.1.2.7	HVAC Ductwork - Fuel Pool Area	-	34	1	3	50	4	-	17	108	108	-	-	296	11	-	-	-	12,733	457	-
2d.1.2.8	HVAC/Chilled Water - RCA Fuel Pool Area	-	33	0	2	37	-	-	14	87	87	-	-	223	-	-	-	-	9,072	397	-
2d.1.2.9	Instrument & Service Air-RCA-Fuel Pool	-	29	1	2	45	-	-	14	91	91	-	-	267	-	-	-	-	10,841	357	-
2d.1.2	Totals	273	924	45	75	819	502	-	631	3,268	3,268	-	-	4,894	1,479	-	-	-	293,606	15,385	-
Decontamination of Site Buildings																					
2d.1.3.1	Reactor (Post Fuel)	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.3	Totals	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.4	Scaffolding in support of decommissioning	-	566	6	3	48	8	-	152	782	782	-	-	257	23	-	-	-	13,028	5,641	-
2d.1	Subtotal Period 2d Activity Costs	1,872	4,147	326	1,139	1,196	13,298	-	5,680	27,659	27,659	-	-	7,120	71,852	-	-	-	3,525,210	67,635	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	79	-	54	96	-	220	-	114	563	563	-	-	-	504	-	-	-	30,239	98	-
2d.3.2	Process decommissioning chemical flush waste	1	-	26	84	-	193	-	64	366	366	-	-	-	249	-	-	-	26,553	47	-
2d.3.3	Small tool allowance	-	91	-	-	-	-	-	14	105	105	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	82	1,112	178	-	237	1,739	1,739	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	27	4	32	-	32	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	80	91	210	262	1,112	590	27	432	2,805	2,773	32	-	6,000	1,282	-	-	-	360,400	292	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	244	-	-	-	-	-	-	61	305	305	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	1,662	166	1,828	1,828	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	806	-	-	-	-	-	202	1,008	1,008	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	1,936	-	-	-	-	-	290	2,227	2,227	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	40	21	-	167	-	49	277	277	-	-	-	2,030	-	-	-	40,600	66	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	547	82	630	630	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	424	42	466	466	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	320	48	368	368	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	844	127	971	971	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	7,311	1,097	8,408	8,408	-	-	-	-	-	-	-	-	-	78,356
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	10,052	1,508	11,560	10,670	890	-	-	-	-	-	-	-	-	149,660
2d.4	Subtotal Period 2d Period-Dependent Costs	244	2,743	40	21	-	167	34,577	5,652	43,444	38,602	4,842	-	-	2,030	-	-	-	40,600	66	390,997
2d.0	TOTAL PERIOD 2d COST	2,196	6,981	576	1,422	2,308	14,055	36,062	12,202	75,803	70,930	4,873	-	13,120	75,164	-	-	-	3,926,210	67,993	403,477

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	47	7	54	-	54	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	1,311	197	1,508	1,454	54	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,471	147	1,618	1,618	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	708	-	-	-	-	-	177	884	884	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	4	-	29	-	9	48	48	-	-	-	355	-	-	-	7,097	12	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	274	41	315	315	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	426	43	468	468	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	5,393	809	6,201	6,201	-	-	-	-	-	-	-	-	-	57,200
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	5,762	864	6,626	5,738	888	-	-	-	-	-	-	-	-	80,707
2f.4	Subtotal Period 2f Period-Dependent Costs	-	708	7	4	-	29	26,741	4,070	31,558	26,719	4,839	-	-	355	-	-	-	7,097	12	300,888
2f.0	TOTAL PERIOD 2f COST	-	708	7	4	-	29	35,137	6,392	42,277	37,383	4,894	-	-	355	-	-	-	7,097	95,059	307,128
PERIOD 2 TOTALS		13,731	65,566	20,473	10,731	49,937	72,577	396,000	130,253	759,268	576,281	182,914	73	288,160	174,123	1,481	1,178	-	21,552,260	727,310	2,393,096
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor Building	-	1,971	-	-	-	-	-	296	2,267	-	-	2,267	-	-	-	-	-	-	13,911	-
3b.1.1.2	Condensate Tanks Foundation	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	50	-
3b.1.1.3	Discharge Retention Basin	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	25	-
3b.1.1.4	HPCI Room	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	97	-
3b.1.1.5	Hot Shop	-	16	-	-	-	-	-	2	19	-	-	19	-	-	-	-	-	-	177	-
3b.1.1.6	Hydrogen & Oxygen Storage	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	19	-
3b.1.1.7	LLRW Storage & Shipping	-	83	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	662	-
3b.1.1.8	MSIV	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	42	-
3b.1.1.9	Misc Structures 2017	-	1,410	-	-	-	-	-	212	1,622	-	-	1,622	-	-	-	-	-	-	13,042	-
3b.1.1.10	Offgas Stack	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	544	-
3b.1.1.11	Offgas Storage & Compressor	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	199	-
3b.1.1.12	Radwaste	-	228	-	-	-	-	-	34	262	-	-	262	-	-	-	-	-	-	1,220	-
3b.1.1.13	Recombiner	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	713	-
3b.1.1.14	Security Barrier	-	186	-	-	-	-	-	28	214	-	-	214	-	-	-	-	-	-	933	-
3b.1.1.15	Structures Greater than 3' Below Grade	-	2,461	-	-	-	-	-	369	2,830	-	-	2,830	-	-	-	-	-	-	12,649	-
3b.1.1.16	Tank Farm	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	21	-
3b.1.1.17	Turbine	-	1,259	-	-	-	-	-	189	1,448	-	-	1,448	-	-	-	-	-	-	13,036	-
3b.1.1.18	Turbine Building Addition	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	618	-
3b.1.1.19	Turbine Pedestal	-	182	-	-	-	-	-	27	209	-	-	209	-	-	-	-	-	-	926	-
3b.1.1	Totals	-	8,169	-	-	-	-	-	1,225	9,394	-	-	9,394	-	-	-	-	-	-	58,885	-
Site Closeout Activities																					
3b.1.2	Grade & landscape site	-	896	-	-	-	-	-	134	1,031	-	-	1,031	-	-	-	-	-	-	1,841	-
3b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	9,065	-	-	-	-	200	1,390	10,655	231	-	10,425	-	-	-	-	-	-	60,726	1,560

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	3,322	-	-	-	-	13	500	3,835	-	-	3,835	-	-	-	-	-	-	12	-
3b.2.2	Intake Structure Cofferdam	-	335	-	-	-	-	-	50	385	-	-	385	-	-	-	-	-	-	2,584	-
3b.2.3	Construction Debris	-	-	-	-	-	-	1,170	176	1,346	-	-	1,346	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	5,583	-	-	-	-	-	837	6,421	-	-	6,421	-	-	-	-	-	-	5,422	-
3b.2.5	Discharge Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
3b.2.6	Disposition of Original MPC Canisters	-	-	-	954	-	5,641	-	1,649	8,244	8,244	-	-	-	21,097	-	-	-	2,501,800	-	-
3b.2	Subtotal Period 3b Additional Costs	-	9,682	-	954	-	5,641	1,183	3,279	20,739	8,244	-	12,495	-	21,097	-	-	-	2,501,800	11,570	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	110	-	-	-	-	-	17	127	-	-	127	-	-	-	-	-	-	-	-
3b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	109	16	125	-	125	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	110	-	-	-	-	109	33	252	-	125	127	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	1,220	122	1,342	1,342	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	2,543	254	2,797	-	2,797	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	5,842	-	-	-	-	-	876	6,719	-	-	6,719	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	315	47	362	-	362	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	356	36	391	-	391	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	257	26	283	-	283	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,122	168	1,290	429	860	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	194	29	223	-	223	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	543	81	624	249	375	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	25,319	3,798	29,117	0	8,589	20,527	-	-	-	-	-	-	-	375,152
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	11,729	1,759	13,489	-	-	13,489	-	-	-	-	-	-	-	122,646
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	7,148	1,072	8,220	-	2,129	6,091	-	-	-	-	-	-	-	101,904
3b.4	Subtotal Period 3b Period-Dependent Costs	-	5,842	-	-	-	-	50,745	8,269	64,857	2,020	16,010	46,826	-	-	-	-	-	-	-	599,702
3b.0	TOTAL PERIOD 3b COST	-	24,700	-	954	-	5,641	52,237	12,971	96,502	10,495	16,135	69,872	-	21,097	-	-	-	2,501,800	72,296	601,262
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	621,735	93,260	714,995	-	714,995	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	621,735	93,260	714,995	-	714,995	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	65,480	6,548	72,028	-	72,028	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	84,564	8,456	93,020	-	93,020	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	20,571	2,057	22,628	-	22,628	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	13,803	1,380	15,183	-	15,183	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	20,053	3,008	23,061	-	23,061	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	10,420	1,563	11,983	-	11,983	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	11,641	1,746	13,387	-	13,387	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	400,396	60,059	460,455	-	460,455	-	-	-	-	-	-	-	-	5,034,774
3c.4.10	DOC Staff Cost	-	-	-	-	-	-	28,541	4,281	32,822	-	32,822	-	-	-	-	-	-	-	-	193,645
3c.4.11	Utility Staff Cost	-	-	-	-	-	-	177,875	26,681	204,556	-	204,556	-	-	-	-	-	-	-	-	2,565,798
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	833,343	115,781	949,123	-	949,123	-	-	-	-	-	-	-	-	7,794,217
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	1,455,078	209,041	1,664,118	-	1,664,118	-	-	-	-	-	-	-	-	7,794,217
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
3d.1.1	Totals	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
3d.4.1	Insurance	-	-	-	-	-	-	27	3	30	30	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	35	3	38	38	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8	1	9	-	9	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	6	1	6	-	6	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	8	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	165	25	190	190	-	-	-	-	-	-	-	-	-	2,074
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	39	6	45	45	-	-	-	-	-	-	-	-	-	539
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	293	40	333	318	15	-	-	-	-	-	-	-	-	2,613
3d.0	TOTAL PERIOD 3d COST	-	-	1,083	-	-	4,313	320	962	6,678	6,632	47	-	-	-	-	-	1,160	225,765	-	2,613
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	0	3	33	-	283	2,223	636	3,178	3,178	-	-	-	848	-	-	-	131,507	11,351	2,273
3e.2	Subtotal Period 3e Additional Costs	-	0	3	33	-	283	2,223	636	3,178	3,178	-	-	-	848	-	-	-	131,507	11,351	2,273
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	118	30	148	148	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	249	62	312	312	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	12	3	15	15	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	71	18	89	89	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	41	10	52	52	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	352	88	440	440	-	-	-	-	-	-	-	-	-	4,999
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	261	65	326	326	-	-	-	-	-	-	-	-	-	3,792
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	1,105	276	1,381	1,381	-	-	-	-	-	-	-	-	-	8,792
3e.0	TOTAL PERIOD 3e COST	-	0	3	33	-	283	3,328	912	4,559	4,559	-	-	-	848	-	-	-	131,507	11,351	11,065
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	1,864	-	-	-	-	293	324	2,480	-	-	2,480	-	-	-	-	-	-	8,713	160
3f.2	Subtotal Period 3f Additional Costs	-	1,864	-	-	-	-	293	324	2,480	-	-	2,480	-	-	-	-	-	-	8,713	160
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	126	13	138	-	-	138	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	117	-	-	-	-	-	17	134	-	-	134	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	7	-	-	7	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	36	5	41	-	-	41	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	21	3	24	-	-	24	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	177	27	204	-	-	204	-	-	-	-	-	-	-	2,520
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	109	16	126	-	-	126	-	-	-	-	-	-	-	1,564
3f.4	Subtotal Period 3f Period-Dependent Costs	-	117	-	-	-	-	475	82	674	-	-	674	-	-	-	-	-	-	-	4,084
3f.0	TOTAL PERIOD 3f COST	-	1,993	-	-	-	-	768	408	3,169	-	-	3,169	-	-	-	-	-	-	8,713	4,244
PERIOD 3 TOTALS		-	26,693	1,086	987	-	10,238	1,511,731	224,293	1,775,028	21,686	1,680,300	73,041	-	21,944	-	-	1,160	2,859,072	92,360	8,413,401
TOTAL COST TO DECOMMISSION		17,263	95,603	21,839	11,878	49,952	84,522	2,064,392	379,943	2,725,392	776,400	1,874,865	74,127	288,203	197,266	1,711	1,178	1,160	24,478,380	851,855	11,999,010

Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
TOTAL COST TO DECOMMISSION WITH 16.19% CONTINGENCY:					**$2,725,392**	**thousands of 2020 dollars**															
TOTAL NRC LICENSE TERMINATION COST IS 28.44% OR:					**$776,400**	**thousands of 2020 dollars**															
SPENT FUEL MANAGEMENT COST IS 68.84% OR:					**$1,874,865**	**thousands of 2020 dollars**															
NON-NUCLEAR DEMOLITION COST IS 2.72% OR:					**$74,127**	**thousands of 2020 dollars**															
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):					**200,155**	**Cubic Feet**															
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:					**1,160**	**Cubic Feet**															
TOTAL SCRAP METAL REMOVED:					**23,123**	**Tons**															
TOTAL CRAFT LABOR REQUIREMENTS:					**851,518**	**Man-hours**															

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX F

DETAILED COST ANALYSIS

SCENARIO 4: DECON with 200 Year DFS

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	632	95	727	654	-	73	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Sacrificial shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Moisture separators/reheaters	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.10	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1a.1.17.11	Pressure suppression structure	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.17.12	Drywell	-	-	-	-	-	-	206	31	236	236	-	-	-	-	-	-	-	-	-	1,600
1a.1.17.13	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
1a.1.17.14	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.15	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	5,486	823	6,308	5,759	-	550	-	-	-	-	-	-	-	42,683
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	16,569	2,485	19,054	18,505	-	550	-	-	-	-	-	-	-	83,013
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,323	198	1,522	-	1,522	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	9,892	1,484	11,376	11,376	-	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	11,215	1,682	12,897	11,376	1,522	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	2,328	233	2,561	2,561	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,570	357	3,927	3,927	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	6	-	50	-	15	83	83	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,817	272	2,089	2,089	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,137	114	1,251	1,251	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	3,428	343	3,770	-	3,770	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	2,616	392	3,009	3,009	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	845	127	971	-	971	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	112	17	129	-	129	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	125	19	144	144	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	16,372	2,456	18,827	18,827	-	-	-	-	-	-	-	-	-	245,440
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	27,285	4,093	31,378	31,378	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	6	-	50	59,634	8,703	69,772	64,902	4,870	-	-	610	-	-	-	12,190	20	667,680

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	6	-	50	87,418	12,871	101,724	94,783	6,392	550	-	610	-	-	-	12,190	20	750,693
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	6	-	50	88,295	12,958	102,689	94,783	7,357	550	-	610	-	-	-	12,190	20	750,693
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	514	77	591	591	-	-	-	-	-	-	-	-	-	4,000
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD housings & NIs	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Removal primary containment	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
1b.1.1.10	Sacrificial shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.11	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
1b.1.1.12	Main Turbine	-	-	-	-	-	-	267	40	307	307	-	-	-	-	-	-	-	-	-	2,080
1b.1.1.13	Main Condensers	-	-	-	-	-	-	268	40	309	309	-	-	-	-	-	-	-	-	-	2,088
1b.1.1.14	Moisture separators & reheaters	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1b.1.1.15	Radwaste building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1.16	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,336	650	4,987	4,524	-	463	-	-	-	-	-	-	-	33,741
1b.1.2	Decon NSSS	296	-	-	-	-	-	-	148	444	444	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	296	-	-	-	-	-	4,336	798	5,431	4,968	-	463	-	-	-	-	-	-	1,067	33,741
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2.2	Site Characterization	-	-	-	-	-	-	5,930	1,779	7,708	7,708	-	-	-	-	-	-	-	-	30,500	10,852
1b.2.3	Mixed & RCRA Waste	-	-	28	29	14	-	-	9	80	80	-	-	43	-	-	-	-	5,253	161	-
1b.2	Subtotal Period 1b Additional Costs	-	-	28	29	14	-	18,605	3,689	22,365	22,365	-	-	43	-	-	-	-	5,253	30,661	10,852
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	38	-	25	45	-	102	-	53	263	263	-	-	-	233	-	-	-	13,991	45	-
1b.3.4	Process decommissioning chemical flush waste	1	-	24	77	-	1,526	-	396	2,024	2,024	-	-	-	-	231	-	-	24,599	43	-
1b.3.5	Small tool allowance	-	2	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,742	411	3,153	-	3,153	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	6,340	951	7,291	7,291	-	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,197	1,202	49	122	-	1,628	10,346	2,655	19,198	16,046	3,153	-	-	233	231	-	-	38,589	89	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	39	-	-	-	-	-	-	10	48	48	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	1,161	116	1,277	1,277	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,710	171	1,881	1,881	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	344	-	-	-	-	-	86	430	430	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	4	-	29	-	9	49	49	-	-	-	356	-	-	-	7,122	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,812	272	2,083	2,083	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	323	32	355	355	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,416	142	1,557	-	1,557	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	1,305	196	1,500	1,500	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	421	63	484	-	484	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	62	9	72	72	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	8,163	1,225	9,388	9,388	-	-	-	-	-	-	-	-	-	122,384
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,846	877	6,723	6,723	-	-	-	-	-	-	-	-	-	63,266
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	13,682	2,052	15,734	15,734	-	-	-	-	-	-	-	-	-	211,579
1b.4	Subtotal Period 1b Period-Dependent Costs	39	719	7	4	-	29	35,956	5,323	42,078	39,972	2,106	-	-	356	-	-	-	7,122	12	397,229
1b.0	TOTAL PERIOD 1b COST	3,531	1,921	84	154	14	1,657	69,243	12,466	89,072	83,350	5,259	463	43	589	231	-	-	50,964	31,828	441,822
PERIOD 1 TOTALS		3,531	3,288	96	160	14	1,707	156,661	25,337	190,796	178,133	11,650	1,012	43	1,199	231	-	-	63,155	31,848	1,192,515

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Recirculation System Piping & Valves	111	94	27	50	-	528	-	221	1,031	1,031	-	-	-	1,430	-	-	-	99,742	2,905	-
2a.1.1.2	Recirculation Pumps & Motors	40	63	16	51	42	539	-	186	938	938	-	-	96	945	-	-	-	112,200	1,563	-
2a.1.1.3	CRDMs & NIs Removal	194	1,020	415	135	-	1,130	-	696	3,591	3,591	-	-	-	3,741	-	-	-	213,700	17,768	-
2a.1.1.4	Reactor Vessel Internals	244	6,722	12,852	2,696	-	29,845	364	24,027	76,749	76,749	-	-	-	1,252	1,481	1,178	-	343,150	30,515	1,379
2a.1.1.5	Reactor Vessel	113	9,121	2,672	1,167	-	5,861	364	10,842	30,140	30,140	-	-	-	16,169	-	-	-	1,105,210	30,515	1,379
2a.1.1	Totals	702	17,020	15,982	4,099	42	37,903	728	35,973	112,449	112,449	-	-	96	23,536	1,481	1,178	-	1,874,002	83,267	2,758
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	385	1,356	521	6,139	439	-	1,341	10,182	10,182	-	-	24,835	1,383	-	-	-	1,577,959	5,438	-
2a.1.3	Main Condensers	-	1,347	360	194	3,225	244	-	947	6,317	6,317	-	-	17,396	727	-	-	-	828,955	18,831	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor Building	-	332	-	-	-	-	-	50	381	381	-	-	-	-	-	-	-	-	2,217	-
2a.1.4.2	Radwaste	-	25	-	-	-	-	-	4	28	28	-	-	-	-	-	-	-	-	127	-
2a.1.4.3	Turbine	-	127	-	-	-	-	-	19	146	146	-	-	-	-	-	-	-	-	1,254	-
2a.1.4	Totals	-	483	-	-	-	-	-	72	556	556	-	-	-	-	-	-	-	-	3,598	-
Disposal of Plant Systems																					
2a.1.5.1	Automatic Press Relief	-	118	7	12	134	70	-	70	410	410	-	-	803	206	-	-	-	45,852	1,656	-
2a.1.5.2	Chemistry Sampling	-	27	1	2	26	13	-	14	83	83	-	-	156	37	-	-	-	8,681	400	-
2a.1.5.3	Chemistry Sampling - Insulated	-	2	0	0	-	0	-	1	3	3	-	-	-	1	-	-	-	72	28	-
2a.1.5.4	Circulating Water - RCA	-	207	14	62	1,114	-	-	230	1,626	1,626	-	-	6,656	-	-	-	-	270,307	2,860	-
2a.1.5.5	Combustible Gas Control - Insul - RCA	-	29	0	2	36	-	-	13	80	80	-	-	212	-	-	-	-	8,617	378	-
2a.1.5.6	Combustible Gas Control - RCA	-	18	1	3	48	-	-	12	81	81	-	-	285	-	-	-	-	11,577	245	-
2a.1.5.7	Condensate & Feedwater	-	987	183	329	3,337	2,464	-	1,431	8,731	8,731	-	-	19,947	7,319	-	-	-	1,275,810	14,196	-
2a.1.5.8	Condensate & Feedwater - Insulated	-	492	34	63	699	408	-	343	2,038	2,038	-	-	4,176	1,207	-	-	-	246,693	6,964	-
2a.1.5.9	Condensate Demin	-	545	30	51	560	339	-	316	1,840	1,840	-	-	3,346	1,000	-	-	-	199,936	7,618	-
2a.1.5.10	Condensate Storage	-	726	33	82	1,193	270	-	444	2,748	2,748	-	-	7,131	795	-	-	-	340,568	10,345	-
2a.1.5.11	Control Rod Drive	-	3	0	0	3	1	-	2	9	9	-	-	19	4	-	-	-	1,009	41	-
2a.1.5.12	Control Rod Drive Hydraulic	-	416	16	26	277	190	-	199	1,124	1,124	-	-	1,658	562	-	-	-	103,306	5,898	-
2a.1.5.13	Core Spray	-	79	20	51	734	176	-	184	1,244	1,244	-	-	4,384	521	-	-	-	211,329	1,163	-
2a.1.5.14	Core Spray - Insulated	-	145	8	13	137	90	-	82	474	474	-	-	818	264	-	-	-	50,149	2,033	-
2a.1.5.15	Demin Water - Insulated - RCA	-	15	0	1	14	-	-	6	36	36	-	-	85	-	-	-	-	3,445	181	-
2a.1.5.16	Demin Water - RCA	-	41	1	2	42	-	-	17	104	104	-	-	253	-	-	-	-	10,278	508	-
2a.1.5.17	Diesel Oil - RCA	-	2	0	0	4	-	-	1	7	7	-	-	23	-	-	-	-	931	25	-
2a.1.5.18	Drywell Atmosphere Cooling - RCA	-	38	1	5	92	-	-	24	159	159	-	-	548	-	-	-	-	22,244	550	-
2a.1.5.19	EDG Emerg Service Water - Insul - RCA	-	0	0	0	0	-	-	0	1	1	-	-	2	-	-	-	-	84	4	-
2a.1.5.20	Electrical - Clean	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	182	-
2a.1.5.21	Emergency Service Water - Insul - RCA	-	21	0	1	23	-	-	9	55	55	-	-	137	-	-	-	-	5,544	281	-
2a.1.5.22	Emergency Service Water - RCA	-	2	0	0	2	-	-	1	5	5	-	-	13	-	-	-	-	512	22	-
2a.1.5.23	GEZIP - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2a.1.5.24	Generator Physical Design - RCA	-	5	0	0	5	-	-	2	12	12	-	-	31	-	-	-	-	1,250	67	-
2a.1.5.25	H2-O2 Control Analyzing	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.26	H2-O2 Control Analyzing - Insulated	-	6	0	0	1	5	-	3	15	15	-	-	6	13	-	-	-	1,080	81	-
2a.1.5.27	High Pressure Coolant Injection	-	67	6	13	163	70	-	61	381	381	-	-	972	209	-	-	-	52,792	966	-
2a.1.5.28	High Pressure Coolant Injection - Insula	-	219	14	24	267	163	-	141	830	830	-	-	1,598	481	-	-	-	95,733	3,079	-
2a.1.5.29	Hydrogen Cooling	-	8	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	118	-
2a.1.5.30	Hydrogen Cooling - RCA	-	7	0	0	7	-	-	3	17	17	-	-	39	-	-	-	-	1,600	79	-
2a.1.5.31	Hydrogen Seal Oil - RCA	-	17	0	2	32	-	-	9	60	60	-	-	189	-	-	-	-	7,669	212	-
2a.1.5.32	Hydrogen Water Chemistry - RCA	-	24	0	1	23	-	-	10	59	59	-	-	140	-	-	-	-	5,672	304	-
2a.1.5.33	Instrument & Service Air - RCA	-	225	4	17	296	-	-	103	644	644	-	-	1,768	-	-	-	-	71,810	2,733	-
2a.1.5.34	Main Condenser	-	196	12	20	223	139	-	122	712	712	-	-	1,333	411	-	-	-	80,439	2,746	-
2a.1.5.35	Main Steam	-	249	17	32	359	201	-	173	1,029	1,029	-	-	2,148	594	-	-	-	125,135	3,512	-
2a.1.5.36	Main Turbine	-	1,012	205	353	3,306	2,921	-	1,553	9,350	9,350	-	-	19,760	8,687	-	-	-	1,354,661	14,733	-
2a.1.5.37	Main Turbine - Insulated	-	214	18	37	423	225	-	180	1,097	1,097	-	-	2,530	667	-	-	-	145,208	3,069	-
2a.1.5.38	Miscellaneous	-	43	1	3	51	-	-	19	115	115	-	-	302	-	-	-	-	12,283	622	-
2a.1.5.39	Off Gas Recombiner	-	189	19	32	300	257	-	163	960	960	-	-	1,795	764	-	-	-	121,554	2,708	-
2a.1.5.40	Off Gas Recombiner - Insulated	-	387	19	27	229	240	-	197	1,100	1,100	-	-	1,366	709	-	-	-	100,933	5,385	-
2a.1.5.41	Post Accident Sampling	-	25	1	1	9	11	-	11	58	58	-	-	53	33	-	-	-	4,318	345	-
2a.1.5.42	Post Accident Sampling - Insulated	-	17	1	1	3	13	-	8	43	43	-	-	17	37	-	-	-	3,116	212	-
2a.1.5.43	RHR Service Water - Insulated - RCA	-	83	3	14	248	-	-	60	409	409	-	-	1,485	-	-	-	-	60,293	1,125	-
2a.1.5.44	RHR Service Water - RCA	-	4	0	0	6	-	-	2	12	12	-	-	35	-	-	-	-	1,410	57	-
2a.1.5.45	Reactor Feedwater Pump Seal	-	56	2	4	32	33	-	28	155	155	-	-	193	96	-	-	-	14,009	773	-

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
2a.1.5.46	Residual Heat Removal	362	252	172	178	1,072	2,051	-	962	5,049	5,049	-	-	6,406	6,012	-	-	-	647,941	4,135	-
2a.1.5.47	Residual Heat Removal - Insulated	622	554	61	82	563	880	-	772	3,535	3,535	-	-	3,367	2,607	-	-	-	303,087	10,340	-
2a.1.5.48	Rx Core Isolation Cooling	-	49	2	4	43	26	-	26	150	150	-	-	259	76	-	-	-	15,396	691	-
2a.1.5.49	Rx Core Isolation Cooling - Insulated	-	107	5	7	48	67	-	52	287	287	-	-	288	198	-	-	-	24,419	1,479	-
2a.1.5.50	Rx Recirculation	56	58	6	4	7	65	-	61	258	258	-	-	43	190	-	-	-	14,095	1,580	-
2a.1.5.51	Snubbers	-	169	2	5	63	30	-	60	331	331	-	-	377	90	-	-	-	21,009	2,548	-
2a.1.5.52	Standby Liquid Control - Insul - RCA	-	4	0	0	4	-	-	2	9	9	-	-	22	-	-	-	-	904	48	-
2a.1.5.53	Standby Liquid Control - RCA	-	26	1	2	41	-	-	13	83	83	-	-	245	-	-	-	-	9,969	341	-
2a.1.5.54	Stator Cooling - RCA	-	7	0	1	21	-	-	5	35	35	-	-	126	-	-	-	-	5,135	98	-
2a.1.5.55	Traversing Incore Probe	0	4	0	0	0	2	-	1	7	7	-	-	1	5	-	-	-	386	51	-
2a.1.5	Totals	1,040	8,221	924	1,572	16,339	11,425	-	8,209	47,730	47,706	-	24	97,654	33,808	-	-	-	6,125,515	119,943	-
2a.1.6	Scaffolding in support of decommissioning	-	2,265	22	12	191	31	-	607	3,127	3,127	-	-	1,030	91	-	-	-	52,111	22,564	-
2a.1	Subtotal Period 2a Activity Costs	1,742	29,721	18,645	6,398	25,937	50,042	728	47,148	180,360	180,336	-	24	141,010	59,545	1,481	1,178	-	10,458,540	253,640	2,758
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	85	-	57	102	-	232	-	122	598	598	-	-	-	532	-	-	-	31,942	104	-
2a.3.2	Process decommissioning chemical flush waste	5	-	216	702	-	1,619	-	534	3,077	3,077	-	-	-	2,093	-	-	-	223,008	392	-
2a.3.3	Small tool allowance	-	324	-	-	-	-	-	49	373	336	-	37	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	24,169	3,625	27,795	-	27,795	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	13,145	1,972	15,117	15,117	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	91	324	274	804	-	1,851	37,314	6,302	46,959	19,127	27,795	37	-	2,625	-	-	-	254,950	495	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	112	-	-	-	-	-	-	28	140	140	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	1,019	102	1,121	1,121	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	4,383	438	4,821	4,821	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,356	-	-	-	-	-	589	2,945	2,945	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,627	-	-	-	-	-	544	4,171	4,171	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	110	57	-	457	-	134	758	758	-	-	-	5,551	-	-	-	111,023	181	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,501	375	2,876	2,876	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	856	86	942	942	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	4,115	412	4,527	-	4,527	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	3,071	461	3,532	3,532	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	1,224	184	1,408	-	1,408	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	162	24	187	-	187	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	181	27	208	208	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,624	244	1,867	1,867	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	21,881	3,282	25,164	25,164	-	-	-	-	-	-	-	-	-	325,574
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	21,021	3,153	24,174	24,174	-	-	-	-	-	-	-	-	-	229,108
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	27,906	4,186	32,092	32,092	-	-	-	-	-	-	-	-	-	426,562
2a.4	Subtotal Period 2a Period-Dependent Costs	112	5,982	110	57	-	457	89,944	14,268	110,931	104,810	6,121	-	-	5,551	-	-	-	111,023	181	981,244
2a.0	TOTAL PERIOD 2a COST	1,945	36,028	19,028	7,259	25,937	52,350	127,987	67,717	338,250	304,273	33,915	62	141,010	67,722	1,481	1,178	-	10,824,520	254,317	984,002
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	ALARA/Radiological	-	18	0	1	6	3	-	6	35	35	-	-	35	10	-	-	-	2,060	277	-
2b.1.1.2	Alternate N2 - RCA	-	16	0	1	16	-	-	7	40	40	-	-	93	-	-	-	-	3,765	185	-
2b.1.1.3	Decontamination Projects	-	1	0	0	0	0	-	0	2	2	-	-	2	0	-	-	-	129	17	-
2b.1.1.4	Electrical - Contaminated	-	445	6	24	400	30	-	183	1,089	1,089	-	-	2,389	90	-	-	-	102,726	6,325	-
2b.1.1.5	Electrical - Decontaminated	-	2,698	48	218	3,906	-	-	1,298	8,167	8,167	-	-	23,344	-	-	-	-	948,013	37,107	-
2b.1.1.6	Fire - RCA	-	101	1	6	103	-	-	42	253	253	-	-	614	-	-	-	-	24,917	1,324	-
2b.1.1.7	HVAC Ductwork	-	305	7	27	446	34	-	156	975	975	-	-	2,665	100	-	-	-	114,598	4,111	-
2b.1.1.8	HVAC/Chilled Water - RCA	-	324	6	26	461	-	-	155	971	971	-	-	2,752	-	-	-	-	111,779	3,985	-
2b.1.1.9	Heating & Ventilation	-	483	16	61	1,007	76	-	302	1,945	1,945	-	-	6,018	227	-	-	-	258,789	7,101	-
2b.1.1.10	Heating Boiler - Insulated - RCA	-	3	0	0	4	-	-	1	9	9	-	-	26	-	-	-	-	1,058	35	-
2b.1.1.11	Liquid Radwaste	588	687	48	63	514	586	-	703	3,188	3,188	-	-	3,073	1,728	-	-	-	235,484	17,194	-
2b.1.1.12	Makeup Demin - RCA	-	103	3	14	246	-	-	65	431	431	-	-	1,471	-	-	-	-	59,747	1,412	-
2b.1.1.13	Non-Essential Diesel Generator - RCA	-	27	3	13	238	-	-	45	327	327	-	-	1,424	-	-	-	-	57,832	395	-
2b.1.1.14	Off Gas Holdup	-	342	21	38	461	214	-	216	1,291	1,291	-	-	2,755	630	-	-	-	152,277	4,769	-
2b.1.1.15	Primary Containment	-	455	42	87	1,038	507	-	414	2,543	2,543	-	-	6,201	1,506	-	-	-	347,704	6,454	-
2b.1.1.16	Process Radiation Monitors	-	46	2	2	24	18	-	20	111	111	-	-	142	52	-	-	-	9,115	649	-

Table F
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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
2b.1.1.17	Rx Bldg Closed Clng Water - Insul - RCA	-	114	2	9	163	-	-	54	343	343	-	-	977	-	-	-	-	39,675	1,484	-
2b.1.1.18	Rx Bldg Closed Clng Water - RCA	-	184	15	66	1,187	-	-	235	1,687	1,687	-	-	7,093	-	-	-	-	288,031	2,489	-
2b.1.1.19	Rx Component Handling Equip	27	142	18	27	194	279	-	154	840	840	-	-	1,158	829	-	-	-	99,730	2,462	-
2b.1.1.20	Rx Pressure Vessel	28	47	6	5	13	78	-	48	225	225	-	-	75	230	-	-	-	17,816	1,051	-
2b.1.1.21	Rx Water Cleanup	172	265	19	16	22	251	-	222	965	965	-	-	130	737	-	-	-	52,670	5,736	-
2b.1.1.22	Secondary Containment	-	124	7	14	170	86	-	81	483	483	-	-	1,017	255	-	-	-	57,567	1,763	-
2b.1.1.23	Service & Seal Water - Insulated - RCA	-	120	2	11	197	-	-	62	392	392	-	-	1,180	-	-	-	-	47,917	1,565	-
2b.1.1.24	Service & Seal Water - RCA	-	159	4	17	303	-	-	88	570	570	-	-	1,809	-	-	-	-	73,453	2,016	-
2b.1.1.25	Service Air Blower - RCA	-	15	0	2	34	-	-	9	62	62	-	-	206	-	-	-	-	8,364	206	-
2b.1.1.26	Solid Radwaste	338	494	36	49	399	467	-	480	2,264	2,264	-	-	2,387	1,380	-	-	-	185,221	10,820	-
2b.1.1.27	Structures & Buildings	-	78	2	5	60	29	-	37	210	210	-	-	357	85	-	-	-	19,933	1,128	-
2b.1.1.28	Wells & Domestic Water	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	144	-
2b.1.1.29	Wells & Domestic Water - RCA	-	52	1	3	57	-	-	22	136	136	-	-	342	-	-	-	-	13,874	633	-
2b.1.1	Totals	1,153	7,860	315	804	11,668	2,657	-	5,107	29,563	29,552	-	11	69,735	7,859	-	-	-	3,334,244	122,835	-
2b.1.2	Scaffolding in support of decommissioning	-	2,831	28	16	239	38	-	758	3,909	3,909	-	-	1,287	114	-	-	-	65,139	28,205	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor Building	5,202	2,903	178	516	8,044	1,181	-	4,924	22,948	22,948	-	-	48,077	7,014	-	-	-	2,317,670	112,518	-
2b.1.3.2	Admin	106	6	0	3	-	15	-	59	189	189	-	-	-	145	-	-	-	6,840	1,600	-
2b.1.3.3	HPCI Room	29	28	1	3	20	14	-	29	123	123	-	-	118	125	-	-	-	10,759	789	-
2b.1.3.4	Hot Shop	17	4	0	2	-	11	-	12	46	46	-	-	-	103	-	-	-	4,860	286	-
2b.1.3.5	LLRW Storage & Shipping	58	24	2	8	5	45	-	48	191	191	-	-	31	433	-	-	-	21,708	1,127	-
2b.1.3.6	Offgas Stack	372	269	7	23	225	82	-	312	1,289	1,289	-	-	1,343	669	-	-	-	87,045	8,860	-
2b.1.3.7	Offgas Storage & Compressor	41	17	1	6	4	33	-	34	136	136	-	-	25	316	-	-	-	15,948	785	-
2b.1.3.8	Radwaste	121	61	3	17	29	96	-	107	435	435	-	-	172	910	-	-	-	49,943	2,503	-
2b.1.3.9	Radwaste Material Storage Warehouse	64	24	2	9	-	52	-	52	202	202	-	-	-	495	-	-	-	23,400	1,197	-
2b.1.3.10	Recombiner	27	25	1	5	33	24	-	32	148	148	-	-	199	216	-	-	-	18,405	695	-
2b.1.3.11	Turbine	705	353	21	104	215	564	-	632	2,594	2,594	-	-	1,283	5,299	-	-	-	303,150	14,443	-
2b.1.3.12	Turbine Building Addition	58	21	1	8	-	45	-	47	181	181	-	-	-	434	-	-	-	20,478	1,087	-
2b.1.3	Totals	6,799	3,736	218	704	8,574	2,164	-	6,288	28,483	28,483	-	-	51,247	16,159	-	-	-	2,880,206	145,889	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	7,952	14,427	560	1,524	20,481	4,859	526	12,232	62,561	62,549	-	11	122,269	24,132	-	-	-	6,279,589	296,929	4,096
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	23	92	1,211	-	-	198	1,524	1,524	-	-	11,760	-	-	-	-	294,000	32	-
2b.2.2	Excavation of Underground Services	-	1,972	-	-	-	-	376	550	2,898	2,898	-	-	-	-	-	-	-	-	12,493	-
2b.2.3	Security Modifications	-	-	-	-	-	-	8,696	1,304	10,000	10,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,972	23	92	1,211	-	9,072	2,052	14,422	14,422	-	-	11,760	-	-	-	-	294,000	12,525	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	198	-	135	240	-	546	-	285	1,404	1,404	-	-	-	1,253	-	-	-	75,186	244	-
2b.3.2	Process decommissioning chemical flush waste	1	-	43	138	-	319	-	105	607	607	-	-	-	413	-	-	-	43,978	77	-
2b.3.3	Small tool allowance	-	364	-	-	-	-	-	55	418	418	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	117,198	17,580	134,778	-	134,778	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	6,277	942	7,218	7,218	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	199	364	178	378	-	865	123,475	18,966	144,425	9,647	134,778	-	-	1,666	-	-	-	119,165	322	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,440	-	-	-	-	-	-	360	1,799	1,799	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	742	74	816	816	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	2,698	270	2,967	2,967	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,376	-	-	-	-	-	594	2,970	2,970	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,711	-	-	-	-	-	407	3,117	3,117	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	101	52	-	419	-	123	694	694	-	-	-	5,084	-	-	-	101,679	166	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,437	216	1,653	1,653	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	623	62	685	685	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,995	299	3,294	-	3,294	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	2,235	335	2,570	2,570	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	891	134	1,024	-	1,024	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	224	34	258	258	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	118	18	136	-	136	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	458	69	527	527	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,182	177	1,359	1,359	-	-	-	-	-	-	-	-	-	-

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2b Period-Dependent Costs (continued)																					
2b.4.16	Security Staff Cost	-	-	-	-	-	-	15,925	2,389	18,314	18,314	-	-	-	-	-	-	-	-	-	236,949
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	14,772	2,216	16,988	16,988	-	-	-	-	-	-	-	-	-	160,160
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	19,442	2,916	22,358	22,358	-	-	-	-	-	-	-	-	-	297,283
2b.4	Subtotal Period 2b Period-Dependent Costs	1,440	5,087	101	52	-	419	63,741	10,691	81,530	77,076	4,455	-	-	5,084	-	-	-	101,679	166	694,392
2b.0	TOTAL PERIOD 2b COST	9,591	21,850	861	2,046	21,692	6,143	196,814	43,941	302,937	163,694	139,232	11	134,029	30,882	-	-	-	6,794,433	309,941	698,488
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	654	58	103	149	-	2,572	-	1,017	4,553	4,553	-	-	-	7,653	-	-	-	486,170	906	-
Disposal of Plant Systems																					
2d.1.2.1	Cranes/Heavy Loads/Rigging - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2d.1.2.2	Electrical - Contaminated Fuel Pool	-	47	1	2	40	3	-	19	112	112	-	-	240	9	-	-	-	10,334	665	-
2d.1.2.3	Electrical - Decontam. Fuel Pool Area	-	297	5	23	411	-	-	140	876	876	-	-	2,457	-	-	-	-	99,783	4,090	-
2d.1.2.4	Fire - RCA - Fuel Pool Area	-	11	0	1	10	-	-	4	26	26	-	-	62	-	-	-	-	2,499	143	-
2d.1.2.5	Fuel Pool Cooling & Cleanup	246	428	34	37	197	455	-	382	1,781	1,781	-	-	1,179	1,341	-	-	-	133,939	8,380	-
2d.1.2.6	Fuel Pool Cooling & Cleanup - Insulated	27	41	3	3	11	40	-	36	161	161	-	-	67	117	-	-	-	10,220	848	-
2d.1.2.7	HVAC Ductwork - Fuel Pool Area	-	34	1	3	50	4	-	17	108	108	-	-	296	11	-	-	-	12,733	457	-
2d.1.2.8	HVAC/Chilled Water - RCA Fuel Pool Area	-	33	0	2	37	-	-	14	87	87	-	-	223	-	-	-	-	9,072	397	-
2d.1.2.9	Instrument & Service Air-RCA-Fuel Pool	-	29	1	2	45	-	-	14	91	91	-	-	267	-	-	-	-	10,841	357	-
2d.1.2	Totals	273	924	45	75	819	502	-	631	3,268	3,268	-	-	4,894	1,479	-	-	-	293,606	15,385	-
Decontamination of Site Buildings																					
2d.1.3.1	Reactor (Post Fuel)	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.3	Totals	946	2,599	172	913	329	10,216	-	3,880	19,056	19,056	-	-	1,969	62,698	-	-	-	2,732,406	45,703	-
2d.1.4	Scaffolding in support of decommissioning	-	566	6	3	48	8	-	152	782	782	-	-	257	23	-	-	-	13,028	5,641	-
2d.1	Subtotal Period 2d Activity Costs	1,872	4,147	326	1,139	1,196	13,298	-	5,680	27,659	27,659	-	-	7,120	71,852	-	-	-	3,525,210	67,635	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,458	437	1,896	1,896	-	-	-	-	-	-	-	-	-	12,480
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	79	-	54	96	-	220	-	114	563	563	-	-	-	504	-	-	-	30,239	98	-
2d.3.2	Process decommissioning chemical flush waste	1	-	26	84	-	193	-	64	366	366	-	-	-	249	-	-	-	26,553	47	-
2d.3.3	Small tool allowance	-	91	-	-	-	-	-	14	105	105	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	82	1,112	178	-	237	1,739	1,739	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	27	4	32	-	32	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	80	91	210	262	1,112	590	27	432	2,805	2,773	32	-	6,000	1,282	-	-	-	360,400	292	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	244	-	-	-	-	-	-	61	305	305	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	1,662	166	1,828	1,828	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	806	-	-	-	-	-	202	1,008	1,008	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	1,936	-	-	-	-	-	290	2,227	2,227	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	40	21	-	167	-	49	277	277	-	-	-	2,030	-	-	-	40,600	66	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	547	82	630	630	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	424	42	466	466	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	320	48	368	368	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	844	127	971	971	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	7,311	1,097	8,408	8,408	-	-	-	-	-	-	-	-	-	78,356
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	10,052	1,508	11,560	10,670	890	-	-	-	-	-	-	-	-	149,660
2d.4	Subtotal Period 2d Period-Dependent Costs	244	2,743	40	21	-	167	34,577	5,652	43,444	38,602	4,842	-	-	2,030	-	-	-	40,600	66	390,997
2d.0	TOTAL PERIOD 2d COST	2,196	6,981	576	1,422	2,308	14,055	36,062	12,202	75,803	70,930	4,873	-	13,120	75,164	-	-	-	3,926,210	67,993	403,477

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	6,920	2,076	8,995	8,995	-	-	-	-	-	-	-	-	95,048	6,240
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	47	7	54	-	54	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	1,311	197	1,508	1,454	54	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	530	53	583	583	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,471	147	1,618	1,618	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	708	-	-	-	-	-	177	884	884	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	4	-	29	-	9	48	48	-	-	-	355	-	-	-	7,097	12	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	274	41	315	315	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	426	43	468	468	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	112	11	123	-	123	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	1,597	239	1,836	1,836	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	84	13	97	-	97	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	94	14	108	108	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	10,999	1,650	12,649	8,918	3,732	-	-	-	-	-	-	-	-	162,981
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	5,393	809	6,201	6,201	-	-	-	-	-	-	-	-	-	57,200
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	5,762	864	6,626	5,738	888	-	-	-	-	-	-	-	-	80,707
2f.4	Subtotal Period 2f Period-Dependent Costs	-	708	7	4	-	29	26,741	4,070	31,558	26,719	4,839	-	-	355	-	-	-	7,097	12	300,888
2f.0	TOTAL PERIOD 2f COST	-	708	7	4	-	29	35,137	6,392	42,277	37,383	4,894	-	-	355	-	-	-	7,097	95,059	307,128
PERIOD 2 TOTALS		13,731	65,566	20,473	10,731	49,937	72,577	396,000	130,253	759,268	576,281	182,914	73	288,160	174,123	1,481	1,178	-	21,552,260	727,310	2,393,096
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor Building	-	1,971	-	-	-	-	-	296	2,267	-	-	2,267	-	-	-	-	-	-	13,911	-
3b.1.1.2	Condensate Tanks Foundation	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	50	-
3b.1.1.3	Discharge Retention Basin	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	25	-
3b.1.1.4	HPCI Room	-	19	-	-	-	-	-	3	22	-	-	22	-	-	-	-	-	-	97	-
3b.1.1.5	Hot Shop	-	16	-	-	-	-	-	2	19	-	-	19	-	-	-	-	-	-	177	-
3b.1.1.6	Hydrogen & Oxygen Storage	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	19	-
3b.1.1.7	LLRW Storage & Shipping	-	83	-	-	-	-	-	12	95	-	-	95	-	-	-	-	-	-	662	-
3b.1.1.8	MSIV	-	4	-	-	-	-	-	1	4	-	-	4	-	-	-	-	-	-	42	-
3b.1.1.9	Misc Structures 2017	-	1,410	-	-	-	-	-	212	1,622	-	-	1,622	-	-	-	-	-	-	13,042	-
3b.1.1.10	Offgas Stack	-	108	-	-	-	-	-	16	124	-	-	124	-	-	-	-	-	-	544	-
3b.1.1.11	Offgas Storage & Compressor	-	39	-	-	-	-	-	6	45	-	-	45	-	-	-	-	-	-	199	-
3b.1.1.12	Radwaste	-	228	-	-	-	-	-	34	262	-	-	262	-	-	-	-	-	-	1,220	-
3b.1.1.13	Recombiner	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	713	-
3b.1.1.14	Security Barrier	-	186	-	-	-	-	-	28	214	-	-	214	-	-	-	-	-	-	933	-
3b.1.1.15	Structures Greater than 3' Below Grade	-	2,461	-	-	-	-	-	369	2,830	-	-	2,830	-	-	-	-	-	-	12,649	-
3b.1.1.16	Tank Farm	-	4	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	21	-
3b.1.1.17	Turbine	-	1,259	-	-	-	-	-	189	1,448	-	-	1,448	-	-	-	-	-	-	13,036	-
3b.1.1.18	Turbine Building Addition	-	55	-	-	-	-	-	8	63	-	-	63	-	-	-	-	-	-	618	-
3b.1.1.19	Turbine Pedestal	-	182	-	-	-	-	-	27	209	-	-	209	-	-	-	-	-	-	926	-
3b.1.1	Totals	-	8,169	-	-	-	-	-	1,225	9,394	-	-	9,394	-	-	-	-	-	-	58,885	-
Site Closeout Activities																					
3b.1.2	Grade & landscape site	-	896	-	-	-	-	-	134	1,031	-	-	1,031	-	-	-	-	-	-	1,841	-
3b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	9,065	-	-	-	-	200	1,390	10,655	231	-	10,425	-	-	-	-	-	-	60,726	1,560

Table F
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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	3,322	-	-	-	-	13	500	3,835	-	-	3,835	-	-	-	-	-	-	12	-
3b.2.2	Intake Structure Cofferdam	-	335	-	-	-	-	-	50	385	-	-	385	-	-	-	-	-	-	2,584	-
3b.2.3	Construction Debris	-	-	-	-	-	-	1,170	176	1,346	-	-	1,346	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	5,583	-	-	-	-	-	837	6,421	-	-	6,421	-	-	-	-	-	-	5,422	-
3b.2.5	Discharge Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
3b.2.6	Disposition of Original MPC Canisters	-	-	-	954	-	5,641	-	1,649	8,244	8,244	-	-	-	21,097	-	-	-	2,501,800	-	-
3b.2	Subtotal Period 3b Additional Costs	-	9,682	-	954	-	5,641	1,183	3,279	20,739	8,244	-	12,495	-	21,097	-	-	-	2,501,800	11,570	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	110	-	-	-	-	-	17	127	-	-	127	-	-	-	-	-	-	-	-
3b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	109	16	125	-	125	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	110	-	-	-	-	109	33	252	-	125	127	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	1,220	122	1,342	1,342	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	2,543	254	2,797	-	2,797	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	5,842	-	-	-	-	-	876	6,719	-	-	6,719	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	315	47	362	-	362	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	356	36	391	-	391	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	257	26	283	-	283	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,122	168	1,290	429	860	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	194	29	223	-	223	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	543	81	624	249	375	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	25,319	3,798	29,117	0	8,589	20,527	-	-	-	-	-	-	-	375,152
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	11,729	1,759	13,489	-	-	13,489	-	-	-	-	-	-	-	122,646
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	7,148	1,072	8,220	-	2,129	6,091	-	-	-	-	-	-	-	101,904
3b.4	Subtotal Period 3b Period-Dependent Costs	-	5,842	-	-	-	-	50,745	8,269	64,857	2,020	16,010	46,826	-	-	-	-	-	-	-	599,702
3b.0	TOTAL PERIOD 3b COST	-	24,700	-	954	-	5,641	52,237	12,971	96,502	10,495	16,135	69,872	-	21,097	-	-	-	2,501,800	72,296	601,262
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,585,563	237,834	1,823,397	-	1,823,397	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	1,585,563	237,834	1,823,397	-	1,823,397	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	135,860	13,586	149,445	-	149,445	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	175,427	17,543	192,970	-	192,970	-	-	-	-	-	-	-	-	-
3c.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	41,099	4,110	45,209	-	45,209	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	28,639	2,864	31,503	-	31,503	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	41,607	6,241	47,848	-	47,848	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	21,621	3,243	24,864	-	24,864	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	24,154	3,623	27,777	-	27,777	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	830,756	124,613	955,369	-	955,369	-	-	-	-	-	-	-	-	10,446,330
3c.4.10	DOC Staff Cost	-	-	-	-	-	-	59,217	8,883	68,100	-	68,100	-	-	-	-	-	-	-	-	401,782
3c.4.11	Utility Staff Cost	-	-	-	-	-	-	369,061	55,359	424,420	-	424,420	-	-	-	-	-	-	-	-	5,323,611
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	1,727,440	240,065	1,967,505	-	1,967,505	-	-	-	-	-	-	-	-	16,171,720
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	3,313,003	477,899	3,790,902	-	3,790,902	-	-	-	-	-	-	-	-	16,171,720
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
3d.1.1	Totals	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,083	-	-	4,313	-	918	6,314	6,314	-	-	-	-	-	-	1,160	225,765	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-

Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	27	3	30	30	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	35	3	38	38	-	-	-	-	-	-	-	-	-	-
3d.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	8	1	9	-	9	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	6	1	6	-	6	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	8	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	165	25	190	190	-	-	-	-	-	-	-	-	-	2,074
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	39	6	45	45	-	-	-	-	-	-	-	-	-	539
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	293	40	333	318	15	-	-	-	-	-	-	-	-	2,613
3d.0	TOTAL PERIOD 3d COST	-	-	1,083	-	-	4,313	320	962	6,678	6,632	47	-	-	-	-	-	1,160	225,765	-	2,613
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	0	3	33	-	283	2,223	636	3,178	3,178	-	-	-	848	-	-	-	131,507	11,351	2,273
3e.2	Subtotal Period 3e Additional Costs	-	0	3	33	-	283	2,223	636	3,178	3,178	-	-	-	848	-	-	-	131,507	11,351	2,273
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	118	30	148	148	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	249	62	312	312	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	12	3	15	15	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	71	18	89	89	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	41	10	52	52	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	352	88	440	440	-	-	-	-	-	-	-	-	-	4,999
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	261	65	326	326	-	-	-	-	-	-	-	-	-	3,792
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	1,105	276	1,381	1,381	-	-	-	-	-	-	-	-	-	8,792
3e.0	TOTAL PERIOD 3e COST	-	0	3	33	-	283	3,328	912	4,559	4,559	-	-	-	848	-	-	-	131,507	11,351	11,065
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	1,864	-	-	-	-	293	324	2,480	-	-	2,480	-	-	-	-	-	-	8,713	160
3f.2	Subtotal Period 3f Additional Costs	-	1,864	-	-	-	-	293	324	2,480	-	-	2,480	-	-	-	-	-	-	8,713	160
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	13	-	-	-	-	-	2	15	-	-	15	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	126	13	138	-	-	138	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	117	-	-	-	-	-	17	134	-	-	134	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	7	-	-	7	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	36	5	41	-	-	41	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	21	3	24	-	-	24	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	177	27	204	-	-	204	-	-	-	-	-	-	-	2,520
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	109	16	126	-	-	126	-	-	-	-	-	-	-	1,564
3f.4	Subtotal Period 3f Period-Dependent Costs	-	117	-	-	-	-	475	82	674	-	-	674	-	-	-	-	-	-	-	4,084
3f.0	TOTAL PERIOD 3f COST	-	1,993	-	-	-	-	768	408	3,169	-	-	3,169	-	-	-	-	-	-	8,713	4,244
PERIOD 3 TOTALS		-	26,693	1,086	987	-	10,238	3,369,655	493,152	3,901,811	21,686	3,807,084	73,041	-	21,944	-	-	1,160	2,859,072	92,360	16,790,910
TOTAL COST TO DECOMMISSION		17,263	95,603	21,839	11,878	49,952	84,522	3,922,317	648,801	4,852,175	776,400	4,001,648	74,127	288,203	197,266	1,711	1,178	1,160	24,478,380	851,855	20,376,520

Monticello Nuclear Generating Plant
Decommissioning Cost Analysis

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Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			

TOTAL COST TO DECOMMISSION WITH 15.43% CONTINGENCY:	**$4,852,175**	**thousands of 2020 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 15.98% OR:	**$776,400**	**thousands of 2020 dollars**
SPENT FUEL MANAGEMENT COST IS 82.49% OR:	**$4,001,648**	**thousands of 2020 dollars**
NON-NUCLEAR DEMOLITION COST IS 1.53% OR:	**$74,127**	**thousands of 2020 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**200,155**	**Cubic Feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,160**	**Cubic Feet**
TOTAL SCRAP METAL REMOVED:	**23,123**	**Tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**851,518**	**Man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX G

ISFSI DECOMMISSIONING

Page

Monticello Nuclear Generating Plant – Scenarios 1 and 2 .....G-2

Monticello Nuclear Generating Plant – Scenarios 3 and 4 .....G-3

Table G-1
Monticello Nuclear Generating Plant
ISFSI Decommissioning Cost Estimate
Scenarios 1 and 2
(thousands of 2020 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	LLRW Disposal Costs	Other Costs	Total Costs	Burial Volume Class A (cubic feet)	Craft Manhours	Oversight and Contractor Manhours
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	240	240	-	-	1,096
Decontamination (activated disposition)	57	188	987	5,925	-	7,157	21,949	366	-
License Termination (radiological surveys)	-	-	-	-	1,475	1,475	-	11,175	-
Subtotal	**57**	**188**	**987**	**5,925**	**1,715**	**8,872**	**21,949**	**11,541**	**1,096**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	470	470	-	-	1,153
Insurance	-	-	-	-	118	118	-	-	-
Property taxes	-	-	-	-	249	249	-	-	-
Plant energy budget	-	-	-	-	12	12	-	-	-
Fixed Overhead	-	-	-	-	71	71	-	-	-
Railroad Track Maintenance	-	-	-	-	41	41	-	-	-
Security Staff Cost	-	-	-	-	352	352	-	-	3,792
Utility Staff Cost	-	-	-	-	261	261	-	-	8,792
Subtotal	-	-	-	-	**1,575**	**1,575**	-	-	**13,737**
Total (w/o contingency)	**57**	**188**	**987**	**5,925**	**3,290**	**10,447**	**21,949**	**11,541**	**14,833**
Total (w/25% contingency)	**71**	**235**	**1,234**	**7,406**	**4,112**	**13,059**			

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)

Table G-2
Monticello Nuclear Generating Plant
ISFSI Decommissioning Cost Estimate
Scenarios 3 and 4
(thousands of 2020 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	LLRW Disposal Costs	Other Costs	Total Costs	Burial Volume Class A (cubic feet)	Craft Manhours	Oversight and Contractor Manhours
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	251	251	-	-	1,120
Decontamination (activated disposition)	0	3	33	283	-	320	848	29	-
License Termination (radiological surveys)	-	-	-	-	1,500	1,500	-	11,322	-
Subtotal	**0**	**3**	**33**	**283**	**1,751**	**2,071**	**848**	**11,351**	**1,120**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	471	471	-	-	1,153
Insurance	-	-	-	-	118	118	-	-	-
Property taxes	-	-	-	-	249	249	-	-	-
Plant energy budget	-	-	-	-	12	12	-	-	-
Fixed Overhead	-	-	-	-	71	71	-	-	-
Railroad Track Maintenance	-	-	-	-	41	41	-	-	-
Security Staff Cost	-	-	-	-	352	352	-	-	4,999
Utility Staff Cost	-	-	-	-	261	261	-	-	3,792
Subtotal	-	-	-	-	**1,576**	**1,576**	-	-	**9,945**
Total (w/o contingency)	**0**	**3**	**33**	**283**	**3,328**	**3,648**	**848**	**11,351**	**11,065**
Total (w/25% contingency)	**0**	**4**	**41**	**354**	**4,160**	**4,559**			

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)

Document X01-1775-001, Rev. 0

DECOMMISSIONING COST ANALYSIS

for the

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

prepared for

Xcel Energy

prepared by

TLG Services, LLC
Bridgewater, Connecticut

October 2020

APPROVALS

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EXECUTIVE SUMMARY

This report presents estimates of the cost to decommission the Prairie Island Nuclear Generating Plant (Prairie Island) for the identified decommissioning scenarios following a cessation of plant operations and the operation and eventual decommissioning of the on-site Independent Spent Fuel Storage Installation (ISFSI). The estimates are designed to provide Xcel Energy with the information to assess its current decommissioning liability, as it relates to Prairie Island.

The analysis relies upon site-specific, technical information from an evaluation prepared in 2017, [1] updated to reflect current assumptions pertaining to the disposition of the nuclear plant and relevant industry experience in undertaking such projects. The costs are based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site restoration requirements.

While the analysis is not a detailed engineering evaluation, it represents the estimates prepared in advance of the detailed engineering required to carry out the decommissioning of the nuclear units. It may also not reflect the actual plan to decommission Prairie Island; the plan may differ from the assumptions made in this analysis based on facts that exist at the time of decommissioning.

The primary goal of the decommissioning is the removal and disposal of the contaminated systems and structures so that the plant's operating licenses can be terminated. The analysis recognizes that spent fuel will be stored at the site in the plant's storage pool and/or in an Independent Spent Fuel Storage Installation (ISFSI) until such time that it can be transferred to a Department of Energy (DOE) facility. Consequently, the estimates also include those costs to manage and subsequently decommission these storage facilities.

The current cost estimates assume that Prairie Island Unit 1 ceases operations in 2033, and 2034 for Unit 2. The cost estimates assume that the shutdown dates of the nuclear units are scheduled and pre-planned (i.e., there is no delay in transitioning the plant and workforce from operations or in obtaining regulatory relief from operating requirements, etc.). This estimate includes additional resources to support the engineering, planning, and licensing efforts for the station; this is done to support a decommissioning schedule similar to the prior estimate. The estimates include the continued operation of the auxiliary building as an interim wet fuel storage facility for

1 "Decommissioning Cost Analysis for the Prairie Island Nuclear Generating Plant," Document No. X01-1725-001, Rev. 0, TLG Services, Inc., October 2017

approximately four years after operations cease. The spent fuel will remain in the ISFSI until the DOE is able to complete the transfer of the fuel to a federal facility (e.g., a monitored retrievable storage facility). [2] The estimates also include the dismantling of non-essential structures and limited restoration of the site.

The 2017 plant inventory, the basis for the decontamination and dismantling requirements and cost, and the decommissioning waste streams, was reviewed for this analysis. Over the three-year period between estimates the plant confirmed there were no substantive changes to the configuration of the plant or site facilities (that would significantly impact decommissioning).

The costs to decommission Prairie Island, for the scenarios evaluated, are tabulated at the end of this section. Costs are reported in 2020 dollars and include monies anticipated to be spent for radiological remediation and operating license termination, spent fuel management, and site restoration activities.

A complete discussion of the assumptions relied upon in this analysis is provided in Section 3, along with schedules of annual expenditures for each scenario. A sequence of significant project activities is provided in Section 4 along with a timeline for each scenario. Detailed cost reports used to generate the summary tables contained within this document are provided in Appendices C through J.

Alternatives and Regulations

The ultimate objective of the decommissioning process is to reduce the inventory of contaminated and activated material so that the licenses can be terminated. The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule adopted on June 27, 1988.[3] In this rule, the NRC set forth technical and financial criteria for decommissioning licensed nuclear power facilities. The regulations addressed planning needs, timing, funding methods, and environmental review requirements for decommissioning. The rule also defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB.

> DECON is defined as "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are

2 Projected expenditures for spent fuel management identified in the cost analysis do not consider any compensation for damages with regard to the delays incurred by Xcel Energy in the timely removal of spent fuel by the DOE.

3 U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70 and 72, "General Requirements for Decommissioning Nuclear Facilities," Nuclear Regulatory Commission, 53 Fed. Reg. 24018, June 27, 1988

removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations."[4]

SAFSTOR is defined as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use."[5] Decommissioning is to be completed within 60 years, although longer time periods will be considered when necessary to protect public health and safety.

ENTOMB is defined as "the alternative in which radioactive contaminants are encased in a structurally long-lived material, such as concrete; the entombed structure is appropriately maintained and continued surveillance is carried out until the radioactivity decays to a level permitting unrestricted release of the property."[6] As with the SAFSTOR alternative, decommissioning is currently required to be completed within 60 years, although longer time periods will also be considered when necessary to protect public health and safety.

The 60-year restriction has limited the practicality for the ENTOMB alternative at commercial reactors that generate significant amounts of long-lived radioactive material. In 1997, the Commission directed its staff to re-evaluate this alternative and identify the technical requirements and regulatory actions that would be necessary for entombment to become a viable option. The resulting evaluation provided several recommendations, however, rulemaking has been deferred based upon several factors (e.g., no licensee has committed to pursuing the entombment option, the unresolved issues associated with the disposition of greater-than-Class C material (GTCC), and the NRC's current priorities) at least until after the additional research studies are complete. The Commission concurred with the staff's recommendation. In a draft regulatory basis document published in March 2017 in support of rulemaking that would amend NRC regulations concerning nuclear plant decommissioning, the NRC staff proposes removing any discussion of the ENTOMB option from existing guidance documents since the method is not deemed practically feasible.

In 1996, the NRC published revisions to its general requirements for decommissioning nuclear power plants to clarify ambiguities and codify procedures and terminology as a

4 Ibid. Page FR24022, Column 3

5 Ibid.

6 Ibid. Page FR24023, Column 2

means of enhancing efficiency and uniformity in the decommissioning process.[7] The amendments allow for greater public participation and better define the transition process from operations to decommissioning. Regulatory Guide 1.184 Revision 1, issued in October 2013, further described the methods and procedures that are acceptable to the NRC staff for implementing the requirements of the 1996 revised rule that relate to the initial activities and the major phases of the decommissioning process. The costs and schedules presented in this analysis follow the general guidance and sequence in the amended regulations. The format and content of the estimates is also consistent with the recommendations of Regulatory Guide 1.202, issued February 2005. [8]

In 2011, the NRC published amended regulations to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site.[9] The regulations require licensees to report additional details in their decommissioning cost estimate, including a decommissioning estimate for the ISFSI. This estimate is provided in Appendix K.

Decommissioning Scenarios

The following scenarios were evaluated and are intended to bound the liability associated with the removal of spent fuel from the site. The current operating licenses expire in 2033 and 2034 for Units 1 and 2, respectively. The scenarios consist of four spent fuel management scenarios, each with a DECON and a SAFSTOR decommissioning alternative for eight total scenarios. The duration of the spent fuel scenarios has little impact to the decommissioning costs and timing of the power block systems and structures. The spent fuel in the plant's spent fuel storage pool is transferred to the ISFSI within the first four years. The equipment, structures, and portions of the plant containing radioactive contaminants are removed or decontaminated to a level that permits the facility to be released for unrestricted use. Remaining site structures are then demolished. Spent fuel storage operations continue at the ISFSI until the transfer of the fuel to the DOE is completed (as shown in the "Last Spent Fuel Assembly" column in the following table).

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7 U.S. Code of Federal Regulations, Title 10, Parts 2, 50 and 51, "Decommissioning of Nuclear Power Reactors," Nuclear Regulatory Commission, 61 Fed. Reg. 39278, July 29, 1996

8 "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors," Regulatory Guide 1.202, Nuclear Regulatory Commission, February 2005

9 U.S. Code of Federal Regulations, Title 10, Parts 20, 30, 40, 50, 70, and 72, "Decommissioning Planning," Nuclear Regulatory Commission, Federal Register Volume 76, (p 35512 et seq.), June 17, 2011

Scenario	1st Spent Fuel Canister Replacement	1st Spent Fuel Assembly Removed from Prairie Island	Last Spent Fuel Assembly Removed from Prairie Island	Scenario Identification
1	n/a	2037	2074	DECON with 42 Year DFS+
2	n/a	2053	2077	DECON with 60 Year DFS
3	2045	2093	2117	DECON with 100 Year DFS
4	2045	2193	2217	DECON with 200 Year DFS
5	n/a	2037	2074	SAFSTOR with 42 Year DFS
6	n/a	2053	2077	SAFSTOR with 60 Year DFS
7	2045	2093	2117	SAFSTOR with 100 Year DFS
8	2045	2193	2217	SAFSTOR with 200 Year DFS

+ Dry Fuel Storage

For Scenarios 1 and 5, although they only provide a total fuel storage period of 42 years following Unit 2 shutdown, some of the Prairie Island casks have been in storage since 1995. Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters for those casks that exceed 50 years. The assumption to not transfer spent fuel at 50-years total storage duration for these two scenarios was premised on the likelihood that the life of the canisters could be successfully extended for the additional years.

For Scenarios 2 and 6, although they provide a total fuel storage period of nominally 60 years following shutdown, Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters at the 50-year mark.

In Scenarios 3, 4, 7 and 8, the Dry Shielded Canisters (DSCs) are assumed to be replaced after fifty years of use. Since the auxiliary building spent fuel storage pool and fuel handling facilities are removed by the year 2037, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. For Scenarios 3 and 7, two such transfers are needed over the time frame assumed. For Scenarios 4 and 8, the spent fuel will be transferred four times following initial placement in the ISFSI.

Methodology

The methodology used to develop the estimates follows the basic approach originally presented in the cost estimating guidelines [10] developed by the Atomic Industrial Forum (now Nuclear Energy Institute). This reference describes a unit cost factor method for estimating decommissioning activity costs. The unit cost factors used in this analysis incorporate site-specific costs and the latest available information about worker productivity in decommissioning.

An activity duration critical path is used to determine the total decommissioning program schedule. This is required for calculating the carrying costs, which include program management, administration, field engineering, equipment rental, quality assurance, and security. This systematic approach for assembling decommissioning estimates ensures a high degree of confidence in the reliability of the resulting costs.

The estimates also reflect lessons learned from TLG's involvement in the Shippingport Station Decommissioning Project, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells and associated facilities, completed in 1997. In addition, the planning and engineering for the Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Oyster Creek, Connecticut Yankee, Crystal River, Vermont Yankee, Fort Calhoun, Pilgrim, and Indian Point nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Contingency

Consistent with cost estimating practice, contingencies are applied to the decontamination and dismantling costs developed as "specific provision for unforeseeable elements of cost within the defined project scope, particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur."[11] The cost elements in the estimates are based on ideal conditions; therefore, the types of unforeseeable events that are almost certain to occur in decommissioning, based on industry experience, are addressed through a percentage contingency applied on a line-item basis. This contingency factor is a nearly universal element in all large-scale construction and demolition projects. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of

10 T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986

11 Project and Cost Engineers' Handbook, Second Edition, American Association of Cost Engineers, Marcel Dekker, Inc., New York, New York, p. 239

decommissioning over the remaining operating life of the station, or duration of the decommissioning program and dry fuel storage period.

Contingency funds are expected to be fully expended throughout the program. As such, inclusion of contingency is necessary to provide assurance that sufficient funding will be available to accomplish the intended tasks.

Low-Level Radioactive Waste Disposal

The contaminated and neutron-activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for "shallow-land" disposal. With the passage of the "Low-Level Radioactive Waste Policy Act" in 1980, [12] and its Amendments of 1985, [13] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders. It was expected that groups of states would combine together to jointly deal with their radioactive wastes; these organizations are referred to as waste disposal compacts.

With the exception of Texas, no new compact facilities have been successfully sited, licensed, and constructed. The Texas Compact disposal facility is now operational and waste is being accepted from generators within the Compact by the operator, Waste Control Specialists (WCS). The facility is also able to accept limited quantities of non-Compact waste.

Disposition of the various waste streams produced by the decommissioning process considered all options and services currently available to Xcel Energy. The majority of the low-level radioactive waste designated for direct disposal (Class A [14]) can be sent to Energy*Solutions*' facility in Clive, Utah. Therefore, disposal costs for Class A waste were based upon current contract rates. This facility is not licensed to receive the higher activity portion of the decommissioning waste stream (Classes B and C resins and activated metal from the reactor vessel[15]).

The Texas facility is licensed to receive the higher activity waste forms (Classes B and C). As such, for this analysis, disposal costs for the Class B and C waste were based upon the Xcel-provided information on the cost for such from WCS.

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12 "Low-Level Radioactive Waste Policy Act," Public Law 96-573, 1980

13 "Low-Level Radioactive Waste Policy Amendments Act of 1985," Public Law 99-240, 1986

14 Waste is classified in accordance with U.S. Code of Federal Regulations, Title 10, Part 61.55

15 U.S. Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste"

The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow-land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste.

The DOE issued its final Environmental Impact Statement for the disposal of GTCC on January 2016.[16] The study evaluated the potential environmental impacts associated with constructing and operating a new facility or using an existing facility, disposal methods, and locations. DOE is awaiting Congressional action on the report and its recommendations. At this time, the federal government has not identified a specific cost for disposing of GTCC or a schedule for acceptance.

For purposes of this analysis, the GTCC radioactive waste is assumed to be packaged and disposed of in a similar manner as high-level waste and at a cost equivalent to that envisioned for the spent fuel. The GTCC is packaged in the same canisters used for spent fuel and either stored on site or shipped directly to a DOE facility as it is generated (depending upon the timing of the decommissioning and whether the spent fuel has been removed from the site prior to the start of physical decommissioning).

A significant portion of the waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be analyzed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to isolate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates reflect the savings from waste recovery/volume reduction.

<u>High-Level Radioactive Waste Management</u>

Congress passed the "Nuclear Waste Policy Act" [17] (NWPA) in 1982, assigning the federal government's long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The DOE was to

16 "Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375)," January 2016

17 "Nuclear Waste Policy Act of 1982 and Amendments," DOE's Office of Civilian Radioactive Management, 1982

begin accepting spent fuel by January 31, 1998; however, to date no progress in the removal of spent fuel from commercial generating sites has been made.

Today, the country is at an impasse on high-level waste disposal, even with the License Application for a geologic repository submitted by the DOE to the NRC in 2008. The Obama administration cut the budget for the repository program while promising to "conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle … and make recommendations for a new plan."[18] Towards this goal, the administration appointed a Blue Ribbon Commission on America's Nuclear Future (Blue Ribbon Commission) to make recommendations for a new plan for nuclear waste disposal. The Blue Ribbon Commission's charter includes a requirement that it consider "[o]ptions for safe storage of used nuclear fuel while final disposition pathways are selected and deployed."[19]

On January 26, 2012, the Blue Ribbon Commission issued its "Report to the Secretary of Energy" containing a number of recommendations on nuclear waste disposal. Two of the recommendations that may impact decommissioning planning are:

- "[T]he United States [should] establish a program that leads to the timely development of one or more consolidated storage facilities"[20]
- "[T]he United States should undertake an integrated nuclear waste management program that leads to the timely development of one or more permanent deep geological facilities for the safe disposal of spent fuel and high-level nuclear waste."[21]

In January 2013, the DOE issued the "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," in response to the recommendations made by the Blue Ribbon Commission and as "a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel..."[22] This document states:

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18 Blue Ribbon Commission on America's Nuclear Future's Charter, http://cybercemetery.unt.edu/archive/brc/20120620215336/http://brc.gov/index.php?q=page/charter

19 Ibid.

20 "Blue Ribbon Commission on America's Nuclear Future, Report to the Secretary of Energy,", p. 32, January 2012

21 Ibid., p.27

22 "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," U.S. DOE, January 11, 2013

"With the appropriate authorizations from Congress, the Obama Administration planned to implement a program over the next 10 years that would have:

- Sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites;
- Advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
- Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048."[23]

The NRC's review of DOE's license application to construct a geologic repository at Yucca Mountain was suspended in 2011 when the Obama Administration significantly reduced the budget for completing that work. However, the US Court of Appeals for the District of Columbia Circuit issued a writ of mandamus (in August 2013) [24] ordering NRC to comply with federal law and restart its review of DOE's Yucca Mountain repository license application to the extent of previously appropriated funding for the review. That review is now complete with the publication of the five-volume safety evaluation report. A supplement to DOE's environmental impact statement and an adjudicatory hearing on the contentions filed by interested parties must be completed before a licensing decision can be made. Although the DOE proposed it would start fuel acceptance in 2025, no progress has been made in the repository program since DOE's 2013 strategy was issued except for the completion of the Yucca Mountain safety evaluation report.

Holtec International submitted a license application to the NRC on March 30, 2017 for a consolidated interim spent fuel storage facility in southeast New Mexico called HI-STORE CIS (Consolidated Interim Storage) under the provisions of 10 CFR Part 72. The application is currently under NRC review.

A centralized interim storage project was initiated by Waste Control Specialists (WCS) for a site in Andrews County, Texas, adjacent to WCS's existing low-level radioactive waste and hazardous waste storage and disposal facilities. The NRC license application for this project was filed in April 2016. In April 2017, WCS

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23 Ibid., p.2

24 United States Court of Appeals for the District Of Columbia Circuit, In Re: Aiken County, et al, August 2013

asked the NRC to suspend the review of this application. Subsequently, WCS and Orano USA (formerly Areva Nuclear Materials) formed a joint venture to license the facility. In response to letters to the NRC in June and July 2018 from the joint venture, Interim Storage Partners, the NRC restarted its review of the application

On May 10, 2018, the U.S. House of Representatives passed H.R. 3053, the "Nuclear Waste Policy Amendments Act of 2018." Proposed to amend the Nuclear Waste Policy Act of 1982, the legislation, if approved by the Senate and signed by the President, would provide the DOE the authority to site, construct, and operate one or more Monitored Retrieval Storage (MRS) facilities while a permanent repository is licensed and constructed and/or to enter into an MRS agreement with a non-Federal entity for temporary storage.

Completion of the decommissioning process is dependent upon the DOE's ability to remove spent fuel from the site in a timely manner. DOE's repository program had originally assumed that spent fuel allocations would be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was discharged from the reactor.[25] However, the Blue Ribbon Commission, in its final report, noted that: "[A]ccepting spent fuel according to the OFF [Oldest Fuel First] priority ranking instead of giving priority to shutdown reactor sites could greatly reduce the cost savings that could be achieved through consolidated storage if priority could be given to accepting spent fuel from shutdown reactor sites before accepting fuel from still-operating plants. …. The magnitude of the cost savings that could be achieved by giving priority to shutdown sites appears to be large enough (i.e., in the billions of dollars) to warrant DOE exercising its right under the Standard Contract to move this fuel first."

The state of Minnesota directed the Public Utilities Commission, "when considering approval of a plan for the accrual of funds for the decommissioning of nuclear facilities" …to "include an evaluation of the costs, if any, arising from storage of used nuclear fuel that may be incurred by the state of Minnesota, and any tribal community, county, city, or township where used nuclear fuel is located following the cessation of operations at a nuclear plant."[26]

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25 U.S. Code of Federal Regulations, Title 10, Part 961.11, Article IV – Responsibilities of the Parties, B. DOE Responsibilities, 5.(a) … DOE shall issue an annual acceptance priority ranking for receipt of SNF and/or HLW at the DOE repository. This priority ranking shall be based on the age of SNF and/or HLW as calculated from the date of discharge of such materials from the civilian nuclear power reactor. The oldest fuel or waste will have the highest priority for acceptance …"

26 Minnesota Statute 216B.2445, "Nuclear Power Plant Decommissioning and Storage of Used Nuclear Fuel"

The state of Minnesota statute also prescribed the parameters to be used in evaluating spent fuel management costs. "To assist the commission in making the determination … the filing shall provide cost estimates, including ratepayer impacts, assuming used nuclear fuel will be stored in the state for 60 years, 100 years, and 200 years following the cessation of operation of the nuclear plant." [27]

Xcel Energy's current spent fuel management plan for the Prairie Island spent fuel is based in general upon:

1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
3) Fuel will be shipped in the existing Transnuclear TN-40 casks, plus NUHOMS DSCs for fuel removed after final plant shutdown (Scenarios 1, 2, 5, and 6); the canisters and NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Spent fuel assemblies from TN-40 casks that are replaced will be put into NUHOMS DSCs. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility. [28]

The NRC requires that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy, pursuant to 10 CFR Part 50.54(bb). [29] This requirement is prepared for through inclusion of certain cost elements in the decommissioning estimates, for example, associated with the isolation and continued operation of the spent fuel pool and the ISFSI.

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27 Ibid.

28 "Order Approving Nuclear Decommissioning Study, Assumptions, and Annual Accrual, and Setting Filing Requirements", Page 8, Items 12e and 12g, Minnesota Public Utilities Commission Docket E-002/M-14-761 October 4, 2015

29 U.S. Code of Federal Regulations, Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," Subpart 54 (bb), "Conditions of Licenses"

The spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor cores at shutdown. The assemblies are packaged into dry shielded canisters (DSCs) over the first four years after shutdown for transfer to the ISFSI for interim storage. It is assumed that this period provides the necessary cooling for the final cores to meet the transport and/or storage requirements for decay heat.

An ISFSI, operated under a Part 72 Site Specific License (in accordance with 10 CFR 72[30]), has been constructed to support continued plant operations. The facility is assumed to be expanded to support decommissioning. This will allow decommissioning activities to proceed within the auxiliary building.

DOE has breached its obligations to remove fuel from reactor sites, and has also failed to provide the plant owners with information about how it will ultimately perform. DOE officials have stated that DOE does not have an obligation to accept already-canistered fuel without an amendment to DOE's contracts with plant licensees to remove the fuel (the "Standard Contract"), but DOE has not explained what any such amendment would involve. Consequently, Xcel Energy has no information or expectations on how DOE will remove fuel from the site in the future. In the absence of information about how DOE will perform, and for purposes of this analysis only, it is assumed that DOE will accept already-canistered fuel. If this assumption is incorrect, it is assumed that DOE will have liability for costs incurred to transfer the fuel to DOE-supplied containers.

Xcel Energy's position is that the DOE has a contractual obligation to accept Prairie Island's fuel earlier than the projections set out above consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, including the cost of storing spent fuel in this study is appropriate to ensure the availability of sufficient decommissioning funds at the end of the station's life if the DOE has not met its obligation. The cost for the interim storage of spent fuel has been calculated and is separately presented as "Spent Fuel Management" expenditures in this report.

Site Restoration

The efficient removal of the contaminated materials at the site may result in damage to many of the site structures. Blasting, coring, drilling, and the other decontamination activities can substantially damage power block structures, potentially weakening the footings and structural supports. It is unreasonable to anticipate that these structures would be repaired and preserved after the radiological contamination is removed. The cost to dismantle site structures with a

30 U.S. Code of Federal Regulations, Title 10, Part 72.40

work force already mobilized is more efficient and less costly than if the process were deferred. Experience at shutdown generating stations has shown that plant facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public and the demolition work force.

This estimate assumes that some site features will remain following the decommissioning project. These include the existing electrical switchyard, which is assumed to remain functional in support of the regional electrical distribution system. The existing shoreline will also be left intact.

Consequently, non-essential site structures addressed by this analysis are completely removed (including foundations) as required by Minnesota statute [31]. The site is then graded and stabilized. The cost for the site restoration of non-essential and/or non-contaminated structures has been calculated and is separately presented as "Site Restoration" expenditures in this report.

Summary

The costs to decommission the Prairie Island station were evaluated for several spent fuel removal scenarios, and using both the DECON and SAFSTOR decommissioning alternatives. Regardless of the timing of the decommissioning activities, the estimates to decommission Prairie Island assume the removal of all contaminated and activated plant components and structural materials such that Xcel Energy may then have unrestricted use of the site with no further requirements for any operating license. In most of the scenarios, spent fuel remains on site following the decommissioning and site restoration of the power block structures. The spent fuel remains in storage at the site until such time that the transfer to a DOE facility can be completed. Once the transfer is complete, the storage facilities are also decommissioned.

The alternatives evaluated in this analysis are described in Section 2. The assumptions are presented in Section 3, along with schedules of annual expenditures. The major cost contributors are identified in Section 6, with detailed activity costs, waste volumes, and associated manpower requirements delineated in Appendices C through J. The major cost components are also identified in the cost summary provided at the end of this section.

The estimates presented in this document reflect the total cost to decontaminate the nuclear units, manage the spent fuel until the DOE is able to complete the transfer to a federal facility, dismantle the plant and restore the site for alternative use.

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31 Minnesota Administrative Rule part 7035.0400 "General Requirements"

The cost elements in the estimates for the four spent fuel scenarios DECON and SAFSTOR alternatives are assigned to one of three subcategories: NRC License Termination (radiological remediation), Spent Fuel Management, and Site Restoration. The subcategory "NRC License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). The cost reported for this subcategory is generally sufficient to terminate the unit's operating license, recognizing that there may be some additional cost impact from spent fuel management. The License Termination cost subcategory also includes costs to decommission the ISFSI (as required by 10 CFR §72.30). Section 3.4.1 provides the basis for the ISFSI decommissioning cost.

The "Spent Fuel Management" subcategory contains costs associated with the containerization and transfer of spent fuel from the wet storage pool to the ISFSI, as well as the transfer of the spent fuel in storage at the ISFSI to the DOE. Costs are included for the operation of the storage pool and the management of the ISFSI until such time that the transfer is complete. It does not include any spent fuel management expenses incurred prior to the cessation of plant operations, nor does it include any costs related to the final disposal of the spent fuel.

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are completely removed (including foundations) and backfilled to conform to local surface elevation.

It should be noted that the costs assigned to these subcategories are allocations. Delegation of cost elements is for the purposes of comparison (e.g., with NRC financial guidelines) or to permit specific financial treatment (e.g., Asset Retirement Obligation determinations). In reality, there can be considerable interaction between the activities in the three subcategories. For example, Xcel Energy may decide to remove non-contaminated structures early in the project to improve access to highly contaminated facilities or plant components. In these instances, the non-contaminated removal costs could be reassigned from Site Restoration to an NRC License Termination support activity. However, in general, the allocations represent a reasonable accounting of those costs that can be expected to be incurred for the specific subcomponents of the total estimated program cost, if executed as described.

As noted within this document, the estimates were developed and costs are presented in 2020 dollars. As such, the estimates do not reflect the escalation of costs (due to inflationary and market forces) over the remaining operating life of the plant or during the decommissioning period.

SCENARIO 1: DECON WITH 42 YEARS DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total
Decontamination	12,109	19,308	31,417
Removal	111,005	147,842	258,847
Packaging	27,756	28,136	55,892
Transportation	9,509	10,116	19,625
Waste Disposal	75,656	79,069	154,725
Off-site Waste Processing	26,049	30,811	56,860
Program Management [1]	239,340	227,121	466,461
Site Security	148,214	136,512	284,726
Spent Fuel Pool Isolation	14,576	9,718	24,294
Spent Fuel Storage (Direct Costs) [2]	114,819	111,649	226,467
Insurance and Regulatory Fees	19,822	16,763	36,586
Energy	10,742	9,033	19,775
Characterization and Licensing Surveys	14,531	16,907	31,438
Property Taxes	77,623	72,753	150,376
Miscellaneous	7,729	7,430	15,159
Railroad Track Maintenance	3,543	3,455	6,998
Retention and Severance	26,985	26,985	53,970
Security Modifications	5,000	5,000	10,000
Prairie Island Indian Community	51,745	50,219	101,964
Total [3]	996,753	1,008,829	2,005,582

Cost Element	Unit 1	Unit 2	Total
NRC License Termination	595,962	590,962	1,186,924
Spent Fuel Management	349,793	345,097	694,890
Site Restoration	50,998	72,770	123,768
Total [3]	996,753	1,008,829	2,005,582

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total
Decontamination	12,109	19,308	31,417
Removal	111,005	147,842	258,847
Packaging	27,756	28,136	55,892
Transportation	9,509	10,116	19,625
Waste Disposal	75,656	79,069	154,725
Off-site Waste Processing	26,049	30,811	56,860
Program Management [1]	241,656	229,438	471,094
Site Security	155,731	144,029	299,759
Spent Fuel Pool Isolation	14,576	9,718	24,294
Spent Fuel Storage (Direct Costs) [2]	116,766	113,596	230,362
Insurance and Regulatory Fees	20,622	17,563	38,185
Energy	10,742	9,033	19,775
Characterization and Licensing Surveys	14,531	16,907	31,438
Property Taxes	82,188	77,319	159,507
Miscellaneous	7,729	7,430	15,159
Railroad Track Maintenance	3,759	3,671	7,430
Retention and Severance	26,985	26,985	53,970
Security Modifications	5,000	5,000	10,000
Prairie Island Indian Community	55,496	53,970	109,466
Total [3]	1,017,865	1,029,941	2,047,805

Cost Element	Unit 1	Unit 2	Total
NRC License Termination	595,962	590,962	1,186,924
Spent Fuel Management	370,904	366,208	737,113
Site Restoration	50,998	72,770	123,768
Total [3]	1,017,865	1,029,941	2,047,805

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total
Decontamination	12,109	19,308	31,417
Removal	111,707	148,543	260,249
Packaging	27,756	28,136	55,892
Transportation	9,509	10,116	19,625
Waste Disposal	75,656	79,069	154,724
Off-site Waste Processing	26,049	30,811	56,860
Program Management [1]	323,909	311,690	635,599
Site Security	255,921	244,219	500,140
Spent Fuel Pool Isolation	14,576	9,718	24,294
Spent Fuel Storage (Direct Costs) [2]	425,553	422,384	847,937
Insurance and Regulatory Fees	31,282	28,223	59,505
Energy	10,742	9,033	19,775
Characterization and Licensing Surveys	14,531	16,907	31,438
Property Taxes	143,057	138,187	281,244
Miscellaneous	7,729	7,430	15,159
Railroad Track Maintenance	6,637	6,549	13,185
Retention and Severance	26,985	26,985	53,970
Security Modifications	5,000	5,000	10,000
Prairie Island Indian Community	105,493	103,966	209,459
Total [3]	1,634,199	1,646,275	3,280,474

Cost Element	Unit 1	Unit 2	Total
NRC License Termination	596,408	591,409	1,187,817
Spent Fuel Management	985,833	981,137	1,966,970
Site Restoration	51,958	73,730	125,688
Total [3]	1,634,199	1,646,275	3,280,474

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total
Decontamination	12,109	19,308	31,417
Removal	111,707	148,543	260,249
Packaging	27,756	28,136	55,892
Transportation	9,509	10,116	19,625
Waste Disposal	75,656	79,069	154,724
Off-site Waste Processing	26,049	30,811	56,860
Program Management [1]	468,903	456,684	925,587
Site Security	506,407	494,705	1,001,112
Spent Fuel Pool Isolation	14,576	9,718	24,294
Spent Fuel Storage (Direct Costs) [2]	859,315	856,146	1,715,461
Insurance and Regulatory Fees	57,933	54,874	112,807
Energy	10,742	9,033	19,775
Characterization and Licensing Surveys	14,531	16,907	31,438
Property Taxes	295,229	290,360	585,589
Miscellaneous	7,729	7,430	15,159
Railroad Track Maintenance	13,831	13,743	27,575
Retention and Severance	26,985	26,985	53,970
Security Modifications	5,000	5,000	10,000
Prairie Island Indian Community	230,489	228,963	459,452
Total [3]	2,774,456	2,786,532	5,560,987

Cost Element	Unit 1	Unit 2	Total
NRC License Termination	596,408	591,409	1,187,817
Spent Fuel Management	2,126,089	2,121,393	4,247,483
Site Restoration	51,958	73,730	125,688
Total [3]	2,774,456	2,786,532	5,560,987

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total
Decontamination	8,262	17,629	25,891
Removal	118,236	154,208	272,444
Packaging	21,286	21,654	42,940
Transportation	7,988	8,587	16,575
Waste Disposal	59,926	62,040	121,966
Off-site Waste Processing	26,624	31,387	58,012
Program Management [1]	321,644	315,246	636,891
Site Security	216,744	170,639	387,383
Spent Fuel Pool Isolation	14,576	9,718	24,294
Spent Fuel Storage (Direct Costs) [2]	109,664	106,495	216,159
Insurance and Regulatory Fees	47,122	43,899	91,021
Energy	21,571	21,262	42,833
Characterization and Licensing Surveys	15,797	18,173	33,970
Property Taxes	214,410	209,541	423,951
Miscellaneous	18,316	22,688	41,004
Railroad Track Maintenance	4,733	4,645	9,377
Retention and Severance	26,985	26,985	53,970
Security Modifications	5,000	5,000	10,000
Prairie Island Indian Community	51,745	50,219	101,964
Total [3]	1,310,629	1,300,016	2,610,645

Cost Element	Unit 1	Unit 2	Total
NRC License Termination	970,442	944,187	1,914,629
Spent Fuel Management	281,510	275,338	556,848
Site Restoration	58,677	80,490	139,167
Total [3]	1,310,629	1,300,016	2,610,645

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total
Decontamination	8,262	17,629	25,891
Removal	118,240	154,230	272,471
Packaging	21,286	21,654	42,940
Transportation	7,988	8,588	16,575
Waste Disposal	59,926	62,042	121,968
Off-site Waste Processing	26,624	31,387	58,012
Program Management [1]	322,356	318,247	640,604
Site Security	218,124	180,276	398,401
Spent Fuel Pool Isolation	14,576	9,718	24,294
Spent Fuel Storage (Direct Costs) [2]	111,541	108,372	219,913
Insurance and Regulatory Fees	47,872	44,607	92,479
Energy	21,571	21,262	42,833
Characterization and Licensing Surveys	15,797	18,173	33,970
Property Taxes	218,698	213,829	432,527
Miscellaneous	18,316	22,688	41,004
Railroad Track Maintenance	4,733	4,645	9,377
Retention and Severance	26,985	26,985	53,970
Security Modifications	5,000	5,000	10,000
Prairie Island Indian Community	55,496	53,970	109,466
Total [3]	1,323,393	1,323,304	2,646,697

Cost Element	Unit 1	Unit 2	Total
NRC License Termination	968,306	952,576	1,920,882
Spent Fuel Management	296,410	290,238	586,648
Site Restoration	58,677	80,490	139,167
Total [3]	1,323,393	1,323,304	2,646,697

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total
Decontamination	8,262	17,447	25,709
Removal	119,002	155,038	274,040
Packaging	25,596	25,964	51,560
Transportation	7,988	8,588	16,576
Waste Disposal	59,928	62,049	121,977
Off-site Waste Processing	26,624	31,387	58,012
Program Management [1]	359,684	363,609	723,293
Site Security	279,245	272,250	551,495
Spent Fuel Pool Isolation	14,576	9,718	24,294
Spent Fuel Storage (Direct Costs) [2]	420,010	416,736	836,746
Insurance and Regulatory Fees	57,899	54,267	112,167
Energy	21,590	21,282	42,872
Characterization and Licensing Surveys	15,797	18,173	33,970
Property Taxes	278,005	273,136	551,141
Miscellaneous	18,316	22,688	41,004
Railroad Track Maintenance	6,373	6,285	12,659
Retention and Severance	26,985	26,985	53,970
Security Modifications	5,000	5,000	10,000
Prairie Island Indian Community	105,493	103,966	209,459
Total [3]	1,856,374	1,894,569	3,750,943

Cost Element	Unit 1	Unit 2	Total
NRC License Termination	963,420	983,908	1,947,327
Spent Fuel Management	836,113	832,007	1,668,119
Site Restoration	56,842	78,655	135,496
Total [3]	1,856,374	1,894,569	3,750,943

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total
Decontamination	8,262	17,447	25,709
Removal	119,002	155,038	274,040
Packaging	25,596	25,964	51,560
Transportation	7,988	8,588	16,576
Waste Disposal	59,928	62,049	121,977
Off-site Waste Processing	26,624	31,387	58,012
Program Management [1]	504,679	508,603	1,013,282
Site Security	501,598	494,603	996,201
Spent Fuel Pool Isolation	14,576	9,718	24,294
Spent Fuel Storage (Direct Costs) [2]	853,529	850,323	1,703,853
Insurance and Regulatory Fees	84,550	80,918	165,469
Energy	21,590	21,282	42,872
Characterization and Licensing Surveys	15,797	18,173	33,970
Property Taxes	430,177	425,308	855,485
Miscellaneous	18,316	22,688	41,004
Railroad Track Maintenance	13,568	13,480	27,048
Retention and Severance	26,985	26,985	53,970
Security Modifications	5,000	5,000	10,000
Prairie Island Indian Community	230,489	228,963	459,452
Total [3]	2,968,256	3,006,518	5,974,774

Cost Element	Unit 1	Unit 2	Total
NRC License Termination	963,419	983,907	1,947,327
Spent Fuel Management	1,947,994	1,943,956	3,891,950
Site Restoration	56,842	78,655	135,496
Total [3]	2,968,256	3,006,518	5,974,774

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

1. INTRODUCTION

This report presents estimates of the cost to decommission the Prairie Island Nuclear Generating Plant (Prairie Island) and the operation and eventual decommissioning of the on-site Independent Spent Fuel Storage Installation (ISFSI) for the selected decommissioning scenarios following the scheduled cessation of plant operations. The estimates are designed to provide Xcel Energy with the information to assess its current decommissioning liability, as it relates to Prairie Island.

The analysis relies upon site-specific, technical information from an earlier evaluation prepared in 2017, [1]* updated to reflect current assumptions pertaining to the disposition of the nuclear plant and relevant industry experience in undertaking such projects. The costs are based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site restoration requirements.

The analysis is not a detailed engineering evaluation, but an estimate prepared in advance of the detailed engineering required to carry out the decommissioning of the nuclear units. It may also not reflect the actual plan to decommission Prairie Island; the plan may differ from the assumptions made in this analysis based on facts that exist at the time of decommissioning.

The 2017 plant inventory was reviewed for this analysis. It serves as the basis for the decontamination and dismantling requirements, cost, and the decommissioning waste streams. The review confirmed that there were no substantive changes to the configuration of the plant or site facilities that would impact decommissioning over the last three years.

1.1 OBJECTIVES OF STUDY

The objectives of this study are to prepare comprehensive estimates of the cost to decommission Prairie Island, to provide a sequence or schedule for the associated activities, and to develop waste stream projections from the decontamination and dismantling activities.

The operating licenses were originally issued for the plant in August 1973 and October 1974 for Units 1 and 2, respectively, and were valid for a period of 40

* Annotated references for citations in Sections 1-6 are provided in Section 7

years. In April 2008, Nuclear Management Company (as agent for Xcel Energy), submitted an application for renewed licenses (i.e., 20 year extensions). The application was approved by the NRC in June 2011. Therefore, for the purposes of this study, final shutdown dates (license expiration) for Unit 1 and Unit 2 are August 9, 2033 and October 29, 2034, respectively, assuming a 60-year operating life (the current operating licenses' expiration dates).

1.2 SITE DESCRIPTION

Prairie Island is located in Goodhue County Minnesota, on the west bank of the Mississippi River, approximately 26 miles southeast of the Twin City Metropolitan Area and within the city limits of Red Wing.

The Nuclear Steam Supply System (NSSS) consists of a pressurized water reactor and a two-loop reactor coolant system. The system is comprised of the reactor vessel and two closed reactor coolant loops connected in parallel to the reactor vessel, each containing a reactor coolant pump and a steam generator. An electrically heated pressurizer is connected to one of the loops.

The system is housed within the reactor containment vessel, a free-standing cylindrical steel shell with a hemispherical dome and ellipsoidal bottom designed to withstand the internal pressure accompanying a loss-of-coolant accident. The reactor containment vessel is surrounded by a cylindrical shield building constructed of reinforced concrete, which serves as a radiation shielding for normal operations and for the loss-of-coolant condition.

Heat produced in the reactor is converted to electrical energy by the plant's power conversion system. A turbine-generator converts the thermal energy of steam produced in the steam generators into mechanical shaft power and then into electrical energy. The turbine-generator consists of one high-pressure, double-flow and two low-pressure, double-flow elements driving a direct-coupled generator at 1800 rpm. The turbines are operated in a closed feedwater cycle in which the steam is condensed and returned to the steam generators by the feedwater system.

Heat rejected in the main condensers is removed by the circulating water system, which provides the heat sink for the removal of the waste heat in the power plant's thermal cycle. The majority of the heat is removed through dilution with river water in the discharge canal. Forced draft cooling towers provide supplemental heat removal.

1.3 REGULATORY GUIDANCE

The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule "General Requirements for Decommissioning Nuclear Facilities," issued in June 1988.[2] This rule set forth financial criteria for decommissioning licensed nuclear power facilities. The regulation addressed decommissioning planning needs, timing, funding methods, and environmental review requirements. The intent of the rule was to ensure that decommissioning would be accomplished in a safe and timely manner and that adequate funds would be available for this purpose. Subsequent to the rule, the NRC issued Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors,[3]" which provided additional guidance to the licensees of nuclear facilities on the financial methods acceptable to the NRC staff for complying with the requirements of the rule. The regulatory guide addressed the funding requirements and provided guidance on the content and form of the financial assurance mechanisms indicated in the rule.

The rule defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB. The DECON alternative assumes that any contaminated or activated portion of the plant's systems, structures, and facilities are removed or decontaminated to levels that permit the site to be released for unrestricted use shortly after the cessation of plant operations while the SAFSTOR and ENTOMB alternatives defer the process.

The rule also placed limits on the time allowed to complete the decommissioning process. For the SAFSTOR alternative, the process is restricted in overall duration to 60 years, unless it can be shown that a longer duration is necessary to protect public health and safety. The guidelines for ENTOMB are similar, providing the NRC with both sufficient leverage and flexibility to ensure that these deferred options are only used in situations where it is reasonable and consistent with the definition of decommissioning. At the conclusion of a 50 to 60-year dormancy period (or longer for ENTOMB if the NRC approves such a case), the site would still require significant remediation to meet the unrestricted release limits for license termination.

The ENTOMB alternative has not been viewed as a viable option for power reactors due to the significant time required to isolate the long-lived radionuclides for decay to permissible levels. However, with rulemaking permitting the controlled release of a site, [4] the NRC did re-evaluate the alternative. The resulting feasibility study, based upon an assessment by Pacific Northwest National Laboratory, concluded that the method did have conditional merit for some, if not most reactors. The staff also found that

additional rulemaking would be needed before this option could be treated as a generic alternative.

The NRC had considered rulemaking to alter the 60-year time for completing decommissioning and to clarify the use of engineered barriers for reactor entombments.[5] However, the NRC's staff has recommended that rulemaking be deferred, based upon several factors, e.g., no licensee has committed to pursuing the entombment option, the unresolved issues associated with the disposition of greater-than-Class C material (GTCC), and the NRC's current priorities, at least until after the additional research studies are complete. The Commission concurred with the staff's recommendation. In a draft regulatory basis document published in March 2017 in support of rulemaking that would amend NRC regulations concerning nuclear plant decommissioning, the NRC staff proposes removing any discussion of the ENTOMB option from existing guidance documents since the method is not deemed practically feasible.

In 1996, the NRC published revisions to the general requirements for decommissioning nuclear power plants. [6] When the regulations were originally adopted in 1988, it was assumed that the majority of licensees would decommission at the end of the facility's operating licensed life. Since that time, several licensees permanently and prematurely ceased operations. Exemptions from certain operating requirements were required once the reactor was defueled to facilitate the decommissioning. Each case was handled individually, without clearly defined generic requirements. The NRC amended the decommissioning regulations in 1996 to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in the decommissioning process. The new amendments allow for greater public participation and better define the transition process from operations to decommissioning.

Under the revised regulations, licensees will submit written certification to the NRC within 30 days after permanent shutdown. Certification will also be required once the fuel is permanently removed from the reactor vessels. Submittal of these notices will entitle the licensee to a fee reduction and eliminate the obligation to follow certain requirements needed only during operation of the reactor. Prior to or within two years following permanent cessation of operations, the licensee is required to submit a Post-Shutdown Decommissioning Activities Report (PSDAR) to the NRC, and a copy to the affected State(s) (10 CFR 50.82(a)(4)(i)). The PSDAR describes the planned decommissioning activities, the associated sequence and schedule, and an estimate of expected costs. Prior to completing decommissioning, the licensee is required to submit applications to the NRC to terminate the license, which will include a License Termination Plan (LTP).

In 2011, the NRC published amended regulations to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site.[7] The regulations require licensees to report additional details in their decommissioning cost estimate including a decommissioning estimate for the ISFSI. This estimate is provided in Appendix K.

1.3.1 High-Level Radioactive Waste Management

Congress passed the "Nuclear Waste Policy Act" [8] (NWPA) in 1982, assigning the federal government's long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The DOE was to begin accepting spent fuel by January 31, 1998; however, to date no progress in the removal of spent fuel from commercial generating sites has been made.

Today, the country is at an impasse on high-level waste disposal, even with the License Application for a geologic repository submitted by the DOE to the NRC in 2008. The Obama administration cut the budget for the repository program while promising to "conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle … and make recommendations for a new plan." Towards this goal, the administration appointed a Blue Ribbon Commission on America's Nuclear Future (Blue Ribbon Commission) to make recommendations for a new plan for nuclear waste disposal. The Blue Ribbon Commission's charter includes a requirement that it consider "[o]ptions for safe storage of used nuclear fuel while final disposition pathways are selected and deployed."[9]

On January 26, 2012, the Blue Ribbon Commission issued its "Report to the Secretary of Energy" containing a number of recommendations on nuclear waste disposal. Two of the recommendations that may impact decommissioning planning are:

- "[T]he United States [should] establish a program that leads to the timely development of one or more consolidated storage facilities"[10]
- "[T]he United States should undertake an integrated nuclear waste management program that leads to the timely development of one or more permanent deep geological facilities for the safe disposal of spent fuel and high-level nuclear waste."

In January 2013, the DOE issued the "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," in response to the recommendations made by the Blue Ribbon Commission and as "a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel..." [11] This document states:

"With the appropriate authorizations from Congress, the Obama Administration planned to implement a program over the next 10 years that would have:

- Sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites;
- Advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
- Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048."

The NRC's review of DOE's license application to construct a geologic repository at Yucca Mountain was suspended in 2011 when the Obama Administration significantly reduced the budget for completing that work. However, the US Court of Appeals for the District of Columbia Circuit issued a writ of mandamus (in August 2013) [12] ordering NRC to comply with federal law and restart its review of DOE's Yucca Mountain repository license application to the extent of previously appropriated funding for the review. That review is now complete with the publication of the five-volume safety evaluation report. A supplement to DOE's environmental impact statement and an adjudicatory hearing on the contentions filed by interested parties must be completed before a licensing decision can be made. Although the DOE proposed it would start fuel acceptance in 2025, no progress has been made in the repository program since DOE's 2013 strategy was issued except for the completion of the Yucca Mountain safety evaluation report.

Holtec International submitted a license application to the NRC on March 30, 2017 for a consolidated interim spent fuel storage facility in southeast New Mexico called HI-STORE CIS (Consolidated Interim

Storage) under the provisions of 10 CFR Part 72. The application is currently under NRC review.

A centralized interim storage project was initiated by Waste Control Specialists (WCS) for a site in Andrews County, Texas, adjacent to WCS's existing low-level radioactive waste and hazardous waste storage and disposal facilities. The NRC license application for this project was filed in April 2016. In April 2017, WCS asked the NRC to suspend the review of this application. Subsequently, WCS and Orano USA (formerly Areva Nuclear Materials) formed a joint venture to license the facility. In response to letters to the NRC in June and July 2018 from the joint venture, Interim Storage Partners, the NRC restarted its review of the application.

On May 10, 2018, the U.S. House of Representatives passed H.R. 3053, the "Nuclear Waste Policy Amendments Act of 2018." Proposed to amend the Nuclear Waste Policy Act of 1982, the legislation, if approved by the Senate and signed by the President, would provide the DOE the authority to site, construct, and operate one or more Monitored Retrieval Storage (MRS) facilities while a permanent repository is licensed and constructed and/or to enter into an MRS agreement with a non-Federal entity for temporary storage.

Completion of the decommissioning process is dependent upon the DOE's ability to remove spent fuel from the site in a timely manner. DOE's repository program had originally assumed that spent fuel allocations would be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was discharged from the reactor.[13] However, the Blue Ribbon Commission, in its final report, noted that: "[A]ccepting spent fuel according to the OFF [Oldest Fuel First] priority ranking instead of giving priority to shutdown reactor sites could greatly reduce the cost savings that could be achieved through consolidated storage if priority could be given to accepting spent fuel from shutdown reactor sites before accepting fuel from still-operating plants. …. The magnitude of the cost savings that could be achieved by giving priority to shutdown sites appears to be large enough (i.e., in the billions of dollars) to warrant DOE exercising its right under the Standard Contract to move this fuel first."

The state of Minnesota directed the Public Utilities Commission, "when considering approval of a plan for the accrual of funds for the decommissioning of nuclear facilities" …to "include an evaluation of the

costs, if any, arising from storage of used nuclear fuel that may be incurred by the state of Minnesota, and any tribal community, county, city, or township where used nuclear fuel is located following the cessation of operations at a nuclear plant."[14]

The state of Minnesota statute also prescribed the parameters to be used in evaluating spent fuel management costs. "To assist the commission in making the determination … the filing shall provide cost estimates, including ratepayer impacts, assuming used nuclear fuel will be stored in the state for 60 years, 100 years, and 200 years following the cessation of operation of the nuclear plant."

Xcel Energy's current spent fuel management plan for the Prairie Island spent fuel is based in general upon:

1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
3) Fuel will be shipped in the existing Transnuclear TN-40 casks, plus NUHOMS DSCs for fuel removed after final plant shutdown (Scenarios 1, 2, 5, and 6); the canisters and NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Spent fuel assemblies from TN-40 casks that are replaced will be put into NUHOMS DSCs. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility. [15]

The NRC requires that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy, pursuant to 10 CFR Part 50.54(bb). [16] This requirement is prepared for through inclusion of certain cost elements in the decommissioning estimates, for example, associated with the isolation and continued operation of the spent fuel pool and the ISFSI.

The spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor cores at shutdown. In the DECON and SAFSTOR scenarios, the assemblies are packaged into dry shielded canisters (DSCs) over the first four years after shutdown for transfer to the ISFSI for interim storage. It is assumed that this period provides the necessary cooling for the final cores to meet the transport and/or storage requirements for decay heat.

An ISFSI, operated under a Part 72 Site Specific License (in accordance with 10 CFR 72[17]), has been constructed to support continued plant operations. The facility is assumed to be expanded to support decommissioning. This will allow decommissioning activities to proceed within the auxiliary building.

DOE has breached its obligations to remove fuel from reactor sites, and has also failed to provide the plant owners with information about how it will ultimately perform. DOE officials have stated that DOE does not have an obligation to accept already-canistered fuel without an amendment to DOE's contracts with plant licensees to remove the fuel (the "Standard Contract"), but DOE has not explained what any such amendment would involve. Consequently, Xcel Energy has no information or expectations on how DOE will remove fuel from the site in the future. In the absence of information about how DOE will perform, and for purposes of this analysis only, it is assumed that DOE will accept already-canistered fuel. If this assumption is incorrect, it is assumed that DOE will have liability for costs incurred to transfer the fuel to DOE-supplied containers.

Xcel Energy's position is that the DOE has a contractual obligation to accept Prairie Island's fuel earlier than the projections set out above, consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, including the cost of storing spent fuel in this study is appropriate to ensure the availability of sufficient decommissioning funds at the end of the station's life if the DOE has not met its obligation. The cost for the interim storage of spent fuel has been calculated and is separately presented as "Spent Fuel Management" expenditures in this report.

1.3.2 Low-Level Radioactive Waste Disposal

The contaminated and activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for "shallow-land" disposal. With the passage of the

"Low-Level Radioactive Waste Policy Act" in 1980, [18] and its Amendments of 1985, [19] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders. It was expected that groups of states would combine together to jointly deal with their radioactive wastes; these organizations are referred to as waste disposal compacts.

With the exception of Texas, no new compact facilities have been successfully sited, licensed, and constructed. The Texas Compact disposal facility is now operational and waste is being accepted from generators within the Compact by the operator, Waste Control Specialists (WCS). The facility is also able to accept limited quantities of non-Compact waste.

Disposition of the various waste streams produced by the decommissioning process considered all options and services currently available to Xcel Energy. The majority of the low-level radioactive waste designated for direct disposal (Class A [20]) can be sent to Energy*Solutions*' facility in Clive, Utah. Therefore, disposal costs for Class A waste were based upon current contract rates. This facility is not licensed to receive the higher activity portion (Classes B and C) of the decommissioning waste stream.

The Texas facility is licensed to receive the higher activity waste forms (Classes B and C). As such, for this analysis, disposal costs for the Class B and C waste were based upon the preliminary and indicative information on the cost for such from WCS.

The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow-land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste.

The DOE issued its final Environmental Impact Statement for the disposal of GTCC on January 2016.[21] The study evaluated the potential environmental impacts associated with constructing and operating a new facility or using an existing facility, disposal methods, and locations. DOE is awaiting Congressional action on the report and its recommendations. At this time, the federal government has not

identified a specific cost for disposing of GTCC or a schedule for acceptance.

For purposes of this analysis, the GTCC radioactive waste is assumed to be packaged and disposed of in a similar manner as high-level waste and at a cost equivalent to that envisioned for the spent fuel. The GTCC is packaged in the same canisters used for spent fuel and either stored on site or shipped directly to a DOE facility as it is generated (depending upon the timing of the decommissioning and whether the spent fuel has been removed from the site prior to the start of decommissioning).

A significant portion of the metallic waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be surveyed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to isolate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates reflect the savings from waste recovery/volume reduction.

1.3.3 Radiological Criteria for License Termination

In 1997, the NRC published Subpart E, "Radiological Criteria for License Termination," [22] amending 10 CFR §20. This subpart provides radiological criteria for releasing a facility for unrestricted use. The regulation states that the site can be released for unrestricted use if radioactivity levels are such that the average member of a critical group would not receive a Total Effective Dose Equivalent (TEDE) in excess of 25 millirem per year, and provided that residual radioactivity has been reduced to levels that are As Low As Reasonably Achievable (ALARA). The decommissioning estimates assume that the Prairie Island site will be remediated to a residual level consistent with the NRC-prescribed level.

It should be noted that the NRC and the Environmental Protection Agency (EPA) differ on the amount of residual radioactivity considered acceptable in site remediation. The EPA has two limits that apply to radioactive materials. An EPA limit of 15 millirem per year is derived from criteria established by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund). [23]

An additional and separate limit of 4 millirem per year, as defined in 40 CFR §141.66, is applied to drinking water. [24]

On October 9, 2002, the NRC signed an agreement with the EPA on the radiological decommissioning and decontamination of NRC-licensed sites. The Memorandum of Understanding (MOU) [25] provides that EPA will defer exercise of authority under CERCLA for the majority of facilities decommissioned under NRC authority. The MOU also includes provisions for NRC and EPA consultation for certain sites when, at the time of license termination, (1) groundwater contamination exceeds EPA-permitted levels; (2) NRC contemplates restricted release of the site; and/or (3) residual radioactive soil concentrations exceed levels defined in the MOU.

The MOU does not impose any new requirements on NRC licensees and should reduce the involvement of the EPA with NRC licensees who are decommissioning. Most sites are expected to meet the NRC criteria for unrestricted use, and the NRC believes that only a few sites will have groundwater or soil contamination in excess of the levels specified in the MOU that trigger consultation with the EPA. However, if there are other hazardous materials on the site, the EPA may be involved in the cleanup. As such, the possibility of dual regulation remains for certain licensees. The present study does not include any costs for this occurrence.

FIGURE 1.1
PRAIRIE ISLAND NUCLEAR GENERATING PLANT
GENERAL PLAN

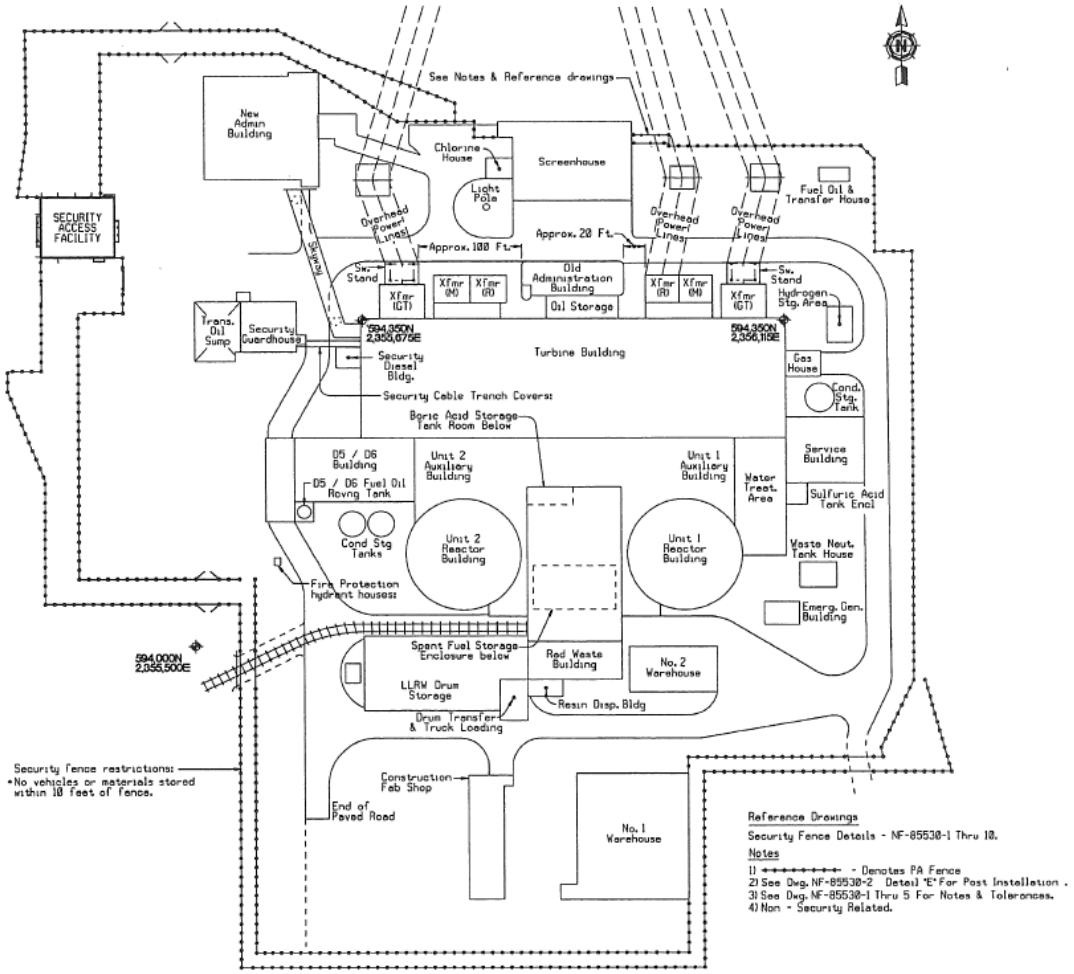
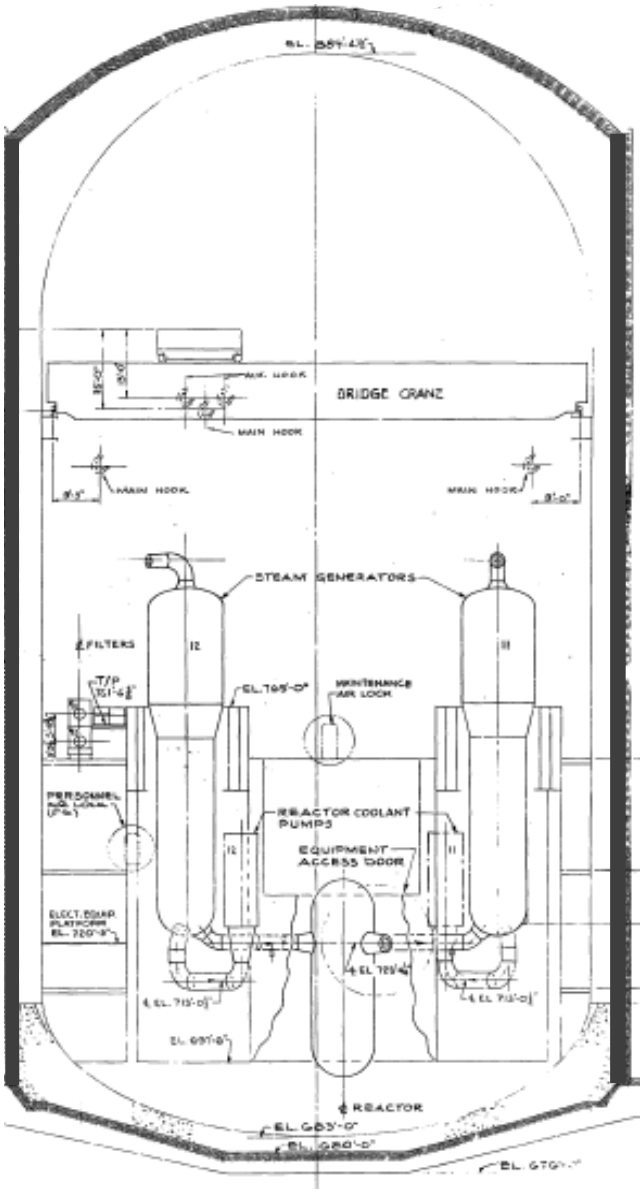


FIGURE 1.2
PRAIRIE ISLAND NUCLEAR GENERATING PLANT
AERIAL VIEW

FIGURE 1.3
PRAIRIE ISLAND NUCLEAR GENERATING PLANT
REACTOR BUILDING SECTION



2. DECOMMISSIONING ALTERNATIVES

Detailed cost estimates were developed to decommission Prairie Island based upon the approved decommissioning alternatives: DECON and SAFSTOR. Although the alternatives differ with respect to technique, process, cost, and schedule, they attain the same result: the ultimate release of the site for unrestricted use.

The following scenarios were evaluated and are intended to bound the liability associated with the removal of spent fuel from the site. The current operating licenses expire in 2033 and 2034. The scenarios consist of four spent fuel management scenarios, each with a DECON and a SAFSTOR decommissioning scenario for eight total scenarios, The duration of the spent fuel scenarios has little impact to the decommissioning costs and timing of the power block systems and structures. The spent fuel in the plant's spent fuel storage pool is transferred to the ISFSI within the first four years. The equipment, structures, and portions of the plant containing radioactive contaminants are removed or decontaminated to a level that permits the facility to be released for unrestricted use. Non-essential structures are then demolished. Spent fuel storage operations continue at the ISFSI until the transfer of the fuel to the DOE is completed (as shown in the "Last Spent Fuel Assembly" column in the following table).

Scenario	1st Spent Fuel Canister Replacement	1st Spent Fuel Assembly Removed from Prairie Island	Last Spent Fuel Assembly Removed from Prairie Island	Scenario Identification
1	n/a	2037	2074	DECON with 42 Year DFS+
2	n/a	2053	2077	DECON with 60 Year DFS
3	2045	2093	2117	DECON with 100 Year DFS
4	2045	2193	2217	DECON with 200 Year DFS
5	n/a	2037	2074	SAFSTOR with 42 Year DFS
6	n/a	2053	2077	SAFSTOR with 60 Year DFS
7	2045	2093	2117	SAFSTOR with 100 Year DFS
8	2045	2193	2217	SAFSTOR with 200 Year DFS

+ Dry Fuel Storage

For Scenarios 1 and 5, although they only provide a total fuel storage period of 42 years following Unit 2 shutdown, some of the Prairie Island casks have been in storage since 1995. Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters for those casks that exceed 50 years. The assumption to not transfer spent fuel at 50-years total storage duration for these two scenarios was premised on the likelihood that the life of the canisters could be successfully extended for the additional years.

For Scenarios 2 and 6, although they provide a total fuel storage period of nominally 60 years following shutdown, Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters at the 50-year mark.

In Scenarios 3, 4, 7 and 8, the Dry Shielded Canisters (DSCs) are assumed to be replaced after fifty years of use. Since the auxiliary building spent fuel storage pool and fuel handling facilities are removed by the year 2037, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. For Scenarios 3 and 7, two such transfers are needed over the time frame assumed. For Scenarios 4 and 8, the spent fuel will be transferred four times following initial placement in the ISFSI.

The following sections describe the basic activities associated with each alternative. Although detailed procedures for each activity identified are not provided, and the actual sequence of work may vary, the activity descriptions provide a basis not only for estimating but also for the expected scope of work (i.e., engineering and planning at the time of decommissioning).

The conceptual approach that the NRC has described in its regulations divides decommissioning into three phases. The initial phase commences with the effective date of permanent cessation of operations and involves the transition of both plant and licensee from reactor operations (i.e., power production) to facilitate de-activation and closure. During the first phase, notification is to be provided to the NRC certifying the permanent cessation of operations and the removal of fuel from the reactor vessels. The licensee would then be prohibited from reactor operation.

The second phase encompasses activities during the storage period or during major decommissioning activities, or a combination of the two. The third phase pertains to the activities involved in license termination. The decommissioning estimates developed for Prairie Island are also divided into phases or periods; however, demarcation of the phases is based upon major milestones within the project or significant changes in the projected expenditures.

2.1 DECON

The DECON alternative, as defined by the NRC, is "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations." This study does not address the cost to dispose of the spent fuel residing at the site; such costs are funded through a surcharge on electrical generation. However, the study does estimate the costs incurred with the interim on-site storage of the fuel pending shipment by the DOE to an off-site disposal facility. Those costs are separately presented as "Spent Fuel Management" expenditures in this report.

2.1.1 Period 1 - Preparations

In anticipation of the cessation of plant operations, detailed preparations are undertaken to provide a smooth transition from plant operations to site decommissioning. Through implementation of a staffing transition plan, the organization required to manage the intended decommissioning activities is assembled from available plant staff and outside resources. Preparations include the planning for permanent defueling of the reactor, revision of technical specifications applicable to the operating conditions and requirements, a characterization of the facility and major components, and the development of the PSDAR.

Engineering and Planning

The PSDAR, required prior to, or within two years of permanent cessation of operations, provides a description of the licensee's planned decommissioning activities, a timetable, a site-specific decommissioning cost estimate, and the associated financial requirements of the intended decommissioning program. Upon receipt of the PSDAR, the NRC will make the document available to the public for comment in a local meeting to be held in the vicinity of the reactor site. Ninety days following submittal and NRC receipt of the PSDAR, the licensee may begin to perform major decommissioning activities under a modified 10 CFR §50.59 procedure, (10 CFR §50.59 establishes the conditions under which licensees may make changes to the facility or procedures and conduct test or experiments, i.e., without prior NRC approval). Major activities are defined as any activity that results in permanent removal of major radioactive components, permanently modifies the structure of the containment, or results in dismantling components (for shipment)

containing GTCC, as defined by 10 CFR §61. Major components are further defined as comprising the reactor vessel and internals, large bore reactor coolant system piping, and other large components that are radioactive. The NRC includes the following additional criteria for use of the §50.59 process in decommissioning. The proposed activity must not:

- foreclose release of the site for possible unrestricted use,
- significantly increase decommissioning costs,
- cause any significant environmental impact not previously reviewed, or
- result in there no longer being reasonable assurance that adequate funds will be available for decommissioning

Existing operational technical specifications are reviewed and modified to reflect plant conditions and the safety concerns associated with permanent cessation of operations. The environmental impact associated with the planned decommissioning activities is also considered. Typically, a licensee will not be allowed to proceed if the consequences of a particular decommissioning activity are greater than that bounded by previously evaluated environmental assessments or impact statements. In this instance, the licensee would have to submit a license amendment for the specific activity and update the environmental report.

The decommissioning program outlined in the PSDAR will be designed to accomplish the required tasks within the ALARA guidelines (as defined in 10 CFR §20) for protection of personnel from exposure to radiation hazards. It will also address the continued protection of the health and safety of the public and the environment during the dismantling activity. Consequently, with the development of the PSDAR, activity specifications, cost-benefit and safety analyses, and work packages and procedures, would be assembled to support the proposed decontamination and dismantling activities.

Site Preparations

Following final plant shutdown, and in preparation for actual decommissioning activities, the following activities are initiated:

- Characterization of the site and surrounding environs. This includes radiation surveys of work areas, major components (including the

reactor vessel and its internals), internal piping, and primary shield cores.

- An ISFSI has been constructed to support continued plant operation and will need to be expanded following the cessation of operations to offload the spent fuel pool in support of the decommissioning program.
- Isolation of the spent fuel storage pool and fuel handling systems, such that decommissioning operations can commence on the balance of the plant. Decommissioning operations are scheduled around the fuel handling area to optimize the overall project schedule. It is assumed that the fuel pool remains operational for the transfer of fuel for approximately four years following the cessation of operations.
- Specification of transport and disposal requirements for activated materials and/or hazardous materials, including shielding and waste stabilization.
- Development of procedures for occupational exposure control, control and release of liquid and gaseous effluent, processing of radwaste (including dry-active waste, resins, filter media, metallic and non-metallic components generated in decommissioning), site security and emergency programs, and industrial safety.
- Perform chemical decontamination of the NSSS to reduce radiation levels in support of removal operations.

2.1.2 Period 2 - Decommissioning Operations

This period includes the physical decommissioning activities associated with the removal and disposal of contaminated and activated components and structures, including the successful amendment of the 10 CFR §50 operating licenses (releasing the site, exclusive of the ISFSI). Significant decommissioning activities in this phase include:

- Construction of temporary facilities and/or modification of existing facilities to support dismantling activities. This may include a centralized processing area to facilitate equipment removal and component preparations for off-site disposal.
- Reconfiguration and modification of site structures and facilities as needed to support decommissioning operations. This may include the upgrading of roads (on- and off-site) to facilitate hauling and transport. Modifications may be required to the containment

structure to facilitate access of large/heavy equipment. Modifications may also be required to the refueling area of the building to support the segmentation of the reactor vessel internals and component extraction.

- Transfer of the spent fuel from the spent fuel storage pool to the ISFSI pad for interim storage.
- Design and fabrication of temporary and permanent shielding to support removal and transportation activities, construction of contamination control envelopes, and the procurement of specialty tooling.
- Procurement (lease or purchase) of shipping canisters, cask liners, and industrial packages.
- Decontamination of components and piping systems as required to control (minimize) worker exposure.
- Removal of piping and components no longer essential to support decommissioning operations.
- Removal of control rod drive housings and the head service structure from reactor vessel head. Segment the vessel closure head.
- Removal and segmentation of the upper internals assemblies. Segmentation will maximize the loading of the shielded transport casks, (i.e., by weight and activity). The operations are conducted under water using remotely operated tooling and contamination controls.
- Disassembly and segmentation of the remaining reactor internals, including the core former and lower core support assembly. Some material is expected to exceed Class C disposal requirements. As such, the segments will be packaged in modified spent fuel storage canisters for geologic disposal.
- Segmentation of the reactor vessel. A shielded platform is installed for segmentation as cutting operations are performed in air using remotely operated equipment within a contamination control envelope. The water level is maintained just below the cut to minimize the working area dose rates. Segments are transferred in-air to containers that are stored under water, for example, in an isolated area of the refueling canal.
- Removal of the activated portions of the concrete biological shield and accessible contaminated concrete surfaces. If dictated by the steam generator and pressurizer removal scenarios, those portions of the

associated cubicles necessary for access and component extraction are removed.

- Removal of the steam generators and pressurizer for material recovery and controlled disposal. The generators will be moved to an on-site processing center, the steam domes are removed and the internal components segregated for off-site processing. The lower shell and tube bundle will be packaged for direct disposal. These components can serve as their own burial containers provided that all penetrations are properly sealed and the internal contaminants are stabilized. Steel shielding is added, as necessary, to those external areas of the steam generators to meet transportation limits and regulations.
- Expansion of the ISFSI and transfer of the spent fuel from the storage pool to the ISFSI pad for interim storage. Spent fuel storage operations continue throughout the active decommissioning period. Fuel transfer to DOE is expected to be completed by the end of the year 2074 (Scenario 1).

At least two years prior to the anticipated date of license termination, an LTP is required. Submitted as a supplement to the Final Safety Analysis Report (FSAR) or its equivalent, the plan must include: a site characterization, description of the remaining dismantling activities, plans for site remediation, procedures for the final radiation survey, designation of the end use of the site, an updated cost estimate to complete the decommissioning, and any associated environmental concerns. The NRC will notice the receipt of the plan, make the plan available for public comment, and schedule a local meeting. LTP approval will be subject to any conditions and limitations as deemed appropriate by the Commission. The licensee may then commence with the final remediation of site facilities and services, including:

- Removal of remaining plant systems and associated components as they become nonessential to the decommissioning program or worker health and safety (e.g., waste collection and treatment systems, electrical power and ventilation systems).
- Removal of the steel liners from the refueling canal, disposing of the activated and contaminated sections as radioactive waste. Removal of any activated/contaminated concrete.
- Surveys of the decontaminated areas of the containment structure.
- Removal of the contaminated equipment and material from the auxiliary building and any other contaminated facility. Use radiation

and contamination control techniques until radiation surveys indicate that the structures can be released for unrestricted access and conventional demolition. This activity may necessitate the dismantling and disposition of most of the systems and components (both clean and contaminated) located within these buildings. This activity will facilitate surface decontamination and subsequent verification surveys required prior to obtaining release for demolition.

- Removal of the remaining components, equipment, and plant services in support of the area release survey(s).
- Routing of material removed in the decontamination and dismantling to a central processing area. Material certified to be free of contamination is released for unrestricted disposition, e.g., as scrap, recycle, or general disposal. Contaminated material is characterized and segregated for additional off-site processing (disassembly, chemical cleaning, volume reduction, and waste treatment), and/or packaged for controlled disposal at a low-level radioactive waste disposal facility.

Incorporated into the LTP is the Final Survey Plan. This plan identifies the radiological surveys to be performed once the decontamination activities are completed and is developed using the guidance provided in the "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)."[26] This document incorporates the statistical approaches to survey design and data interpretation used by the EPA. It also identifies commercially available instrumentation and procedures for conducting radiological surveys. Use of this guidance ensures that the surveys are conducted in a manner that provides a high degree of confidence that applicable NRC criteria are satisfied. Once the survey is complete, the results are provided to the NRC in a format that can be verified. The NRC then reviews and evaluates the information, performs an independent confirmation of radiological site conditions, and makes a determination on the requested change to the operating licenses (that would release the property, exclusive of the ISFSI, for unrestricted use).

The NRC will amend the operating licenses to reduce the licensed area to the ISFSI area if it determines that site remediation has been performed in accordance with the LTP, and that the terminal radiation survey and associated documentation demonstrate that the property (exclusive of the ISFSI) is suitable for release.

2.1.3 Period 3 - Site Restoration

Following completion of decommissioning operations, site restoration activities will begin. Efficient removal of the contaminated materials and verification that residual radionuclide concentrations are below the NRC limits will result in substantial damage to many of the structures. Although performed in a controlled and safe manner, blasting, coring, drilling, scarification (surface removal), and the other decontamination activities will substantially degrade power block structures including the reactor and auxiliary buildings. Under certain circumstances, verifying that subsurface radionuclide concentrations meet NRC site release requirements will require removal of grade slabs and lower floors, potentially weakening footings and structural supports. This removal activity will be necessary for those facilities and plant areas where historical records, when available, indicate the potential for radionuclides having been present in the soil, where system failures have been recorded, or where it is required to confirm that subsurface process and drain lines were not breached over the operating life of the station.

Dismantling of site structures following decommissioning is clearly the most appropriate and cost-effective option. It is unreasonable to anticipate that these structures would be repaired and preserved after the radiological contamination is removed. The effort to dismantle site structures with a work force already mobilized on site is more efficient than if the process were deferred. Site facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public as well as to future workers. Abandonment creates a breeding ground for vermin infestation as well as other biological hazards.

This cost study presumes that non-essential structures and site facilities are dismantled as a continuation of the decommissioning activity. Foundations and exterior walls are completely removed, including foundations and basemats as required by Minnesota regulations. [27] Site areas affected by the dismantling activities are restored and the plant area graded as required to prevent ponding, establish erosion control by the planting of native vegetation, and inhibit the refloating of subsurface materials.

Non-contaminated concrete rubble produced by demolition activities is processed to remove reinforcing steel and miscellaneous embedments. All non-contaminated materials are trucked to an off-site area for

disposal as construction debris. Subgrade voids are backfilled with clean construction fill, suitable under Minnesota regulations.

2.1.4 ISFSI Operations and Decommissioning

The ISFSI will continue to operate under a site-specific license as authorized by 10 CFR Part 72 following the amendment of the operating license to release the adjacent (power block) property. Assuming that Prairie Island spent fuel shipments begin in 2037, the process is not expected to be completed until 2074 (Scenario 1). Any delay in the transfer process, for example, due to a delay in the scheduled opening of the geologic repository, a slower acceptance rate, or a combination of both, can result in a longer on-site residence time for the fuel discharge from the reactor, as well as additional caretaking expenses. Scenarios 3 and 4 address extended delay periods, which includes the assumption that the spent fuel DSCs will need to be replaced every fifty years.

The assumed design for the ISFSI is based upon the use of the existing TN-40 casks from Transnuclear, plus the use of a multi-purpose dry shielded storage canister and a NUHOMS horizontal storage module for pad storage for those fuel assemblies packaged after plant shutdown.

At the conclusion of the spent fuel transfer process, the ISFSI will be decommissioned. The Commission will terminate the license if it determines that the remediation of the ISFSI has been performed in accordance with an ISFSI license termination plan and that the final radiation survey and associated documentation demonstrate that the facility is suitable for release. Once the requirements are satisfied, the NRC can terminate the license for the ISFSI.

For purposes of this cost analysis, it is assumed that once the TN-40s and DSCs containing the spent fuel assemblies have been removed, any required decontamination is performed on the storage overpacks (some minor neutron-induced activation is assumed), and the license for the facility terminated, the concrete overpacks can be dismantled using conventional techniques for the demolition of reinforced concrete. The concrete storage pad is then removed and the area regraded. This topic is discussed in greater detail in section 3.4.1.

2.2 SAFSTOR

The NRC defines SAFSTOR as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be

safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use." The facility is left intact (during the dormancy period), with structures maintained in a sound condition. Systems not required to operate in support of the spent fuel pool or site surveillance and security are drained, de-energized, and secured. Minimal cleaning/removal of loose contamination and/or fixation and sealing of remaining contamination are performed. Access to contaminated areas is secured to provide controlled access for inspection and maintenance.

The engineering and planning requirements are similar to those for the DECON alternative. Site preparations are also similar to those for the DECON alternative. However, with the exception of the required radiation surveys and site characterizations, the mobilization and preparation of site facilities is less extensive.

2.2.1 Period 1 - Preparations

Preparations for long-term storage include the planning for permanent defueling of the reactors, revision of technical specifications appropriate to the operating conditions and requirements, a characterization of the facility and major components, and the development of the PSDAR.

The process of placing the plant in safe-storage includes, but is not limited to, the following activities:

- Isolation of the spent fuel storage services and fuel handling systems located in the auxiliary building so that safe-storage operations may commence on the balance of the plant. This activity may be carried out by plant personnel in accordance with existing operating technical specifications. Activities are scheduled around the fuel handling systems to the greatest extent possible.
- Draining and de-energizing of the non-contaminated systems not required to support continued site operations or maintenance.
- Disposing of contaminated filter elements and resin beds not required for processing wastes from layup activities for future operations.
- Draining of the reactor vessels, with the internals left in place and the vessel heads secured.
- Draining and de-energizing non-essential, contaminated systems with decontamination as required for future maintenance and inspection.

- Preparing lighting and alarm systems whose continued use is required; de-energizing portions of fire protection, electric power, and HVAC systems whose continued use is not required.
- Cleaning of the loose surface contamination from building access pathways.
- Performing an interim radiation survey of plant, posting warning signs where appropriate.
- Erecting physical barriers and/or securing all access to radioactive or contaminated areas, except as required for inspection and maintenance.
- Installing security and surveillance monitoring equipment and relocating security fence around secured structures, as required.

2.2.2 Period 2 - Dormancy

The second phase identified by the NRC in its rule addresses licensed activities during a storage period and is applicable to the dormancy phases of the deferred decommissioning alternatives. Dormancy activities include a 24-hour security force, preventive and corrective maintenance on security systems, area lighting, general building maintenance, heating and ventilation of buildings, routine radiological inspections of contaminated structures, maintenance of structural integrity, and a site environmental and radiation monitoring program. Resident maintenance personnel perform equipment maintenance, inspection activities, routine services to maintain safe conditions, adequate lighting, heating, and ventilation, and periodic preventive maintenance on essential site services.

An environmental surveillance program is carried out during the dormancy period to ensure that releases of radioactive material to the environment are prevented and/or detected and controlled. Appropriate emergency procedures are established and initiated for potential releases that exceed prescribed limits. The environmental surveillance program constitutes an abbreviated version of the program in effect during normal plant operations.

Security during the dormancy period is conducted primarily to protect the spent nuclear fuel while it is on site, prevent unauthorized entry, and to protect the public from the consequences of their own actions. The security fence, sensors, alarms, and other surveillance equipment provide security. Fire and radiation alarms are also monitored and

maintained. While remote surveillance is an option, it does not offer the immediate response time of a physical presence.

The length of the dormancy period is such that decommissioning (license termination) of the station (excluding the ISFSI) is accomplished within 60 years of final shutdown. During Scenario 5, the transfer of the spent fuel to a DOE facility continues during this period until complete. The Scenario 6 SAFSTOR has the site remain in dormancy following spent fuel removal to the maximum extent possible, such that the licenses are terminated within the required 60-year time period. Scenarios 7 and 8 address extended delay periods, which include the assumption that the spent fuel DSCs will need to be replaced every fifty years.

It is required that the licensee submit an application to terminate each license, along with a LTP (described in Section 2.1.2), thereby initiating delayed decommissioning.

2.2.3 Periods 3 and 4 - Delayed Decommissioning

With the beginning of the third phase, prior to the commencement of decommissioning operations, preparations are undertaken to reactivate site services and prepare for decommissioning. Preparations include engineering and planning, a detailed site characterization, and the assembly of a decommissioning management organization. Final planning for activities and the writing of activity specifications and detailed procedures are also initiated at this time.

Much of the work in developing a termination plan is relevant to the development of the detailed engineering plans and procedures. The activities associated with this phase and the follow-on decontamination and dismantling processes are detailed in Sections 2.1.1 and 2.1.2. The primary difference between the sequences anticipated for the DECON and SAFSTOR scenarios is the absence, in the latter, of any constraint on the availability of the fuel storage pool located within the auxiliary building for decommissioning.

Variations in the length of the dormancy period are expected to have some effect upon the quantities of radioactive wastes generated from system and structure removal operations. However, given the levels of radioactivity and spectrum of radionuclides expected from approximately sixty years of plant operation, no plant process system identified as being contaminated upon final shutdown will become releasable due to the decay period alone. (i.e., there is no significant

reduction in the waste generated from the decommissioning activities). Due to the lower activity levels, a greater percentage of the waste volume can be designated for off-site processing and recovery.

The delay in decommissioning also yields lower working area radiation levels. As such, the estimate for the delayed scenarios incorporate reduced ALARA controls for the SAFSTOR's lower occupational exposure potential.

Although the initial radiation levels due to ^{60}Co will substantially decrease during the dormancy period, the internal components of the reactor vessels will still exhibit sufficiently high radiation dose rates to require remote sectioning under water due to the presence of long-lived radionuclides such as ^{94}Nb, ^{59}Ni, and ^{63}Ni. Therefore, the dismantling procedures described for the DECON alternative would still be employed during this scenario. Portions of the biological shield wall will still be radioactive due to the presence of activated trace elements with long half-lives (^{152}Eu and ^{154}Eu). Decontamination will require controlled removal and disposal. It is assumed that radioactive corrosion products on inner surfaces of piping and components will not have decayed to levels that will permit unrestricted use or allow conventional removal. These systems and components will be surveyed as they are removed and disposed of in accordance with the existing radioactive release criteria.

2.2.4 Period 5 - Site Restoration

Following completion of decommissioning operations, site-restoration activities can begin. Dismantling, as a continuation of the decommissioning process, is a cost-effective option, as described in Section 2.1.3. The basis for the dismantling cost in this scenario is consistent with that described for DECON, presuming the removal of structures and site facilities to include the existing foundations and basemats, and the limited restoration of the site.

2.2.5 ISFSI Operations and Decommissioning

For Scenarios 7 and 8, the ISFSI will continue to operate under a site-specific license as authorized by 10 CFR Part 72 following the amendment of the operating license to release the adjacent (power block) property. Assuming that Prairie Island spent fuel shipments begin in 2093, the process is not expected to be completed until 2117 (Scenario 7). Assuming that Prairie Island spent fuel shipments begin in 2193, the process is not expected to be completed until 2217 (Scenario 8). Any

delay in the transfer process, for example, due to a delay in the scheduled opening of the geologic repository, a slower acceptance rate, or a combination of both, can result in a longer on-site residence time for the fuel, as well as additional caretaking expenses. ISFSI operations will include the assumption that the spent fuel DSCs will need to be replaced every fifty years.

Operations and decommissioning activities for Scenarios 7 and 8 during a SAFSTOR scenario proceed in a similar fashion to the Scenario 3 and 4 following DECON, as discussed in Section 2.1.4.

3. COST ESTIMATES

The cost estimates prepared for decommissioning Prairie Island consider the unique features of the site, including the NSSS, power generation systems, support services, site buildings, and ancillary facilities. The basis of the estimates, including the sources of information relied upon, the estimating methodology employed, site-specific considerations, and other pertinent assumptions, is described in this section.

3.1 BASIS OF ESTIMATES

The estimates were developed using the site-specific, technical information from the 2017 analysis. The plant inventory, the basis for the decontamination and dismantling requirements and cost, and the decommissioning waste streams, was reviewed for this analysis; no substantive changes were identified over the three-year period (between estimates) to the configuration of the plant or site facilities that would impact decommissioning. The site-specific considerations and assumptions used in the previous evaluation were also revisited; no necessary modifications were identified.

3.2 METHODOLOGY

The methodology used to develop the estimates follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates,"[28] and the DOE "Decommissioning Handbook."[29] These documents present a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/inch) were developed using local labor rates. The activity-dependent costs were estimated with the item quantities (cubic yards and tons), developed from plant drawings and inventory documents. Removal rates and material costs for the conventional disposition of components and structures relied upon information available in the industry publication, "Building Construction Cost Data," published by RSMeans. [30]

The unit factor method provides a demonstrable basis for establishing reliable cost estimates. The detail provided in the unit factors, including activity duration, labor costs (by craft), and equipment and consumable costs, ensures that essential elements have not been omitted. Appendix A presents the detailed development of a typical unit factor. Appendix B provides the values contained within one set of factors developed for this analysis.

Regulatory Guide 1.184 [31] describes the methods and procedures that are acceptable to the NRC staff for implementing the requirements that relate to the initial activities and the major phases of the decommissioning process. The costs and schedules presented in this analysis follow the general guidance and sequence in the regulations. The format and content of the estimates is also consistent with the recommendations of Regulatory Guide 1.202. [32]

The estimates also reflect lessons learned from TLG's involvement in the Shippingport Station Decommissioning Project, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells and associated facilities, completed in 1997. In addition, the planning and engineering for the Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Oyster Creek, Connecticut Yankee, Crystal River, Vermont Yankee, Fort Calhoun, Pilgrim, and Indian Point nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Work Difficulty Factors

The estimates follow the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

Work difficulty adjustment factors (WDFs) account for the inefficiencies in working in a power plant environment. The factors are assigned to each unique set of unit cost factors, commensurate with the inefficiencies associated with working in confined, hazardous environments. The ranges used for the WDFs are as follows:

- Access Factor 10% to 20%
- Respiratory Protection Factor 10% to 50%
- Radiation/ALARA Factor 10% to 40%
- Protective Clothing Factor 10% to 30%
- Work Break Factor 8.33%

The factors and their associated range of values were developed in conjunction with the AIF/NESP-036 study. The application of the factors is discussed in more detail in that publication.

Scheduling Program Durations

The unit factors, adjusted by the WDFs as described above, are applied against the inventory of materials to be removed in the radiologically controlled areas. The resulting man-hours, or crew-hours, are used in the development of the decommissioning program schedule, using resource loading and event sequencing considerations. The scheduling of conventional removal and dismantling activities are based upon productivity information available from the RSMeans "Building Construction Cost Data" publication. Dismantling of the fuel handing systems and decontamination of the spent fuel pool is also dependent upon the timetable for the transfer of the spent fuel assemblies from the pool to the ISFSI.

The program schedule is used to determine the period-dependent costs for program management, administration, field engineering, equipment rental, contracted services, etc. The study relies upon regional or site-specific salary and wage rates for the personnel associated with the intended program.

3.3 IMPACT OF DECOMMISSIONING MULTIPLE REACTOR UNITS

In estimating the near simultaneous decommissioning of two co-located reactor units there can be opportunities to achieve economies of scale, by sharing costs between units, and coordinating the sequence of work activities. There will also be schedule constraints, particularly where there are requirements for specialty equipment and staff, or practical limitations on when final status surveys can take place. For purposes of the estimates, Units 1 and 2 are assumed to be essentially identical. Common facilities have been assigned to Unit 2. A summary of the principal impacts is listed below.

- The sequence of work generally follows the principal that the work is done at Unit 1 first, followed by similar work at Unit 2. This permits the experience gained at Unit 1 to be applied by the workforce at the second unit. It should be noted however, that the estimates do not consider productivity improvements at the second unit, since there is little documented experience with decommissioning two units simultaneously. The work associated with developing activity specifications and procedures can be considered essentially identical between the two units, therefore the second unit costs are assumed to be a fraction of the first unit (~ 43%).

- Segmenting the reactor vessel and internals will require the use of special equipment. The cost of procuring that equipment is assumed to be shared on an equal basis between the two units. In addition, the decommissioning project will be scheduled such that Unit 2's reactor internals and vessel are segmented immediately after the activities at Unit 1 have been completed.
- Duplication of some program management and support costs, particularly costs associated with the more senior positions, can be avoided with two reactors undergoing decommissioning simultaneously. As a result, the estimates are based on a "lead" unit that includes these senior positions, and a "second" unit that excludes these positions. The designation as lead is based on the unit undertaking the most complex tasks (for instance vessel segmentation) or performing tasks for the first time.
- The final radiological survey schedule is also affected by a two-unit decommissioning schedule. Trying to complete the final status survey of Unit 1, while Unit 2 still has ongoing radiological remediation work and waste handling in process is considered impractical. As a result, Unit 1 and Unit 2 delay durations awaiting spent fuel pool availability for decommissioning are synchronized, such that the spent fuel pool area decommissioning and subsequent final status survey can be completed for the station. During the spent fuel storage period, program management costs are reduced accordingly.
- The final demolition of buildings at Units 1 and 2 are considered to take place concurrently.
- Unit 1, as the first unit to enter decommissioning, incurs the majority of site characterization costs.
- Shared systems and structures are generally assigned to Unit 2.
- Station costs such as ISFSI operations, emergency response fees, regulatory agency fees, and insurance are generally allocated on an equal basis between the two units.

3.4 FINANCIAL COMPONENTS OF THE COST MODEL

TLG's proprietary decommissioning cost model, DECCER, produces a number of distinct cost elements. These direct expenditures, however, do not comprise the total cost to accomplish the project goal, i.e., license termination and site restoration.

3.4.1 Contingency

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In the DECCER cost model, contingency fulfills this role. Contingency is added to each line item to account for costs that are difficult or impossible to develop analytically. Such costs are historically inevitable over the duration of a job of this magnitude; therefore, this cost analysis includes funds to cover these types of expenses.

The activity- and period-dependent costs are combined to develop the total decommissioning cost. A contingency is then applied on a line-item basis, using one or more of the contingency types listed in the AIF/NESP-036 study. "Contingencies" are defined in the American Association of Cost Engineers "Project and Cost Engineers' Handbook"[33] as "specific provision for unforeseeable elements of cost within the defined project scope; particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur." The cost elements in this analysis are based upon ideal conditions and maximum efficiency; therefore, consistent with industry practice, a contingency factor has been applied. In the AIF/NESP-036 study, the types of unforeseeable events that are likely to occur in decommissioning are discussed and guidelines are provided for percentage contingency in each category. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station.

The use and role of contingency within decommissioning estimates is not a "safety factor issue." Safety factors provide additional security and address situations that may never occur. Contingency funds are expected to be fully expended throughout the program. They also provide assurance that sufficient funding is available to accomplish the intended tasks. An estimate without contingency, or from which contingency has been removed, can disrupt the orderly progression of events and jeopardize a successful conclusion to the decommissioning process.

For example, the most technologically challenging task in decommissioning a commercial nuclear plant is the disposition of the reactor vessels and internal components, now highly radioactive after a lifetime of exposure to core activity. The disposition of these components

forms the basis of the critical path (schedule) for decommissioning operations. Cost and schedule are interdependent, and any deviation in schedule has a significant impact on cost for performing a specific activity.

Disposition of the reactor vessel internals involves the underwater cutting of complex components that are highly radioactive. Costs are based upon optimum segmentation, handling, and packaging scenarios. The schedule is primarily dependent upon the turnaround time for the heavily shielded shipping casks, including preparation, loading, and decontamination of the containers for transport. The number of casks required is a function of the pieces generated in the segmentation activity, a value calculated on optimum performance of the tooling employed in cutting the various subassemblies. The expected optimization, however, may not be achieved, resulting in delays and additional program costs. For this reason, contingency must be included to mitigate the consequences of the expected inefficiencies inherent in this complex activity, along with related concerns associated with the operation of highly specialized tooling, field conditions, and water clarity.

Contingency funds are an integral part of the total cost to complete the decommissioning process. Exclusion of this component puts at risk a successful completion of the intended tasks and, potentially, subsequent related activities. For this study, TLG examined the major activity-related problems (decontamination, segmentation, equipment handling, packaging, transport, and waste disposal) that necessitate a contingency. Individual activity contingencies ranged from 10% to 75%, depending on the degree of difficulty judged to be appropriate from TLG's actual decommissioning experience. The contingency values used in this study are as follows:

Decontamination	50%
Contaminated Component Removal	25%
Contaminated Component Packaging	10%
Contaminated Component Transport	15%
Low-Level Radioactive Waste Disposal	25%
Low-Level Radioactive Waste Processing	15%
Reactor Segmentation	75%
NSSS Component Removal	25%
Reactor Waste Packaging	25%
Reactor Waste Transport	25%

Reactor Vessel Component Disposal	50%
GTCC Disposal	15%
Staffing	15%
Spent Fuel Management	15%
Non-Radioactive Component Removal	15%
Heavy Equipment and Tooling	15%
Supplies	25%
Engineering	15%
Energy	15%
Insurance and Fees	10%
Characterization and Termination Surveys	30%
Operations and Maintenance Expense	15%
Construction	15%
Property Taxes	10%
ISFSI Decommissioning	25%

The contingency values are applied to the appropriate components of the estimates on a line item basis. A composite value is then reported at the end of each detailed estimate (as provided in Appendices C through J). Appendix K, the ISFSI decommissioning calculation, uses a flat 25% contingency added at the end of the calculation.

3.4.2 Financial Risk

In addition to the routine uncertainties addressed by contingency, another cost element that is sometimes necessary to consider when bounding decommissioning costs relates to uncertainty, or risk. Examples can include changes in work scope, pricing, job performance, and other variations that could conceivably, but not necessarily, occur. Consideration is sometimes necessary to generate a level of confidence in the estimate, within a range of probabilities. TLG considers these types of costs under the broad term "financial risk." Included within the category of financial risk are:

- Transition activities and costs: ancillary expenses associated with eliminating 50% to 80% of the site labor force shortly after the cessation of plant operations, added cost for worker separation packages throughout the decommissioning program, national or company-mandated retraining, and retention incentives for key personnel.

- Delays in approval of the decommissioning plan due to intervention, public participation in local community meetings, legal challenges, and national and local hearings.
- Changes in the project work scope from the baseline estimate, involving the discovery of unexpected levels of contaminants, contamination in places not previously expected, contaminated soil previously undiscovered (either radioactive or hazardous material contamination), variations in plant inventory or configuration not indicated by the as-built drawings.
- Regulatory changes (e.g., affecting worker health and safety, site release criteria, waste transportation, and disposal).
- Policy decisions altering national commitments (e.g., in the ability to accommodate certain waste forms for disposition) or in the timetable for such, for example, the start and rate of acceptance of spent fuel by the DOE.
- Pricing changes for basic inputs such as labor, energy, materials, and disposal. Items subject to widespread price competition (such as materials) may not show significant variation; however, others such as waste disposal could exhibit large pricing uncertainties, particularly in markets where limited access to services is available.

This cost study does not add any additional costs to the estimate for financial risk, since there is insufficient historical data from which to project future liabilities. Consequently, the areas of uncertainty or risk are revisited periodically and addressed through repeated revisions or updates of the base estimates.

3.5 SITE-SPECIFIC CONSIDERATIONS

There are a number of site-specific considerations that affect the method for dismantling and removal of equipment from the site and the degree of restoration required. The cost impacts of the considerations identified below are included in this cost study.

3.5.1 Spent Fuel Management

The cost to dispose of spent fuel generated from plant operations is not reflected within the estimates to decommission Prairie Island. Ultimate disposition of the spent fuel is within the province of the DOE's Waste Management System, as defined by the Nuclear Waste Policy Act. As such, the disposal cost was financed by a 1 mill/kWhr surcharge paid

into the DOE's waste fund during operations. On November 19, 2013, the U.S. Court of Appeals for the D.C. Circuit ordered the Secretary of the Department of Energy to suspend collecting annual fees for nuclear waste disposal from nuclear power plant operators until the DOE has conducted a legally adequate fee assessment.

The NRC does, however, require licensees to establish a program to manage and provide funding for the management of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy. This requirement is prepared for through inclusion of certain high-level waste cost elements within the estimates, as described below.

Xcel Energy's current spent fuel management plan for the Prairie Island spent fuel is based in general upon:

1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
3) Fuel will be shipped in the existing Transnuclear TN-40 casks, plus NUHOMS DSCs for fuel removed after final plant shutdown (Scenarios 1, 2, 5, and 6); the canisters and NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Spent fuel assemblies from TN-40 casks that are replaced will be put into NUHOMS DSCs. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility.

This analysis assumes that the existing ISFSI is modified at the cessation of plant operations to accommodate the fuel present in the storage pool at shutdown.

The DOE's repository program assumes that spent fuel will be accepted for disposal from the nation's commercial nuclear plants in the order (the "queue") in which it was removed from service ("oldest fuel first").[34] Repository operations were based upon annual industry-wide receipt of

400 Metric Tons Heavy Metal (MTHM) in the first year of operation, a total of 3,800 MTHM in years 2 through 4 and 3,000 MTHM for year 5 and beyond.[35] This logic supports the spent fuel schedules for Scenarios 1 and 5. All other spent fuel scenarios are consistent with those identified by the Minnesota PSC.

Operation and maintenance costs for the spent fuel pool and ISFSI are included within the estimates and address the costs for staffing the facility, as well as security, insurance, and licensing fees. The estimates also include the costs to purchase, load, and transfer the NUHOMs DSCs from the pool to the ISFSI. Costs are also provided for the final disposition of the ISFSI once the transfer of the TN-40s and DSCs from the ISFSI to the DOE is complete.

Storage Canister Design

The design and capacity of the ISFSI is based upon the Monticello Transnuclear NUHOMS system (with a 61-fuel assembly capacity). The system consists of a multi-purpose (storage and transport) dry shielded storage canister (DSC) and a horizontal storage module (HSM). The PWR equivalent for a NUHOMS system of 32 assemblies is assumed for this estimate. The existing TN-40 casks will remain in the ISFSI until they are either shipped to the DOE, or emptied and disposed of during recasking.

Canister Loading and Transfer

The estimates include an average cost of $626,000 for the labor to load/transport the spent fuel from the pool to the ISFSI pad. For estimating purposes an allowance of $361,000 is used for the cost to transfer each fuel canister from the ISFSI pad to the DOE transport vehicle.

Operations and Maintenance

An annual cost (excluding labor) of approximately $845,000 and $112,000 are used for operation and maintenance of the spent fuel pool and the ISFSI, respectively.

At shutdown, the spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles). Over the next four years the assemblies are packaged into DSCs for transfer to the ISFSI for transfer to the DOE. It is assumed that the four years

provides the necessary cooling period for the final cores to meet the decay heat requirements for dry storage. Once the pool is emptied, the spent fuel storage and handling facilities are available for decommissioning.

Replacement of DSCs during ISFSI fuel storage period

Scenarios 1, 2, 5, and 6 do not assume any replacement of the spent fuel storage DSCs (recasking).

The other four cost estimates, Scenarios 3, 4, 7 and 8, include costs to recask the spent fuel, based upon an assumption that the DSC has a limited lifetime of approximately 50 years.

Scenarios 3 and 7, which are 100 years (nominally) in length, considers two repackaging efforts for each DSC in the ISFSI.

Scenario 4 and 8, which are a (nominal) 200-year scenario, assumes that when any DSC in the ISFSI reaches the 50 years of storage milestone, the DSC is replaced. The fuel will be recasked four times following final shutdown of Prairie Island.

Since the auxiliary building, spent fuel storage pool, and fuel handling facilities are removed by the year 2037, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. Scenarios 3, 4, 7 and 8 include the cost to construct such a transfer facility, as well as additional staffing positions for support of the dry transfer activities, and additional NRC oversight associated with the transfer operations. The decommissioning of this transfer facility is also included in these scenarios.

ISFSI Decommissioning

In accordance with 10 CFR §72.30, licensees must have a proposed decommissioning plan for the ISFSI site and facilities that includes a cost estimate for the plan. The plan should contain sufficient information on the proposed practices and procedures for the decontamination of the ISFSI and for the disposal of residual radioactive materials after all spent fuel, high-level radioactive waste, and reactor-related GTCC waste have been removed.

The NUHOMS multi-purpose dry shielded storage canister with a horizontal, reinforced concrete storage module is used as a basis for the

ISFSI decommissioning cost analyses. The modules are assumed to have some level of neutron-induced activation, as a result of the long-term storage of the fuel, i.e., to levels exceeding free-release limits. As an allowance, 8 modules are assumed to require remediation, equivalent to the number of modules required to accommodate the final core offloads at Prairie Island (121 assemblies per unit). The cost of the disposition of this material, as well as the demolition of the ISFSI facility, is included in the estimates.

The existing ISFSI pad, supporting the TN-40 casks, is not expected to be contaminated and will be demolished accordingly after a confirmation survey.

In accordance with the specific requirements of 10 CFR §72.30 for the ISFSI work scope, the cost estimate for decommissioning the ISFSI reflects: 1) the cost of an independent contractor performing the decommissioning activities; 2) an adequate contingency factor; and 3) the cost of meeting the criteria for unrestricted use. The cost summary for decommissioning the ISFSI is presented in Appendix K. It contains four different scenarios reflecting the different number of casks present at the end of the ISFSI operations. The demolition of the ISFSI for all eight scenarios is reflected within the estimates.

GTCC

The dismantling of the reactor internals is expected to generate radioactive waste considered unsuitable for shallow land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste. [36]

Although the material is not classified as high-level waste, federal regulations under the Act designate that disposal of this material is a federal responsibility under Section 3(b)(1)(D). However, the DOE has not been forthcoming with an acceptance criteria or disposition schedule for this material, and numerous questions remain as to the ultimate disposal cost and waste form requirements.

As such, for purposes of this study, the GTCC has been packaged and disposed of in the same manner as high-level waste, at a cost equivalent to that envisioned for the spent fuel. The number of DSCs required and the packaged volume for GTCC was based upon experience at Maine Yankee (e.g., the constraints on loading as identified in the canister's certificate of compliance), but adjusted for the increased spent fuel capacity of the current DSCs.

It is assumed that the DOE would not accept this waste prior to completing the transfer of spent fuel. Therefore, until such time the DOE is ready to accept GTCC waste, it is reasonable to assume that this material would remain in storage at Prairie Island (for the four DECON scenarios (1 through 4) and the SAFSTOR scenarios 7 and 8. alternatives). In SAFSTOR scenarios 5 and 6, the GTCC material is shipped directly to a DOE facility as it is generated since the fuel will have been removed from the site prior to the completion of delayed dismantling. GTCC costs have been segregated and included within the "License Termination" expenditures.

3.5.2 Reactor Vessel and Internal Components

The reactor pressure vessel and internal components are segmented for disposal in shielded, reusable transportation casks. Segmentation is performed underwater in the refueling canal, where a turntable and remote cutter are installed. The vessels are segmented in place, using a mast-mounted cutter supported off the lower head and directed from a shielded work platform installed overhead in the reactor cavity. Transportation cask specifications and transportation regulations dictate the segmentation and packaging methodology. The control elements are disposed of along with the spent fuel; there is no additional cost provided for their disposal.

Intact disposal of reactor vessel shells has been successfully demonstrated at several of the sites that have been decommissioned. Access to navigable waterways has allowed these large packages to be transported to the Barnwell disposal site with minimal overland travel. Intact disposal of the reactor vessel and internal components can provide savings in cost and worker exposure by eliminating the complex segmentation requirements, isolation of the GTCC material, and transport/storage of the resulting waste packages. Portland General Electric (PGE) was able to dispose of the Trojan reactor as an intact package (including the internals). However, its location on the Columbia River simplified the transportation analysis since:

- the reactor package could be secured to the transport vehicle for the entire journey, i.e., the package was not lifted during transport,
- there were no man-made or natural terrain features between the plant site and the disposal location that could produce a large drop, and
- transport speeds were very low, limited by the overland transport vehicle and the river barge.

As a member of the Northwest Compact, PGE had a site available for disposal of the package - the US Ecology facility in Washington State. The characteristics of this arid site proved favorable in demonstrating compliance with land disposal regulations.

It is not known whether this option will be available when Prairie Island ceases operation. Future viability of this option will depend upon the ultimate location of the disposal site, as well as the disposal site licensee's ability to accept highly radioactive packages and effectively isolate them from the environment. As such, the estimates assume segmentation of the reactor vessel, as a bounding condition. With lower levels of activation, the vessel shell can be packaged more efficiently than the curie-limited internal components. This will allow the use of more conventional waste packages rather than shielded casks for transport.

3.5.3 Primary System Components

In the DECON scenarios, the reactor coolant system components are assumed to be decontaminated using chemical agents prior to the start of cutting operations. This type of decontamination can be expected to have a significant ALARA impact in the DECON scenarios, since the removal work is done within the first few years of shutdown. A decontamination factor (average reduction) of 10 is assumed for the process. Disposal of the decontamination solution effluent is included within the estimate as a "process liquid waste" charge. The SAFSTOR scenarios do not include any decontamination of the reactor system; radioactive decay from the delay period in the dormancy results in similar results.

The following discussion deals with the removal and disposition of the steam generators, but the techniques involved are also applicable to other large radioactively-contaminated components, such as heat

exchangers, component coolers, and the pressurizer. The steam generators' size and weight, their location within the reactor building, as well as the disposal facility waste acceptance criteria, and access to transportation will ultimately determine the removal, transportation, and disposal strategy.

A trolley crane is set up for the removal of the generators. It can also be used to move portions of the steam generator cubicle walls and floor slabs from the reactor building to a location where they can be decontaminated and transported to the material handling area. Interferences within the work area, such as grating, piping, and other components are removed to create sufficient lay-down space for processing these large components.

The generators are rigged for removal, disconnected from the surrounding piping and supports, and maneuvered into the open area where they are lowered onto a down-ending cradle. Each generator is rotated into the horizontal position for extraction from the containment and placed onto a multi-wheeled vehicle for transport to an on-site preparation area.

Disposal costs are based upon the displaced volume and weight of the primary side portions of the steam generators. Each component is then loaded onto a rail car for transport to the disposal facility. The secondary side is assumed to be sent to an off-site waste processor.

Reactor coolant piping is cut from the reactor vessel once the water level in the vessel (used for personnel shielding during dismantling and cutting operations in and around the vessel) is dropped below the nozzle zone. The piping is boxed and transported by shielded van. The reactor coolant pumps and motors are lifted out intact, packaged, and transported for processing and/or disposal.

3.5.4 Main Turbine and Condenser

The main turbine and condenser are assumed to have only minor levels of contamination. As such, the components are dismantled using conventional maintenance procedures. The turbine rotors and shafts will be removed to a laydown area. The lower turbine casings will be removed from their anchors by controlled demolition. The main condensers will also be disassembled and moved to a laydown area. Material is then prepared for transportation to an off-site recycling facility where it will be surveyed and designated for either

decontamination or volume reduction, or controlled disposal. Components will be packaged and readied for transport in accordance with the intended disposition.

3.5.5 Transportation Methods

Contaminated piping, components, and structural material other than the highly activated reactor vessels and internal components will qualify as LSA-I, II or III or Surface Contaminated Object, SCO-I or II, as described in Title 49. [37] The contaminated material will be packaged in Industrial Packages (IP-1, IP-2, or IP-3, as defined in subpart 10 CFR 173.411) for transport unless demonstrated to qualify as their own shipping containers. The reactor vessel and internal components are expected to be transported in accordance with 10 CFR Part 71, as Type B. It is conceivable that the reactor, due to its limited specific activity, could qualify as LSA II or III. However, the high radiation levels on the outer surface would require that additional shielding be incorporated within the packaging so as to attenuate the dose to levels acceptable for transport.

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ^{137}Cs, ^{90}Sr, or transuranics) has been prevented from reaching levels exceeding those that permit the major reactor components to be shipped under current transportation regulations and disposal requirements.

Transport of the highly activated metal, produced in the segmentation of the reactor vessel and internal components, will be by shielded truck cask. Cask shipments may exceed 95,000 pounds, including vessel segment(s), supplementary shielding, cask tie-downs, and tractor-trailer. The maximum level of activity per shipment assumed permissible was based upon the license limits of the available shielded transport casks. The segmentation scheme for the vessel and internal segments is designed to meet these limits.

The transport of large intact components (e.g., large heat exchangers and other oversized components) will be by a combination of truck, rail, and/or multi-wheeled transporter. Transportation costs for Class A radioactive material requiring controlled disposal are based upon the mileage to the Energy*Solutions* facility in Clive, Utah. Transportation costs for the higher activity Class B and C radioactive material are based upon the mileage to the WCS facility in Andrews County, Texas.

The transportation cost for the GTCC material is assumed to be contained within the disposal cost. Transportation costs for off-site waste processing are based upon the mileage to Oak Ridge, Tennessee. Truck transport costs were estimated using published tariffs from Tri-State Motor Transit. [38]

3.5.6 Low-Level Radioactive Waste Disposal

To the greatest extent practical, metallic material generated in the decontamination and dismantling processes is processed to reduce the total cost of controlled disposal. Material meeting the regulatory and/or site release criterion, is released as scrap, requiring no further cost consideration. Conditioning (preparing the material to meet the waste acceptance criteria of the disposal site) and recovery of the waste stream is performed off site at a licensed processing center. Any material leaving the site is subject to a survey and release charge, at a minimum.

The mass of radioactive waste generated during the various decommissioning activities at the site is shown on a line-item basis in the detailed Appendices C through J, and summarized in Section 5. The quantified waste summaries shown in these tables are consistent with 10 CFR Part 61 classifications. Commercially available steel containers are presumed to be used for the disposal of piping, small components, and concrete. Larger components can serve as their own containers, with proper closure of all openings, access ways, and penetrations. The volumes are calculated based on the exterior package dimensions for containerized material or a specific calculation for components serving as their own waste containers.

The more highly activated reactor components will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume and weight, with surcharges added for the special handling requirements and the radiological characteristics of the payload. Packaging efficiencies are lower for the highly activated materials (greater than Type A quantity waste), where high concentrations of gamma-emitting radionuclides limit the capacity of the shipping canisters.

The cost to dispose of the lowest level and majority of the material generated from the decontamination and dismantling activities is based upon representative costs for disposal at Energy*Solutions* facility in Clive, Utah. Disposal costs for the higher activity waste (Class B and C)

were based upon preliminary and indicative information from WCS for the Andrews County facility.

Material exceeding Class C limits (limited to material closest to the reactor core and comprising less than 1% of the total waste volume) is generally not suitable for shallow-land disposal. This material is packaged in the same multipurpose canisters used for spent fuel storage/transport, for eventual transfer to the DOE for disposal.

3.5.7 Site Conditions Following Decommissioning

The NRC will amend or terminate each unit's license if it determines that site remediation has been performed in accordance with the license termination plan, and that the terminal radiation survey and associated documentation demonstrate that the facility is suitable for release. The NRC's involvement in the decommissioning process will end at this point. Building codes and environmental regulations will dictate the next step in the decommissioning process, as well as Xcel Energy's own future plans for the site, e.g., the electrical switchyard will remain in support of the regional transmission and distribution system.

Asphalt surfaces in the immediate vicinity of site buildings are broken up and the material disposed of as construction debris. The site access road will remain.

Only existing site structures are considered in the dismantling cost. All subgrade structures are removed. The voids are backfilled with clean debris and capped with soil. The site is then re-graded to conform to the adjacent landscape. Vegetation is established to inhibit erosion. These "non-radiological costs" are included in the total cost of decommissioning.

Bulk excavation of soil and material in the immediate vicinity of the power block is included to remove various duct banks, catch basins, and underground utilities that may exist.

The estimates do not assume the remediation of any significant volume of contaminated soil. This assumption may be affected by continued plant operations and/or future regulatory actions, such as the development of site-specific release criteria.

3.6 ASSUMPTIONS

The following are the major assumptions made in the development of the estimates for decommissioning the site.

3.6.1 Estimating Basis

Decommissioning costs are reported in the year of projected expenditure; however, the values are provided in 2020 dollars. Costs are not inflated, escalated, or discounted over the periods of performance.

The estimates rely upon the physical plant inventory that was the basis for the 2017 analysis (updated to reflect any material changes to the plant over the past three years).

The study follows the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

3.6.2 Labor Costs

For purposes of this analysis, it is assumed that Xcel Energy will hire a Decommissioning Operations Contractor (DOC) to manage the decommissioning. Xcel Energy will provide site security, radiological health and safety, quality assurance and overall site administration during the decommissioning and demolition phases. Contract personnel will provide engineering services (e.g., for preparing the activity specifications, work procedures, neutron activation, and structural analyses) under the direction of Xcel Energy.

Utility labor costs were provided by Xcel Energy. Average costs were provided by department or work group and included payroll overheads. Decommissioning Operations Contractor (DOC) labor costs were based on utility labor costs with modified markups to account for employee benefits, DOC overhead and profit.

The craft labor required to decontaminate and dismantle the nuclear station will be acquired through standard site contracting practices. Craft labor costs were based upon information from Xcel Energy. Craft labor costs include applicable overheads and profit.

Security levels are assumed to be maintained at "operating levels" for approximately 18 months after operations ceases. Additional reductions in force size are assumed when the pool is empty and with the completion of the decommissioning and site restoration activities.

Staffing levels are assigned by sub-period and functional area. Economies of a multi-unit decommissioning are recognized by establishing a primary and a secondary staff level. The unit assigned the primary staff will include common supervisory positions and positions that may be shared across both units. The types of positions and staffing levels are adjusted based upon the type of activity occurring in each sub-period.

Representative profiles of the staffing level for decommissioning, including contractors and craft, is provided in Figures 3.1 and 3.2 for the DECON (Scenario 2) and SAFSTOR (Scenario 6) estimates. Utility staffing levels will gradually decrease after completing the removal of physical systems. Staffing levels and management support will vary based upon the amount and type of decommissioning work. Craft manpower levels decrease after systems removal and structures decontamination and drop substantially during the delay period and the license termination survey period. However, craft levels increase again during the site restoration period due to the work associated with structures demolition. During SAFSTOR dormancy, following transfer of the spent fuel to the ISFSI, staffing levels for the power block are reduced to a minimum, then rise as the delayed dismantling operations begin.

Security, while reduced from operating levels, is maintained throughout the decommissioning for access control, material control, and to safeguard the spent fuel (in accordance with the requirements of 10 CFR Part 37, Part 72, and Part 73). Once the fuel has been transferred to the DOE in scenarios 5 and 6, the security organization will be reduced to Part 37 requirements.

3.6.3 Design Conditions

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ^{137}Cs, ^{90}Sr, or transuranics) has been prevented from reaching levels exceeding those that permit the major NSSS components to be shipped under current transportation regulations and disposal requirements.

The curie contents of the vessels and internals at final shutdown are derived from those listed in NUREG/CR-3474.[39] Actual estimates are derived from the curie/gram values contained therein and adjusted for the different mass of the Prairie Island components, projected operating life, and different periods of decay. Additional short-lived isotopes were derived from NUREG/CR-0130[40] and NUREG/CR-0672, [41] and benchmarked to the long-lived values from NUREG/CR-3474.

It is anticipated that there will be control element assemblies (CEAs) in the spent fuel pool at the cessation of operations, including those CEAs from the final core. This analysis assumes that the CEAs can be disposed of along with the spent fuel at no additional cost (in accordance with Appendix E of the Standard Contract [42]).

Neutron activation of the reactor building structure is confined to the reactor biological shield.

3.6.4 General

Transition Activities

Existing warehouses will be cleared of non-essential material and remain for use by Xcel Energy and subcontractors. The plant's operating staff will perform the following activities at no additional cost or credit to the project during the transition period:

- Drain and collect fuel oils, lubricating oils, and transformer oils for recycle and/or sale.
- Drain and collect acids, caustics, and other chemical stores for recycle and/or sale.
- Processes operating waste inventories, i.e., the estimates do not address the disposition of any legacy wastes; the disposal of

operating wastes during this initial period is not considered a decommissioning expense.

Scrap and Salvage

The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. Xcel Energy will make economically reasonable efforts to salvage equipment following final plant shutdown. However, dismantling techniques assumed by TLG for equipment in this analysis are not consistent with removal techniques required for salvage (resale) of equipment. Experience has indicated that some buyers wanted equipment stripped down to very specific requirements before they would consider purchase. This required expensive rework after the equipment had been removed from its installed location. Since placing a salvage value on this machinery and equipment would be speculative, and the value would be small in comparison to the overall decommissioning expenses, this analysis does not attempt to quantify the possible salvage value that Xcel Energy may realize based upon those efforts.

It is assumed, for purposes of this analysis, that any value received from the sale of scrap generated in the dismantling process would be offset by the on-site processing costs. The dismantling techniques assumed in the decommissioning estimates do not include the additional cost for size reduction and preparation to meet "furnace ready" conditions. For example, the recovery of copper from electrical cabling may require the removal and disposition of any contaminated insulation, an added expense. With a volatile market, the potential profit margin in scrap recovery is highly speculative, regardless of the ability to free release this material. This assumption is an implicit recognition of scrap value in the disposal of clean metallic waste at no additional cost to the project.

Furniture, tools, mobile equipment such as forklifts, trucks, bulldozers, and other property will be removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts will also be made available for alternative use.

The concrete debris resulting from building demolition activities is crushed on site to reduce the size of the debris. The resulting crushed concrete is disposed offsite as construction debris. The rebar removed from the concrete crushing process is disposed of as scrap steel in a similar fashion as other scrap metal as discussed previously.

Asbestos

At the time of Prairie Island's construction, asbestos was still being used for system component and piping insulation, and as fireproofing material for structures. No inventory of asbestos at Prairie Island was available, so TLG developed an estimated quantity. The allowance for the remediation of this asbestos is captured in the detailed cost analyses (Appendices C through J).

Energy

For estimating purposes, the plant is assumed to be de-energized, except for those facilities associated with spent fuel storage. Replacement power costs are used for the cost of energy consumption during decommissioning for tooling, lighting, ventilation, and essential services.

Emergency Planning

FEMA and state fees associated with emergency planning are assumed to continue for approximately 18 months following the cessation of operations. At this time, the FEMA fees are discontinued. The timing is based upon the anticipated condition of the spent fuel (i.e., the hottest spent fuel assemblies are assumed to be cool enough that no substantial Zircaloy oxidation and off-site event would occur with the loss of spent fuel pool water). State and local fees are continued until all spent fuel is transferred out of the spent fuel pool.

Insurance

Costs for continuing coverage (nuclear liability and property insurance) following cessation of plant operations and during decommissioning are included and based upon current operating premiums. Reductions in premiums, throughout the decommissioning process, are based upon the guidance provided in SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning."[43] The NRC's financial protection requirements are based on various reactor (and spent fuel) configurations.

Site Non-Labor Overhead

These estimates include costs for site non-labor overhead charges. These costs include telephones, copy machines, computers, IT infrastructure, office supplies, janitorial supplies, training expenses, etc. Xcel Energy

provided a two-part cost to address these costs. A variable charge of $5,648 per person per year of the Xcel Energy staff is included throughout the estimate. A fixed annual overhead charge is also included, starting at $1.5 million per reactor at the time of unit shut down and decreasing at various intervals to approximately $163 thousand per reactor.

Severance Program

Severance for personnel retained for the decommissioning organization is included in this estimate.

Taxes

Property taxes are included for all decommissioning periods. Xcel Energy provided a schedule of decreasing tax payments against the current tax assessment. These payments are maintained for the balance of the decommissioning program.

NRC Fees

These estimates include charges from the NRC to support the Prairie Island decommissioning program. Charges are included for the yearly license held by Xcel Energy for the Part 50 licenses, as well as engineering support charges by the NRC to review activities at the site. The Part 50 license fee for a reactor in a decommissioning or possession-only status and which has spent fuel onsite is $188 thousand per year. Once the reactors have been decommissioned, the site Part 50 license continues at the same fee until final removal of the spent fuel. The hourly rate for NRC review is $279.00. The level of effort of NRC participation is commensurate with the decommissioning alternative and schedule.

Disposal of Processed Water

This estimate assumes that processed water which meets state and federal release limits can be disposed of without additional cost.

Site Modifications

The perimeter fence and in-plant security barriers will be moved, as appropriate, to conform to the Site Security Plan in force during the various stages of the project.

Prairie Island Indian Community Payments

This estimate includes a $2.5 million annual payment to the Prairie Island Indian Community while spent fuel is still on the Prairie Island site.

Minnesota state regulations regarding concrete

This estimate complies with the Minnesota state regulations regarding the removal of all subterranean concrete during demolition, plus the survey and confirmation of the suitability of the clean fill used for backfill of the subgrade structures following concrete removal.

3.7 COST ESTIMATE SUMMARY

The estimates presented in this document reflects the total cost to decontaminate the nuclear units, manage the spent fuel until the DOE is able to complete the transfer to a federal facility, dismantle the plant and restore the site for alternative use.

Schedules of expenditures are provided in Tables 3.1 through 3.16. The tables delineate the cost contributors by year of expenditures as well as cost contributor (e.g., labor, materials, and waste disposal).

Additional tables in Appendices C through J provide detailed costs elements. The cost elements are also assigned to one of three subcategories: "License Termination," "Spent Fuel Management," and "Site Restoration." The subcategory "License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). In situations where the long-term management of spent fuel is not an issue, the cost reported for this subcategory is generally sufficient to terminate each unit's operating license, recognizing that there may be some additional cost impact from spent fuel management.

The "Spent Fuel Management" subcategory contains costs associated with the containerization and transfer of spent fuel from the pool to the ISFSI for interim storage, and the transfer of the multipurpose canisters from the ISFSI to the DOE. Costs are also included for the operations of the pool and management of the ISFSI until such time that the transfer of all fuel from this facility to an off-site location (e.g., interim storage facility) is complete.

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from

contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are completely removed, including foundations and basemats and backfilled to conform to local grade.

As discussed in Section 3.5.1, it is assumed that the DOE will not accept the GTCC waste prior to completing the transfer of spent fuel. Therefore, the cost of GTCC disposal is shown in the final year of ISFSI operation (for the DECON alternative). While designated for disposal at a federal facility along with the spent fuel, GTCC waste is still classified as low-level radioactive waste and, as such, included as a "License Termination" expense.

Decommissioning costs are reported in 2020 dollars. Costs are not inflated, escalated, or discounted over the period of expenditure (or projected lifetime of the plant).

TABLE 3.1
SCENARIO 1: DECON WITH 42 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2033	23,782	923	741	25	10,292	35,762
2034	67,414	9,626	2,605	5,533	21,280	106,458
2035	68,591	29,172	1,970	24,644	23,300	147,677
2036	64,154	24,188	1,598	31,001	24,350	145,292
2037	45,558	25,073	1,398	22,010	19,293	113,333
2038	25,712	31,391	1,284	1,217	11,074	70,678
2039	34,084	5,035	599	4,110	6,754	50,583
2040	20,889	6,593	253	16	4,536	32,287
2041	15,747	9,087	186	0	4,139	29,160
2042	9,317	4,776	88	0	3,765	17,945
2043	3,430	467	0	0	3,431	7,328
2044	3,387	311	0	0	3,440	7,139
2045	3,482	623	0	0	3,431	7,536
2046	3,482	623	0	0	3,431	7,536
2047	3,430	467	0	0	3,431	7,328
2048	3,491	623	0	0	3,440	7,554
2049	3,482	623	0	0	3,431	7,536
2050	3,430	467	0	0	3,431	7,328
2051	3,482	623	0	0	3,431	7,536
2052	3,439	467	0	0	3,440	7,346
2053	3,378	311	0	0	3,431	7,120
2054	3,378	311	0	0	3,431	7,120
2055	3,378	311	0	0	3,431	7,120
2056	3,284	0	0	0	3,440	6,724
2057	3,275	0	0	0	3,431	6,705
2058	3,275	0	0	0	3,431	6,705
2059	3,275	0	0	0	3,431	6,705
2060	3,387	311	0	0	3,440	7,139
2061	3,378	311	0	0	3,431	7,120
2062	3,378	311	0	0	3,431	7,120

TABLE 3.1 (continued)
SCENARIO 1: DECON WITH 42 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2063	3,378	311	0	0	3,431	7,120
2064	3,387	311	0	0	3,440	7,139
2065	3,378	311	0	0	3,431	7,120
2066	3,378	311	0	0	3,431	7,120
2067	3,378	311	0	0	3,431	7,120
2068	3,387	311	0	0	3,440	7,139
2069	3,378	311	0	0	3,431	7,120
2070	3,378	311	0	0	3,431	7,120
2071	3,378	311	0	0	3,431	7,120
2072	3,387	311	0	0	3,440	7,139
2073	3,378	311	0	0	3,431	7,120
2074	3,378	2,116	0	0	13,408	18,902
2075	886	554	20	3,165	1,924	6,549
Total	484,624	159,120	10,742	91,722	250,544	996,753

Note: Columns may not add due to rounding

TABLE 3.2
SCENARIO 1: DECON WITH 42 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2034	8,346	600	327	10	5,287	14,570
2035	49,894	6,051	2,191	2,472	28,487	89,096
2036	67,057	30,095	2,409	22,189	20,301	142,050
2037	75,292	40,738	1,676	30,330	20,209	168,245
2038	82,522	47,557	1,284	36,708	18,369	186,439
2039	39,423	5,799	599	5,008	6,511	57,340
2040	25,047	10,813	253	16	5,209	41,339
2041	18,516	15,396	186	0	5,303	39,401
2042	10,621	7,749	88	0	4,313	22,771
2043	3,430	467	0	0	3,431	7,328
2044	3,387	311	0	0	3,440	7,139
2045	3,482	623	0	0	3,431	7,536
2046	3,482	623	0	0	3,431	7,536
2047	3,430	467	0	0	3,431	7,328
2048	3,491	623	0	0	3,440	7,554
2049	3,482	623	0	0	3,431	7,536
2050	3,430	467	0	0	3,431	7,328
2051	3,482	623	0	0	3,431	7,536
2052	3,439	467	0	0	3,440	7,346
2053	3,378	311	0	0	3,431	7,120
2054	3,378	311	0	0	3,431	7,120
2055	3,378	311	0	0	3,431	7,120
2056	3,284	0	0	0	3,440	6,724
2057	3,275	0	0	0	3,431	6,705
2058	3,275	0	0	0	3,431	6,705
2059	3,275	0	0	0	3,431	6,705
2060	3,387	311	0	0	3,440	7,139
2061	3,378	311	0	0	3,431	7,120
2062	3,378	311	0	0	3,431	7,120
2063	3,378	311	0	0	3,431	7,120

TABLE 3.2 (continued)
SCENARIO 1: DECON WITH 42 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2064	3,387	311	0	0	3,440	7,139
2065	3,378	311	0	0	3,431	7,120
2066	3,378	311	0	0	3,431	7,120
2067	3,378	311	0	0	3,431	7,120
2068	3,387	311	0	0	3,440	7,139
2069	3,378	311	0	0	3,431	7,120
2070	3,378	311	0	0	3,431	7,120
2071	3,378	311	0	0	3,431	7,120
2072	3,387	311	0	0	3,440	7,139
2073	3,378	311	0	0	3,431	7,120
2074	3,378	2,116	0	0	13,408	18,902
2075	886	554	20	3,165	1,924	6,549
Total	486,095	178,053	9,033	99,899	235,749	1,008,829

Note: Columns may not add due to rounding

TABLE 3.3
SCENARIO 2: DECON WITH 60 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2033	23,782	923	741	25	10,292	35,762
2034	67,414	9,626	2,605	5,533	21,280	106,458
2035	68,591	29,172	1,970	24,644	23,300	147,677
2036	64,127	24,105	1,598	31,001	24,350	145,182
2037	45,510	24,928	1,398	22,010	19,293	113,140
2038	25,609	31,083	1,284	1,217	11,074	70,267
2039	33,735	3,985	599	4,110	6,754	49,183
2040	20,663	5,915	253	16	4,536	31,383
2041	15,525	8,421	186	0	4,139	28,272
2042	9,047	3,968	88	0	3,758	16,861
2043	3,275	0	0	0	3,418	6,692
2044	3,284	0	0	0	3,427	6,711
2045	3,275	0	0	0	3,418	6,692
2046	3,275	0	0	0	3,418	6,692
2047	3,275	0	0	0	3,418	6,692
2048	3,284	0	0	0	3,427	6,711
2049	3,275	0	0	0	3,418	6,692
2050	3,275	0	0	0	3,418	6,692
2051	3,275	0	0	0	3,418	6,692
2052	3,284	0	0	0	3,427	6,711
2053	3,378	311	0	0	3,418	7,107
2054	3,482	623	0	0	3,418	7,523
2055	3,482	623	0	0	3,418	7,523
2056	3,543	778	0	0	3,427	7,749
2057	3,430	467	0	0	3,418	7,315
2058	3,586	934	0	0	3,418	7,938
2059	3,430	467	0	0	3,418	7,315
2060	3,387	311	0	0	3,427	7,126
2061	3,482	623	0	0	3,418	7,523
2062	3,482	623	0	0	3,418	7,523

TABLE 3.3 (continued)
SCENARIO 2: DECON WITH 60 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2063	3,430	467	0	0	3,418	7,315
2064	3,491	623	0	0	3,427	7,541
2065	3,482	623	0	0	3,418	7,523
2066	3,430	467	0	0	3,418	7,315
2067	3,482	623	0	0	3,418	7,523
2068	3,491	623	0	0	3,427	7,541
2069	3,430	467	0	0	3,418	7,315
2070	3,482	623	0	0	3,418	7,523
2071	3,482	623	0	0	3,418	7,523
2072	3,491	623	0	0	3,427	7,541
2073	3,482	623	0	0	3,418	7,523
2074	3,482	623	0	0	3,418	7,523
2075	3,842	1,702	0	0	3,418	8,962
2076	3,491	623	0	0	3,427	7,541
2077	3,482	2,428	0	0	13,395	19,305
2078	886	554	20	3,165	1,924	6,549
Total	494,817	160,199	10,742	91,722	260,384	1,017,865

Note: Columns may not add due to rounding

TABLE 3.4
SCENARIO 2: DECON WITH 60 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2034	8,346	600	327	10	5,287	14,570
2035	49,894	6,051	2,191	2,472	28,487	89,096
2036	67,020	29,984	2,409	22,189	20,301	141,903
2037	75,245	40,598	1,676	30,330	20,209	168,058
2038	82,427	47,271	1,284	36,708	18,369	186,059
2039	39,073	4,749	599	5,008	6,511	55,940
2040	24,821	10,135	253	16	5,209	40,435
2041	18,294	14,730	186	0	5,303	38,514
2042	10,352	6,941	88	0	4,306	21,688
2043	3,275	0	0	0	3,418	6,692
2044	3,284	0	0	0	3,427	6,711
2045	3,275	0	0	0	3,418	6,692
2046	3,275	0	0	0	3,418	6,692
2047	3,275	0	0	0	3,418	6,692
2048	3,284	0	0	0	3,427	6,711
2049	3,275	0	0	0	3,418	6,692
2050	3,275	0	0	0	3,418	6,692
2051	3,275	0	0	0	3,418	6,692
2052	3,284	0	0	0	3,427	6,711
2053	3,378	311	0	0	3,418	7,107
2054	3,482	623	0	0	3,418	7,523
2055	3,482	623	0	0	3,418	7,523
2056	3,543	778	0	0	3,427	7,749
2057	3,430	467	0	0	3,418	7,315
2058	3,586	934	0	0	3,418	7,938
2059	3,430	467	0	0	3,418	7,315
2060	3,387	311	0	0	3,427	7,126
2061	3,482	623	0	0	3,418	7,523
2062	3,482	623	0	0	3,418	7,523
2063	3,430	467	0	0	3,418	7,315

TABLE 3.4 (continued)
SCENARIO 2: DECON WITH 60 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2064	3,491	623	0	0	3,427	7,541
2065	3,482	623	0	0	3,418	7,523
2066	3,430	467	0	0	3,418	7,315
2067	3,482	623	0	0	3,418	7,523
2068	3,491	623	0	0	3,427	7,541
2069	3,430	467	0	0	3,418	7,315
2070	3,482	623	0	0	3,418	7,523
2071	3,482	623	0	0	3,418	7,523
2072	3,491	623	0	0	3,427	7,541
2073	3,482	623	0	0	3,418	7,523
2074	3,482	623	0	0	3,418	7,523
2075	3,842	1,702	0	0	3,418	8,962
2076	3,491	623	0	0	3,427	7,541
2077	3,482	2,428	0	0	13,395	19,305
2078	886	554	20	3,165	1,924	6,549
Total	496,288	179,133	9,033	99,899	245,588	1,029,941

Note: Columns may not add due to rounding

TABLE 3.5
SCENARIO 3: DECON WITH 100 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2033	23,782	923	741	25	10,292	35,762
2034	67,414	9,626	2,605	5,533	21,280	106,458
2035	68,591	29,172	1,970	24,644	23,300	147,677
2036	64,616	25,575	1,598	31,001	24,350	147,141
2037	46,367	27,499	1,398	22,010	19,293	116,568
2038	26,103	32,563	1,284	1,217	11,074	72,241
2039	33,735	3,985	599	4,110	6,754	49,183
2040	20,722	5,915	253	16	4,536	31,442
2041	15,615	8,421	186	0	4,139	28,362
2042	9,448	3,968	88	0	3,744	17,249
2043	3,952	0	0	0	3,392	7,344
2044	3,963	0	0	0	3,401	7,364
2045	5,466	4,542	0	0	3,392	13,400
2046	4,962	3,028	0	0	3,392	11,382
2047	4,962	3,028	0	0	3,392	11,382
2048	3,963	0	0	0	3,401	7,364
2049	4,962	3,028	0	0	3,392	11,382
2050	5,466	4,542	0	0	3,392	13,400
2051	5,412	4,378	0	0	3,392	13,181
2052	5,477	4,542	0	0	3,401	13,421
2053	3,952	0	0	0	3,392	7,344
2054	3,952	0	0	0	3,392	7,344
2055	5,466	4,542	0	0	3,392	13,400
2056	4,972	3,028	0	0	3,401	11,402
2057	4,962	3,028	0	0	3,392	11,382
2058	3,952	0	0	0	3,392	7,344
2059	4,907	2,864	0	0	3,392	11,162
2060	4,972	3,028	0	0	3,401	11,402
2061	4,962	3,028	0	0	3,392	11,382
2062	3,952	0	0	0	3,392	7,344

TABLE 3.5 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2063	6,980	9,085	0	0	3,392	19,457
2064	5,927	5,892	0	0	3,401	15,220
2065	4,962	3,028	0	0	3,392	11,382
2066	3,952	0	0	0	3,392	7,344
2067	3,952	0	0	0	3,392	7,344
2068	5,982	6,057	0	0	3,401	15,439
2069	5,466	4,542	0	0	3,392	13,400
2070	3,952	0	0	0	3,392	7,344
2071	3,952	0	0	0	3,392	7,344
2072	6,432	7,406	0	0	3,401	17,239
2073	3,952	0	0	0	3,392	7,344
2074	3,952	0	0	0	3,392	7,344
2075	6,836	8,650	0	0	3,392	18,877
2076	3,963	0	0	0	3,401	7,364
2077	3,952	0	0	0	3,392	7,344
2078	6,476	7,571	0	0	3,392	17,438
2079	3,952	0	0	0	3,392	7,344
2080	3,963	0	0	0	3,401	7,364
2081	3,952	0	0	0	3,392	7,344
2082	6,366	7,242	0	0	3,392	17,000
2083	3,952	0	0	0	3,392	7,344
2084	3,963	0	0	0	3,401	7,364
2085	3,952	0	0	0	3,392	7,344
2086	3,952	0	0	0	3,392	7,344
2087	3,952	0	0	0	3,392	7,344
2088	19,160	45,618	0	2,988	3,924	71,690
2089	3,952	0	0	0	3,392	7,344
2090	3,952	0	0	0	3,392	7,344
2091	3,952	0	0	0	3,392	7,344
2092	3,963	0	0	0	3,401	7,364

TABLE 3.5 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2093	4,056	311	0	0	3,392	7,759
2094	4,212	778	0	0	3,392	8,382
2095	5,730	5,335	0	0	3,392	14,457
2096	5,287	3,972	0	0	3,401	12,659
2097	5,120	3,504	0	0	3,392	12,017
2098	4,315	1,090	0	0	3,392	8,797
2099	5,120	3,504	0	0	3,392	12,017
2100	5,575	4,868	0	0	3,392	13,834
2101	5,730	5,335	0	0	3,392	14,457
2102	5,730	5,335	0	0	3,392	14,457
2103	4,108	467	0	0	3,392	7,967
2104	4,171	623	0	0	3,401	8,194
2105	5,679	5,179	0	0	3,392	14,249
2106	5,120	3,504	0	0	3,392	12,017
2107	5,172	3,660	0	0	3,392	12,224
2108	4,171	623	0	0	3,401	8,194
2109	5,120	3,504	0	0	3,392	12,017
2110	5,172	3,660	0	0	3,392	12,224
2111	5,172	3,660	0	0	3,392	12,224
2112	4,171	623	0	0	3,401	8,194
2113	7,197	9,735	0	0	3,392	20,324
2114	6,185	6,698	0	0	3,392	16,274
2115	5,532	4,739	0	0	3,392	13,663
2116	4,171	623	0	0	3,401	8,194
2117	4,134	2,428	0	0	13,370	19,932
2118	1,124	887	20	177	1,957	4,164
Total	751,975	383,995	10,742	91,722	395,765	1,634,199

Note: Columns may not add due to rounding

TABLE 3.6
SCENARIO 3: DECON WITH 100 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2034	8,346	600	327	10	5,287	14,570
2035	49,894	6,051	2,191	2,472	28,487	89,096
2036	67,674	31,946	2,409	22,189	20,301	144,519
2037	76,073	43,082	1,676	30,330	20,209	171,370
2038	82,785	48,346	1,284	36,708	18,369	187,492
2039	39,073	4,749	599	5,008	6,511	55,940
2040	24,880	10,135	253	16	5,209	40,493
2041	18,384	14,730	186	0	5,303	38,604
2042	10,753	6,941	88	0	4,292	22,075
2043	3,952	0	0	0	3,392	7,344
2044	3,963	0	0	0	3,401	7,364
2045	5,466	4,542	0	0	3,392	13,400
2046	4,962	3,028	0	0	3,392	11,382
2047	4,962	3,028	0	0	3,392	11,382
2048	3,963	0	0	0	3,401	7,364
2049	4,962	3,028	0	0	3,392	11,382
2050	5,466	4,542	0	0	3,392	13,400
2051	5,412	4,378	0	0	3,392	13,181
2052	5,477	4,542	0	0	3,401	13,421
2053	3,952	0	0	0	3,392	7,344
2054	3,952	0	0	0	3,392	7,344
2055	5,466	4,542	0	0	3,392	13,400
2056	4,972	3,028	0	0	3,401	11,402
2057	4,962	3,028	0	0	3,392	11,382
2058	3,952	0	0	0	3,392	7,344
2059	4,907	2,864	0	0	3,392	11,162
2060	4,972	3,028	0	0	3,401	11,402
2061	4,962	3,028	0	0	3,392	11,382
2062	3,952	0	0	0	3,392	7,344
2063	6,980	9,085	0	0	3,392	19,457

TABLE 3.6 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2064	5,927	5,892	0	0	3,401	15,220
2065	4,962	3,028	0	0	3,392	11,382
2066	3,952	0	0	0	3,392	7,344
2067	3,952	0	0	0	3,392	7,344
2068	5,982	6,057	0	0	3,401	15,439
2069	5,466	4,542	0	0	3,392	13,400
2070	3,952	0	0	0	3,392	7,344
2071	3,952	0	0	0	3,392	7,344
2072	6,432	7,406	0	0	3,401	17,239
2073	3,952	0	0	0	3,392	7,344
2074	3,952	0	0	0	3,392	7,344
2075	6,836	8,650	0	0	3,392	18,877
2076	3,963	0	0	0	3,401	7,364
2077	3,952	0	0	0	3,392	7,344
2078	6,476	7,571	0	0	3,392	17,438
2079	3,952	0	0	0	3,392	7,344
2080	3,963	0	0	0	3,401	7,364
2081	3,952	0	0	0	3,392	7,344
2082	6,366	7,242	0	0	3,392	17,000
2083	3,952	0	0	0	3,392	7,344
2084	3,963	0	0	0	3,401	7,364
2085	3,952	0	0	0	3,392	7,344
2086	3,952	0	0	0	3,392	7,344
2087	3,952	0	0	0	3,392	7,344
2088	19,160	45,618	0	2,988	3,924	71,690
2089	3,952	0	0	0	3,392	7,344
2090	3,952	0	0	0	3,392	7,344
2091	3,952	0	0	0	3,392	7,344
2092	3,963	0	0	0	3,401	7,364
2093	4,056	311	0	0	3,392	7,759

TABLE 3.6 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2094	4,212	778	0	0	3,392	8,382
2095	5,730	5,335	0	0	3,392	14,457
2096	5,287	3,972	0	0	3,401	12,659
2097	5,120	3,504	0	0	3,392	12,017
2098	4,315	1,090	0	0	3,392	8,797
2099	5,120	3,504	0	0	3,392	12,017
2100	5,575	4,868	0	0	3,392	13,834
2101	5,730	5,335	0	0	3,392	14,457
2102	5,730	5,335	0	0	3,392	14,457
2103	4,108	467	0	0	3,392	7,967
2104	4,171	623	0	0	3,401	8,194
2105	5,679	5,179	0	0	3,392	14,249
2106	5,120	3,504	0	0	3,392	12,017
2107	5,172	3,660	0	0	3,392	12,224
2108	4,171	623	0	0	3,401	8,194
2109	5,120	3,504	0	0	3,392	12,017
2110	5,172	3,660	0	0	3,392	12,224
2111	5,172	3,660	0	0	3,392	12,224
2112	4,171	623	0	0	3,401	8,194
2113	7,197	9,735	0	0	3,392	20,324
2114	6,185	6,698	0	0	3,392	16,274
2115	5,532	4,739	0	0	3,392	13,663
2116	4,171	623	0	0	3,401	8,194
2117	4,134	2,428	0	0	13,370	19,932
2118	1,124	887	20	177	1,957	4,164
Total	753,446	402,928	9,033	99,898	380,970	1,646,275

Note: Columns may not add due to rounding

TABLE 3.7
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2033	23,782	923	741	25	10,292	35,762
2034	67,414	9,626	2,605	5,533	21,280	106,458
2035	68,591	29,172	1,970	24,644	23,300	147,677
2036	64,616	25,575	1,598	31,001	24,350	147,141
2037	46,367	27,499	1,398	22,010	19,293	116,568
2038	26,103	32,563	1,284	1,217	11,074	72,241
2039	33,735	3,985	599	4,110	6,754	49,183
2040	20,722	5,915	253	16	4,536	31,442
2041	15,615	8,421	186	0	4,139	28,362
2042	9,448	3,968	88	0	3,737	17,241
2043	3,952	0	0	0	3,378	7,330
2044	3,963	0	0	0	3,387	7,350
2045	5,466	4,542	0	0	3,378	13,386
2046	4,962	3,028	0	0	3,378	11,367
2047	4,962	3,028	0	0	3,378	11,367
2048	3,963	0	0	0	3,387	7,350
2049	4,962	3,028	0	0	3,378	11,367
2050	5,466	4,542	0	0	3,378	13,386
2051	5,412	4,378	0	0	3,378	13,167
2052	5,477	4,542	0	0	3,387	13,406
2053	3,952	0	0	0	3,378	7,330
2054	3,952	0	0	0	3,378	7,330
2055	5,466	4,542	0	0	3,378	13,386
2056	4,972	3,028	0	0	3,387	11,388
2057	4,962	3,028	0	0	3,378	11,367
2058	3,952	0	0	0	3,378	7,330
2059	4,907	2,864	0	0	3,378	11,148
2060	4,972	3,028	0	0	3,387	11,388
2061	4,962	3,028	0	0	3,378	11,367
2062	3,952	0	0	0	3,378	7,330

TABLE 3.7 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2063	6,980	9,085	0	0	3,378	19,443
2064	5,927	5,892	0	0	3,387	15,206
2065	4,962	3,028	0	0	3,378	11,367
2066	3,952	0	0	0	3,378	7,330
2067	3,952	0	0	0	3,378	7,330
2068	5,982	6,057	0	0	3,387	15,425
2069	5,466	4,542	0	0	3,378	13,386
2070	3,952	0	0	0	3,378	7,330
2071	3,952	0	0	0	3,378	7,330
2072	6,432	7,406	0	0	3,387	17,225
2073	3,952	0	0	0	3,378	7,330
2074	3,952	0	0	0	3,378	7,330
2075	6,836	8,650	0	0	3,378	18,863
2076	3,963	0	0	0	3,387	7,350
2077	3,952	0	0	0	3,378	7,330
2078	6,476	7,571	0	0	3,378	17,424
2079	3,952	0	0	0	3,378	7,330
2080	3,963	0	0	0	3,387	7,350
2081	3,952	0	0	0	3,378	7,330
2082	6,366	7,242	0	0	3,378	16,986
2083	3,952	0	0	0	3,378	7,330
2084	3,963	0	0	0	3,387	7,350
2085	3,952	0	0	0	3,378	7,330
2086	3,952	0	0	0	3,378	7,330
2087	3,952	0	0	0	3,378	7,330
2088	19,160	45,618	0	2,988	3,910	71,675
2089	3,952	0	0	0	3,378	7,330
2090	3,952	0	0	0	3,378	7,330
2091	3,952	0	0	0	3,378	7,330
2092	3,963	0	0	0	3,387	7,350

TABLE 3.7 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2093	3,952	0	0	0	3,378	7,330
2094	3,952	0	0	0	3,378	7,330
2095	5,471	4,556	0	0	3,378	13,405
2096	4,976	3,037	0	0	3,387	11,400
2097	4,965	3,037	0	0	3,378	11,380
2098	3,952	0	0	0	3,378	7,330
2099	4,965	3,037	0	0	3,378	11,380
2100	5,471	4,556	0	0	3,378	13,405
2101	5,471	4,556	0	0	3,378	13,405
2102	5,471	4,556	0	0	3,378	13,405
2103	3,952	0	0	0	3,378	7,330
2104	3,963	0	0	0	3,387	7,350
2105	5,471	4,556	0	0	3,378	13,405
2106	4,965	3,037	0	0	3,378	11,380
2107	4,965	3,037	0	0	3,378	11,380
2108	3,963	0	0	0	3,387	7,350
2109	4,965	3,037	0	0	3,378	11,380
2110	4,965	3,037	0	0	3,378	11,380
2111	4,965	3,037	0	0	3,378	11,380
2112	3,963	0	0	0	3,387	7,350
2113	6,990	9,112	0	0	3,378	19,480
2114	5,977	6,075	0	0	3,378	15,430
2115	5,324	4,117	0	0	3,378	12,819
2116	3,963	0	0	0	3,387	7,350
2117	3,952	0	0	0	3,378	7,330
2118	5,977	6,075	0	0	3,378	15,430
2119	5,471	4,556	0	0	3,378	13,405
2120	3,963	0	0	0	3,387	7,350
2121	3,952	0	0	0	3,378	7,330
2122	6,483	7,594	0	0	3,378	17,455

TABLE 3.7 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2123	3,952	0	0	0	3,378	7,330
2124	3,963	0	0	0	3,387	7,350
2125	6,483	7,594	0	0	3,378	17,455
2126	3,952	0	0	0	3,378	7,330
2127	3,952	0	0	0	3,378	7,330
2128	6,494	7,594	0	0	3,387	17,475
2129	3,952	0	0	0	3,378	7,330
2130	3,952	0	0	0	3,378	7,330
2131	3,952	0	0	0	3,378	7,330
2132	6,494	7,594	0	0	3,387	17,475
2133	3,952	0	0	0	3,378	7,330
2134	3,952	0	0	0	3,378	7,330
2135	3,952	0	0	0	3,378	7,330
2136	3,963	0	0	0	3,387	7,350
2137	3,952	0	0	0	3,378	7,330
2138	19,139	45,562	0	0	3,378	68,079
2139	3,952	0	0	0	3,378	7,330
2140	3,963	0	0	0	3,387	7,350
2141	3,952	0	0	0	3,378	7,330
2142	3,952	0	0	0	3,378	7,330
2143	3,952	0	0	0	3,378	7,330
2144	3,963	0	0	0	3,387	7,350
2145	5,471	4,556	0	0	3,378	13,405
2146	4,965	3,037	0	0	3,378	11,380
2147	4,965	3,037	0	0	3,378	11,380
2148	3,963	0	0	0	3,387	7,350
2149	4,965	3,037	0	0	3,378	11,380
2150	5,471	4,556	0	0	3,378	13,405
2151	5,471	4,556	0	0	3,378	13,405
2152	5,482	4,556	0	0	3,387	13,425

TABLE 3.7 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2153	3,952	0	0	0	3,378	7,330
2154	3,952	0	0	0	3,378	7,330
2155	5,831	5,635	0	0	3,378	14,844
2156	4,976	3,037	0	0	3,387	11,400
2157	4,965	3,037	0	0	3,378	11,380
2158	3,952	0	0	0	3,378	7,330
2159	4,965	3,037	0	0	3,378	11,380
2160	4,976	3,037	0	0	3,387	11,400
2161	4,965	3,037	0	0	3,378	11,380
2162	3,952	0	0	0	3,378	7,330
2163	6,990	9,112	0	0	3,378	19,480
2164	5,988	6,075	0	0	3,387	15,450
2165	4,965	3,037	0	0	3,378	11,380
2166	3,952	0	0	0	3,378	7,330
2167	3,952	0	0	0	3,378	7,330
2168	5,988	6,075	0	0	3,387	15,450
2169	5,471	4,556	0	0	3,378	13,405
2170	3,952	0	0	0	3,378	7,330
2171	3,952	0	0	0	3,378	7,330
2172	6,494	7,594	0	0	3,387	17,475
2173	3,952	0	0	0	3,378	7,330
2174	3,952	0	0	0	3,378	7,330
2175	6,483	7,594	0	0	3,378	17,455
2176	3,963	0	0	0	3,387	7,350
2177	3,952	0	0	0	3,378	7,330
2178	6,483	7,594	0	0	3,378	17,455
2179	3,952	0	0	0	3,378	7,330
2180	3,963	0	0	0	3,387	7,350
2181	3,952	0	0	0	3,378	7,330
2182	6,483	7,594	0	0	3,378	17,455

TABLE 3.7 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2183	3,952	0	0	0	3,378	7,330
2184	3,963	0	0	0	3,387	7,350
2185	3,952	0	0	0	3,378	7,330
2186	3,952	0	0	0	3,378	7,330
2187	3,952	0	0	0	3,378	7,330
2188	19,150	45,562	0	0	3,387	68,099
2189	3,952	0	0	0	3,378	7,330
2190	3,952	0	0	0	3,378	7,330
2191	3,952	0	0	0	3,378	7,330
2192	3,963	0	0	0	3,387	7,350
2193	4,056	311	0	0	3,378	7,745
2194	4,212	778	0	0	3,378	8,368
2195	6,090	6,414	0	0	3,378	15,881
2196	5,287	3,972	0	0	3,387	12,645
2197	5,120	3,504	0	0	3,378	12,002
2198	4,315	1,090	0	0	3,378	8,783
2199	5,120	3,504	0	0	3,378	12,002
2200	5,575	4,868	0	0	3,378	13,820
2201	5,730	5,335	0	0	3,378	14,443
2202	5,730	5,335	0	0	3,378	14,443
2203	4,108	467	0	0	3,378	7,952
2204	4,171	623	0	0	3,387	8,180
2205	5,679	5,179	0	0	3,378	14,235
2206	5,120	3,504	0	0	3,378	12,002
2207	5,172	3,660	0	0	3,378	12,210
2208	4,171	623	0	0	3,387	8,180
2209	5,120	3,504	0	0	3,378	12,002
2210	5,172	3,660	0	0	3,378	12,210
2211	5,172	3,660	0	0	3,378	12,210
2212	4,171	623	0	0	3,387	8,180
2213	7,197	9,735	0	0	3,378	20,310

TABLE 3.7 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2214	6,185	6,698	0	0	3,378	16,260
2215	5,172	3,660	0	0	3,378	12,210
2216	4,171	623	0	0	3,387	8,180
2217	4,134	2,428	0	0	13,357	19,918
2218	1,124	887	20	177	1,957	4,164
Total	1,249,423	689,898	10,742	91,722	732,670	2,774,456

Note: Columns may not add due to rounding

TABLE 3.8
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2034	8,346	600	327	10	5,287	14,570
2035	49,894	6,051	2,191	2,472	28,487	89,096
2036	67,674	31,946	2,409	22,189	20,301	144,519
2037	76,073	43,082	1,676	30,330	20,209	171,370
2038	82,785	48,346	1,284	36,708	18,369	187,492
2039	39,073	4,749	599	5,008	6,511	55,940
2040	24,880	10,135	253	16	5,209	40,493
2041	18,384	14,730	186	0	5,303	38,604
2042	10,753	6,941	88	0	4,285	22,067
2043	3,952	0	0	0	3,378	7,330
2044	3,963	0	0	0	3,387	7,350
2045	5,466	4,542	0	0	3,378	13,386
2046	4,962	3,028	0	0	3,378	11,367
2047	4,962	3,028	0	0	3,378	11,367
2048	3,963	0	0	0	3,387	7,350
2049	4,962	3,028	0	0	3,378	11,367
2050	5,466	4,542	0	0	3,378	13,386
2051	5,412	4,378	0	0	3,378	13,167
2052	5,477	4,542	0	0	3,387	13,406
2053	3,952	0	0	0	3,378	7,330
2054	3,952	0	0	0	3,378	7,330
2055	5,466	4,542	0	0	3,378	13,386
2056	4,972	3,028	0	0	3,387	11,388
2057	4,962	3,028	0	0	3,378	11,367
2058	3,952	0	0	0	3,378	7,330
2059	4,907	2,864	0	0	3,378	11,148
2060	4,972	3,028	0	0	3,387	11,388
2061	4,962	3,028	0	0	3,378	11,367
2062	3,952	0	0	0	3,378	7,330
2063	6,980	9,085	0	0	3,378	19,443

TABLE 3.8 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2064	5,927	5,892	0	0	3,387	15,206
2065	4,962	3,028	0	0	3,378	11,367
2066	3,952	0	0	0	3,378	7,330
2067	3,952	0	0	0	3,378	7,330
2068	5,982	6,057	0	0	3,387	15,425
2069	5,466	4,542	0	0	3,378	13,386
2070	3,952	0	0	0	3,378	7,330
2071	3,952	0	0	0	3,378	7,330
2072	6,432	7,406	0	0	3,387	17,225
2073	3,952	0	0	0	3,378	7,330
2074	3,952	0	0	0	3,378	7,330
2075	6,836	8,650	0	0	3,378	18,863
2076	3,963	0	0	0	3,387	7,350
2077	3,952	0	0	0	3,378	7,330
2078	6,476	7,571	0	0	3,378	17,424
2079	3,952	0	0	0	3,378	7,330
2080	3,963	0	0	0	3,387	7,350
2081	3,952	0	0	0	3,378	7,330
2082	6,366	7,242	0	0	3,378	16,986
2083	3,952	0	0	0	3,378	7,330
2084	3,963	0	0	0	3,387	7,350
2085	3,952	0	0	0	3,378	7,330
2086	3,952	0	0	0	3,378	7,330
2087	3,952	0	0	0	3,378	7,330
2088	19,160	45,618	0	2,988	3,910	71,675
2089	3,952	0	0	0	3,378	7,330
2090	3,952	0	0	0	3,378	7,330
2091	3,952	0	0	0	3,378	7,330
2092	3,963	0	0	0	3,387	7,350
2093	3,952	0	0	0	3,378	7,330

TABLE 3.8 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2094	3,952	0	0	0	3,378	7,330
2095	5,471	4,556	0	0	3,378	13,405
2096	4,976	3,037	0	0	3,387	11,400
2097	4,965	3,037	0	0	3,378	11,380
2098	3,952	0	0	0	3,378	7,330
2099	4,965	3,037	0	0	3,378	11,380
2100	5,471	4,556	0	0	3,378	13,405
2101	5,471	4,556	0	0	3,378	13,405
2102	5,471	4,556	0	0	3,378	13,405
2103	3,952	0	0	0	3,378	7,330
2104	3,963	0	0	0	3,387	7,350
2105	5,471	4,556	0	0	3,378	13,405
2106	4,965	3,037	0	0	3,378	11,380
2107	4,965	3,037	0	0	3,378	11,380
2108	3,963	0	0	0	3,387	7,350
2109	4,965	3,037	0	0	3,378	11,380
2110	4,965	3,037	0	0	3,378	11,380
2111	4,965	3,037	0	0	3,378	11,380
2112	3,963	0	0	0	3,387	7,350
2113	6,990	9,112	0	0	3,378	19,480
2114	5,977	6,075	0	0	3,378	15,430
2115	5,324	4,117	0	0	3,378	12,819
2116	3,963	0	0	0	3,387	7,350
2117	3,952	0	0	0	3,378	7,330
2118	5,977	6,075	0	0	3,378	15,430
2119	5,471	4,556	0	0	3,378	13,405
2120	3,963	0	0	0	3,387	7,350
2121	3,952	0	0	0	3,378	7,330
2122	6,483	7,594	0	0	3,378	17,455
2123	3,952	0	0	0	3,378	7,330

TABLE 3.8 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2124	3,963	0	0	0	3,387	7,350
2125	6,483	7,594	0	0	3,378	17,455
2126	3,952	0	0	0	3,378	7,330
2127	3,952	0	0	0	3,378	7,330
2128	6,494	7,594	0	0	3,387	17,475
2129	3,952	0	0	0	3,378	7,330
2130	3,952	0	0	0	3,378	7,330
2131	3,952	0	0	0	3,378	7,330
2132	6,494	7,594	0	0	3,387	17,475
2133	3,952	0	0	0	3,378	7,330
2134	3,952	0	0	0	3,378	7,330
2135	3,952	0	0	0	3,378	7,330
2136	3,963	0	0	0	3,387	7,350
2137	3,952	0	0	0	3,378	7,330
2138	19,139	45,562	0	0	3,378	68,079
2139	3,952	0	0	0	3,378	7,330
2140	3,963	0	0	0	3,387	7,350
2141	3,952	0	0	0	3,378	7,330
2142	3,952	0	0	0	3,378	7,330
2143	3,952	0	0	0	3,378	7,330
2144	3,963	0	0	0	3,387	7,350
2145	5,471	4,556	0	0	3,378	13,405
2146	4,965	3,037	0	0	3,378	11,380
2147	4,965	3,037	0	0	3,378	11,380
2148	3,963	0	0	0	3,387	7,350
2149	4,965	3,037	0	0	3,378	11,380
2150	5,471	4,556	0	0	3,378	13,405
2151	5,471	4,556	0	0	3,378	13,405
2152	5,482	4,556	0	0	3,387	13,425
2153	3,952	0	0	0	3,378	7,330

TABLE 3.8 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2154	3,952	0	0	0	3,378	7,330
2155	5,831	5,635	0	0	3,378	14,844
2156	4,976	3,037	0	0	3,387	11,400
2157	4,965	3,037	0	0	3,378	11,380
2158	3,952	0	0	0	3,378	7,330
2159	4,965	3,037	0	0	3,378	11,380
2160	4,976	3,037	0	0	3,387	11,400
2161	4,965	3,037	0	0	3,378	11,380
2162	3,952	0	0	0	3,378	7,330
2163	6,990	9,112	0	0	3,378	19,480
2164	5,988	6,075	0	0	3,387	15,450
2165	4,965	3,037	0	0	3,378	11,380
2166	3,952	0	0	0	3,378	7,330
2167	3,952	0	0	0	3,378	7,330
2168	5,988	6,075	0	0	3,387	15,450
2169	5,471	4,556	0	0	3,378	13,405
2170	3,952	0	0	0	3,378	7,330
2171	3,952	0	0	0	3,378	7,330
2172	6,494	7,594	0	0	3,387	17,475
2173	3,952	0	0	0	3,378	7,330
2174	3,952	0	0	0	3,378	7,330
2175	6,483	7,594	0	0	3,378	17,455
2176	3,963	0	0	0	3,387	7,350
2177	3,952	0	0	0	3,378	7,330
2178	6,483	7,594	0	0	3,378	17,455
2179	3,952	0	0	0	3,378	7,330
2180	3,963	0	0	0	3,387	7,350
2181	3,952	0	0	0	3,378	7,330
2182	6,483	7,594	0	0	3,378	17,455
2183	3,952	0	0	0	3,378	7,330

TABLE 3.8 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2184	3,963	0	0	0	3,387	7,350
2185	3,952	0	0	0	3,378	7,330
2186	3,952	0	0	0	3,378	7,330
2187	3,952	0	0	0	3,378	7,330
2188	19,150	45,562	0	0	3,387	68,099
2189	3,952	0	0	0	3,378	7,330
2190	3,952	0	0	0	3,378	7,330
2191	3,952	0	0	0	3,378	7,330
2192	3,963	0	0	0	3,387	7,350
2193	4,056	311	0	0	3,378	7,745
2194	4,212	778	0	0	3,378	8,368
2195	6,090	6,414	0	0	3,378	15,881
2196	5,287	3,972	0	0	3,387	12,645
2197	5,120	3,504	0	0	3,378	12,002
2198	4,315	1,090	0	0	3,378	8,783
2199	5,120	3,504	0	0	3,378	12,002
2200	5,575	4,868	0	0	3,378	13,820
2201	5,730	5,335	0	0	3,378	14,443
2202	5,730	5,335	0	0	3,378	14,443
2203	4,108	467	0	0	3,378	7,952
2204	4,171	623	0	0	3,387	8,180
2205	5,679	5,179	0	0	3,378	14,235
2206	5,120	3,504	0	0	3,378	12,002
2207	5,172	3,660	0	0	3,378	12,210
2208	4,171	623	0	0	3,387	8,180
2209	5,120	3,504	0	0	3,378	12,002
2210	5,172	3,660	0	0	3,378	12,210
2211	5,172	3,660	0	0	3,378	12,210
2212	4,171	623	0	0	3,387	8,180
2213	7,197	9,735	0	0	3,378	20,310

TABLE 3.8 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2214	6,185	6,698	0	0	3,378	16,260
2215	5,172	3,660	0	0	3,378	12,210
2216	4,171	623	0	0	3,387	8,180
2217	4,134	2,428	0	0	13,357	19,918
2218	1,124	887	20	177	1,957	4,164
Total	1,250,894	708,831	9,033	99,898	717,875	2,786,532

Note: Columns may not add due to rounding

TABLE 3.9
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2033	19,045	696	741	25	4,394	24,901
2034	48,160	4,428	1,864	527	26,418	81,398
2035	19,428	13,608	524	148	16,938	50,647
2036	16,303	14,592	374	20	17,085	48,374
2037	16,258	14,552	373	20	17,038	48,242
2038	14,281	12,057	340	18	15,144	41,840
2039	5,186	945	186	11	6,235	12,563
2040	5,252	1,101	187	11	6,252	12,803
2041	5,134	789	186	11	6,235	12,356
2042	5,290	1,256	186	11	6,235	12,979
2043	5,134	789	186	11	6,235	12,356
2044	5,096	634	187	11	6,252	12,180
2045	5,186	945	186	11	6,235	12,563
2046	5,186	945	186	11	6,235	12,563
2047	5,134	789	186	11	6,235	12,356
2048	5,200	946	187	11	6,252	12,596
2049	5,186	945	186	11	6,235	12,563
2050	5,134	789	186	11	6,235	12,356
2051	5,186	945	186	11	6,235	12,563
2052	5,148	790	187	11	6,252	12,388
2053	5,082	633	186	11	6,235	12,148
2054	5,082	633	186	11	6,235	12,148
2055	5,082	633	186	11	6,235	12,148
2056	4,992	323	187	11	6,252	11,765
2057	4,979	322	186	11	6,235	11,733
2058	4,979	322	186	11	6,235	11,733
2059	4,979	322	186	11	6,235	11,733
2060	5,096	634	187	11	6,252	12,180
2061	5,082	633	186	11	6,235	12,148
2062	5,082	633	186	11	6,235	12,148

TABLE 3.9 (continued)
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2063	5,082	633	186	11	6,235	12,148
2064	5,096	634	187	11	6,252	12,180
2065	5,082	633	186	11	6,235	12,148
2066	5,082	633	186	11	6,235	12,148
2067	5,082	633	186	11	6,235	12,148
2068	5,096	634	187	11	6,252	12,180
2069	5,082	633	186	11	6,235	12,148
2070	5,082	633	186	11	6,235	12,148
2071	5,082	633	186	11	6,235	12,148
2072	5,096	634	187	11	6,252	12,180
2073	5,082	633	186	11	6,235	12,148
2074	5,082	633	186	11	6,235	12,148
2075	4,282	320	186	10	3,162	7,961
2076	4,294	321	187	11	3,171	7,983
2077	4,282	320	186	10	3,162	7,961
2078	4,282	320	186	10	3,162	7,961
2079	4,282	320	186	10	3,162	7,961
2080	4,294	321	187	11	3,171	7,983
2081	4,282	320	186	10	3,162	7,961
2082	4,282	320	186	10	3,162	7,961
2083	4,282	320	186	10	3,162	7,961
2084	4,294	321	187	11	3,171	7,983
2085	4,282	320	186	10	3,162	7,961
2086	4,282	320	186	10	3,162	7,961
2087	27,710	3,200	1,088	1,062	3,389	36,449
2088	49,590	7,228	1,866	2,031	4,068	64,784
2089	56,167	28,002	1,771	26,522	15,816	128,280
2090	42,753	14,271	1,506	22,835	10,248	91,613
2091	37,335	8,726	1,398	21,346	8,000	76,805
2092	7,675	892	150	1,477	2,793	12,986

TABLE 3.9 (continued)
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2093	18,857	4,193	299	28	2,367	25,743
2094	13,636	8,639	186	0	1,922	24,384
2095	9,863	6,248	135	0	1,390	17,636
Total	632,401	170,481	21,571	76,568	409,608	1,310,629

Note: Columns may not add due to rounding

TABLE 3.10
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2034	7,648	506	327	11	3,559	12,051
2035	47,107	5,551	1,864	350	27,380	82,253
2036	32,232	16,816	856	464	19,987	70,355
2037	23,188	20,952	373	24	15,859	60,397
2038	20,005	17,338	340	21	14,170	51,875
2039	5,242	963	186	11	6,223	12,626
2040	5,308	1,120	187	11	6,240	12,865
2041	5,190	808	186	11	6,223	12,418
2042	5,346	1,275	186	11	6,223	13,041
2043	5,190	808	186	11	6,223	12,418
2044	5,152	653	187	11	6,240	12,243
2045	5,242	963	186	11	6,223	12,626
2046	5,242	963	186	11	6,223	12,626
2047	5,190	808	186	11	6,223	12,418
2048	5,256	964	187	11	6,240	12,658
2049	5,242	963	186	11	6,223	12,626
2050	5,190	808	186	11	6,223	12,418
2051	5,242	963	186	11	6,223	12,626
2052	5,204	809	187	11	6,240	12,450
2053	5,138	652	186	11	6,223	12,210
2054	5,138	652	186	11	6,223	12,210
2055	5,138	652	186	11	6,223	12,210
2056	5,048	342	187	11	6,240	11,828
2057	5,035	341	186	11	6,223	11,795
2058	5,035	341	186	11	6,223	11,795
2059	5,035	341	186	11	6,223	11,795
2060	5,152	653	187	11	6,240	12,243
2061	5,138	652	186	11	6,223	12,210
2062	5,138	652	186	11	6,223	12,210
2063	5,138	652	186	11	6,223	12,210

TABLE 3.10 (continued)
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2064	5,152	653	187	11	6,240	12,243
2065	5,138	652	186	11	6,223	12,210
2066	5,138	652	186	11	6,223	12,210
2067	5,138	652	186	11	6,223	12,210
2068	5,152	653	187	11	6,240	12,243
2069	5,138	652	186	11	6,223	12,210
2070	5,138	652	186	11	6,223	12,210
2071	5,138	652	186	11	6,223	12,210
2072	5,152	653	187	11	6,240	12,243
2073	5,138	652	186	11	6,223	12,210
2074	5,138	652	186	11	6,223	12,210
2075	825	333	186	10	3,164	4,519
2076	828	334	187	10	3,172	4,531
2077	825	333	186	10	3,164	4,519
2078	825	333	186	10	3,164	4,519
2079	825	333	186	10	3,164	4,519
2080	828	334	187	10	3,172	4,531
2081	825	333	186	10	3,164	4,519
2082	825	333	186	10	3,164	4,519
2083	825	333	186	10	3,164	4,519
2084	828	334	187	10	3,172	4,531
2085	825	333	186	10	3,164	4,519
2086	825	333	186	10	3,164	4,519
2087	825	333	186	10	3,164	4,519
2088	23,101	3,334	1,447	1,478	3,367	32,727
2089	37,591	11,836	1,841	7,041	6,362	64,671
2090	56,571	29,110	1,771	25,884	15,637	128,973
2091	57,872	12,950	1,427	25,648	8,617	106,515
2092	53,927	10,188	1,253	21,984	7,242	94,594
2093	23,983	6,921	299	28	2,688	33,918

TABLE 3.10 (continued)
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2094	16,407	14,975	186	0	3,086	34,655
2095	11,867	10,832	135	0	2,232	25,065
Total	608,172	191,616	21,262	83,445	395,520	1,300,015

Note: Columns may not add due to rounding

TABLE 3.11
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2033	19,045	696	741	25	4,394	24,901
2034	48,160	4,428	1,864	527	26,418	81,398
2035	19,353	13,383	524	148	16,938	50,346
2036	16,219	14,341	374	20	17,085	48,039
2037	16,175	14,301	373	20	17,038	47,907
2038	14,212	11,850	340	18	15,144	41,564
2039	4,979	322	186	11	6,235	11,733
2040	4,992	323	187	11	6,252	11,765
2041	4,979	322	186	11	6,235	11,733
2042	4,979	322	186	11	6,235	11,733
2043	4,979	322	186	11	6,235	11,733
2044	4,992	323	187	11	6,252	11,765
2045	4,979	322	186	11	6,235	11,733
2046	4,979	322	186	11	6,235	11,733
2047	4,979	322	186	11	6,235	11,733
2048	4,992	323	187	11	6,252	11,765
2049	4,979	322	186	11	6,235	11,733
2050	4,979	322	186	11	6,235	11,733
2051	4,979	322	186	11	6,235	11,733
2052	5,096	634	187	11	6,252	12,180
2053	5,186	945	186	11	6,235	12,563
2054	5,186	945	186	11	6,235	12,563
2055	5,238	1,100	186	11	6,235	12,771
2056	5,148	790	187	11	6,252	12,388
2057	5,290	1,256	186	11	6,235	12,978
2058	5,134	789	186	11	6,235	12,356
2059	5,082	633	186	11	6,235	12,148
2060	5,200	946	187	11	6,252	12,595
2061	5,186	945	186	11	6,235	12,563
2062	5,134	789	186	11	6,235	12,356

TABLE 3.11 (continued)
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2063	5,186	945	186	11	6,235	12,563
2064	5,200	946	187	11	6,252	12,595
2065	5,134	789	186	11	6,235	12,356
2066	5,186	945	186	11	6,235	12,563
2067	5,186	945	186	11	6,235	12,563
2068	5,148	790	187	11	6,252	12,388
2069	5,186	945	186	11	6,235	12,563
2070	5,186	945	186	11	6,235	12,563
2071	5,186	945	186	11	6,235	12,563
2072	5,200	946	187	11	6,252	12,595
2073	5,186	945	186	11	6,235	12,563
2074	5,546	2,024	186	11	6,235	14,002
2075	5,186	945	186	11	6,235	12,563
2076	5,200	946	187	11	6,252	12,595
2077	4,979	322	186	11	6,235	11,733
2078	4,282	320	186	10	3,162	7,962
2079	4,282	320	186	10	3,162	7,962
2080	4,294	321	187	11	3,171	7,983
2081	4,282	320	186	10	3,162	7,962
2082	4,282	320	186	10	3,162	7,962
2083	4,282	320	186	10	3,162	7,962
2084	4,294	321	187	11	3,171	7,983
2085	4,282	320	186	10	3,162	7,962
2086	4,282	320	186	10	3,162	7,962
2087	27,710	3,200	1,088	1,062	3,389	36,449
2088	49,590	7,228	1,866	2,031	4,068	64,784
2089	56,167	28,002	1,771	26,522	15,816	128,280
2090	42,753	14,271	1,506	22,835	10,248	91,613
2091	37,335	8,726	1,398	21,346	8,000	76,805
2092	7,675	892	150	1,477	2,793	12,986

TABLE 3.11 (continued)
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2093	18,857	4,193	299	28	2,367	25,743
2094	13,636	8,639	186	0	1,922	24,384
2095	9,863	6,248	135	0	1,390	17,636
Total	634,853	171,565	21,571	76,569	418,836	1,323,393

Note: Columns may not add due to rounding

TABLE 3.12
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2034	7,648	506	327	11	3,559	12,051
2035	47,107	5,551	1,864	350	27,380	82,253
2036	32,148	16,562	856	464	19,987	70,018
2037	23,064	20,579	373	24	15,859	59,899
2038	19,903	17,031	340	21	14,170	51,465
2039	5,035	341	186	11	6,223	11,795
2040	5,048	342	187	11	6,240	11,828
2041	5,035	341	186	11	6,223	11,795
2042	5,035	341	186	11	6,223	11,795
2043	5,035	341	186	11	6,223	11,795
2044	5,048	342	187	11	6,240	11,828
2045	5,035	341	186	11	6,223	11,795
2046	5,035	341	186	11	6,223	11,795
2047	5,035	341	186	11	6,223	11,795
2048	5,048	342	187	11	6,240	11,828
2049	5,035	341	186	11	6,223	11,795
2050	5,035	341	186	11	6,223	11,795
2051	5,035	341	186	11	6,223	11,795
2052	5,048	342	187	11	6,240	11,828
2053	5,138	652	186	11	6,223	12,210
2054	5,242	963	186	11	6,223	12,626
2055	5,242	963	186	11	6,223	12,626
2056	5,308	1,120	187	11	6,240	12,865
2057	5,190	808	186	11	6,223	12,418
2058	5,346	1,275	186	11	6,223	13,041
2059	5,190	808	186	11	6,223	12,418
2060	5,152	653	187	11	6,240	12,243
2061	5,242	963	186	11	6,223	12,626
2062	5,242	963	186	11	6,223	12,626
2063	5,190	808	186	11	6,223	12,418

TABLE 3.12 (continued)
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2064	5,256	964	187	11	6,240	12,658
2065	5,242	963	186	11	6,223	12,626
2066	5,190	808	186	11	6,223	12,418
2067	5,242	963	186	11	6,223	12,626
2068	5,256	964	187	11	6,240	12,658
2069	5,190	808	186	11	6,223	12,418
2070	5,242	963	186	11	6,223	12,626
2071	5,242	963	186	11	6,223	12,626
2072	5,256	964	187	11	6,240	12,658
2073	5,242	963	186	11	6,223	12,626
2074	5,242	963	186	11	6,223	12,626
2075	5,602	2,043	186	11	6,223	14,064
2076	5,256	964	187	11	6,240	12,658
2077	5,242	963	186	11	6,223	12,626
2078	825	333	186	10	3,164	4,519
2079	825	333	186	10	3,164	4,519
2080	828	334	187	10	3,172	4,531
2081	825	333	186	10	3,164	4,519
2082	825	333	186	10	3,164	4,519
2083	825	333	186	10	3,164	4,519
2084	828	334	187	10	3,172	4,531
2085	825	333	186	10	3,164	4,519
2086	825	333	186	10	3,164	4,519
2087	825	333	186	10	3,164	4,519
2088	23,101	3,334	1,447	1,478	3,368	32,727
2089	37,591	11,836	1,841	7,041	6,362	64,671
2090	56,571	29,110	1,771	25,884	15,637	128,973
2091	57,872	12,950	1,427	25,648	8,617	106,515
2092	53,927	10,188	1,253	21,984	7,242	94,594
2093	23,983	6,921	299	28	2,688	33,918

TABLE 3.12 (continued)
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2094	16,407	14,975	186	0	3,086	34,655
2095	11,867	10,832	135	0	2,232	25,065
Total	621,171	192,717	21,262	83,448	404,706	1,323,303

Note: Columns may not add due to rounding

TABLE 3.13
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2033	19,545	696	741	25	4,394	25,400
2034	48,890	4,345	1,864	527	26,418	82,043
2035	15,648	2,269	524	148	16,938	35,529
2036	11,694	763	374	20	17,085	29,936
2037	16,619	15,634	373	20	17,038	49,684
2038	23,866	40,813	340	18	15,144	80,181
2039	4,979	322	186	11	6,235	11,733
2040	4,992	323	187	11	6,252	11,765
2041	4,979	322	186	11	6,235	11,733
2042	4,979	322	186	11	6,235	11,733
2043	4,979	322	186	11	6,235	11,733
2044	4,992	323	187	11	6,252	11,765
2045	6,493	4,864	186	11	6,235	17,790
2046	5,988	3,350	186	11	6,235	15,771
2047	5,988	3,350	186	11	6,235	15,771
2048	4,992	323	187	11	6,252	11,765
2049	5,988	3,350	186	11	6,235	15,771
2050	6,493	4,864	186	11	6,235	17,790
2051	6,438	4,700	186	11	6,235	17,571
2052	6,506	4,865	187	11	6,252	17,822
2053	4,979	322	186	11	6,235	11,733
2054	4,979	322	186	11	6,235	11,733
2055	6,493	4,864	186	11	6,235	17,790
2056	6,002	3,351	187	11	6,252	15,803
2057	5,988	3,350	186	11	6,235	15,771
2058	4,979	322	186	11	6,235	11,733
2059	5,933	3,186	186	11	6,235	15,552
2060	6,002	3,351	187	11	6,252	15,803
2061	5,988	3,350	186	11	6,235	15,771
2062	4,979	322	186	11	6,235	11,733

TABLE 3.13 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2063	8,007	9,407	186	11	6,235	23,846
2064	6,956	6,215	187	11	6,252	19,622
2065	5,988	3,350	186	11	6,235	15,771
2066	4,979	322	186	11	6,235	11,733
2067	4,979	322	186	11	6,235	11,733
2068	7,011	6,379	187	11	6,252	19,841
2069	6,493	4,864	186	11	6,235	17,790
2070	4,979	322	186	11	6,235	11,733
2071	4,979	322	186	11	6,235	11,733
2072	7,461	7,729	187	11	6,252	21,640
2073	4,979	322	186	11	6,235	11,733
2074	4,979	322	186	11	6,235	11,733
2075	7,862	8,972	186	11	6,235	23,266
2076	4,992	323	187	11	6,252	11,765
2077	4,979	322	186	11	6,235	11,733
2078	7,502	7,893	186	11	6,235	21,827
2079	4,979	322	186	11	6,235	11,733
2080	4,992	323	187	11	6,252	11,765
2081	4,979	322	186	11	6,235	11,733
2082	7,393	7,564	186	11	6,235	21,389
2083	4,979	322	186	11	6,235	11,733
2084	4,992	323	187	11	6,252	11,765
2085	4,979	322	186	11	6,235	11,733
2086	4,979	322	186	11	6,235	11,733
2087	27,646	3,201	1,088	1,062	6,520	39,517
2088	64,790	52,925	1,866	5,020	7,348	131,949
2089	57,854	29,888	1,771	26,522	11,260	127,296
2090	43,227	14,760	1,506	21,569	10,138	91,201
2091	37,320	8,651	1,398	19,568	9,685	76,624
2092	7,957	887	150	1,355	6,165	16,514

TABLE 3.13 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2093	21,014	4,434	299	28	5,681	31,456
2094	16,104	9,238	186	0	4,973	30,502
2095	14,255	11,453	135	0	4,548	30,391
2096	5,005	3,972	0	0	3,448	12,424
2097	4,839	3,504	0	0	3,439	11,782
2098	4,034	1,090	0	0	3,439	8,563
2099	4,839	3,504	0	0	3,439	11,782
2100	5,294	4,868	0	0	3,439	13,600
2101	5,449	5,335	0	0	3,439	14,222
2102	5,449	5,335	0	0	3,439	14,222
2103	3,827	467	0	0	3,439	7,732
2104	3,889	623	0	0	3,448	7,959
2105	5,397	5,179	0	0	3,439	14,015
2106	4,839	3,504	0	0	3,439	11,782
2107	4,891	3,660	0	0	3,439	11,990
2108	3,889	623	0	0	3,448	7,959
2109	4,839	3,504	0	0	3,439	11,782
2110	4,891	3,660	0	0	3,439	11,990
2111	4,891	3,660	0	0	3,439	11,990
2112	3,889	623	0	0	3,448	7,959
2113	6,916	9,735	0	0	3,439	20,090
2114	5,904	6,698	0	0	3,439	16,040
2115	5,251	4,739	0	0	3,439	13,429
2116	3,889	623	0	0	3,448	7,959
2117	3,853	2,428	0	0	13,415	19,696
2118	1,124	887	20	177	1,957	4,164
Total	808,018	399,730	21,590	76,570	550,465	1,856,374

Note: Columns may not add due to rounding

TABLE 3.14
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2034	7,675	305	327	11	3,559	11,877
2035	47,508	5,797	1,864	350	27,380	82,899
2036	27,600	3,076	856	464	19,987	51,983
2037	21,435	15,692	373	24	15,859	53,383
2038	27,847	40,864	340	21	14,170	83,243
2039	5,035	341	186	11	6,223	11,795
2040	5,048	342	187	11	6,240	11,828
2041	5,035	341	186	11	6,223	11,795
2042	5,035	341	186	11	6,223	11,795
2043	5,035	341	186	11	6,223	11,795
2044	5,048	342	187	11	6,240	11,828
2045	6,549	4,883	186	11	6,223	17,852
2046	6,044	3,369	186	11	6,223	15,833
2047	6,044	3,369	186	11	6,223	15,833
2048	5,048	342	187	11	6,240	11,828
2049	6,044	3,369	186	11	6,223	15,833
2050	6,549	4,883	186	11	6,223	17,852
2051	6,494	4,719	186	11	6,223	17,633
2052	6,562	4,884	187	11	6,240	17,884
2053	5,035	341	186	11	6,223	11,795
2054	5,035	341	186	11	6,223	11,795
2055	6,549	4,883	186	11	6,223	17,852
2056	6,058	3,370	187	11	6,240	15,865
2057	6,044	3,369	186	11	6,223	15,833
2058	5,035	341	186	11	6,223	11,795
2059	5,989	3,205	186	11	6,223	15,614
2060	6,058	3,370	187	11	6,240	15,865
2061	6,044	3,369	186	11	6,223	15,833
2062	5,035	341	186	11	6,223	11,795
2063	8,063	9,426	186	11	6,223	23,908

TABLE 3.14 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2064	7,012	6,234	187	11	6,240	19,684
2065	6,044	3,369	186	11	6,223	15,833
2066	5,035	341	186	11	6,223	11,795
2067	5,035	341	186	11	6,223	11,795
2068	7,067	6,398	187	11	6,240	19,903
2069	6,549	4,883	186	11	6,223	17,852
2070	5,035	341	186	11	6,223	11,795
2071	5,035	341	186	11	6,223	11,795
2072	7,517	7,748	187	11	6,240	21,703
2073	5,035	341	186	11	6,223	11,795
2074	5,035	341	186	11	6,223	11,795
2075	7,918	8,991	186	11	6,223	23,329
2076	5,048	342	187	11	6,240	11,828
2077	5,035	341	186	11	6,223	11,795
2078	7,558	7,911	186	11	6,223	21,890
2079	5,035	341	186	11	6,223	11,795
2080	5,048	342	187	11	6,240	11,828
2081	5,035	341	186	11	6,223	11,795
2082	7,449	7,583	186	11	6,223	21,451
2083	5,035	341	186	11	6,223	11,795
2084	5,048	342	187	11	6,240	11,828
2085	5,035	341	186	11	6,223	11,795
2086	5,035	341	186	11	6,223	11,795
2087	5,035	341	186	11	6,223	11,795
2088	38,955	48,954	1,447	4,466	7,047	100,869
2089	37,814	12,311	1,841	7,041	7,480	66,488
2090	57,989	30,995	1,771	25,884	11,081	127,720
2091	59,766	13,027	1,427	24,007	9,822	108,049
2092	55,869	10,125	1,253	20,460	9,192	96,899
2093	26,140	7,163	299	28	6,002	39,632

TABLE 3.14 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2094	18,875	15,575	186	0	6,136	40,773
2095	16,259	16,037	135	0	5,390	37,820
2096	5,005	3,972	0	0	3,448	12,424
2097	4,839	3,504	0	0	3,439	11,782
2098	4,034	1,090	0	0	3,439	8,563
2099	4,839	3,504	0	0	3,439	11,782
2100	5,294	4,868	0	0	3,439	13,600
2101	5,449	5,335	0	0	3,439	14,222
2102	5,449	5,335	0	0	3,439	14,222
2103	3,827	467	0	0	3,439	7,732
2104	3,889	623	0	0	3,448	7,959
2105	5,397	5,179	0	0	3,439	14,015
2106	4,839	3,504	0	0	3,439	11,782
2107	4,891	3,660	0	0	3,439	11,990
2108	3,889	623	0	0	3,448	7,959
2109	4,839	3,504	0	0	3,439	11,782
2110	4,891	3,660	0	0	3,439	11,990
2111	4,891	3,660	0	0	3,439	11,990
2112	3,889	623	0	0	3,448	7,959
2113	6,916	9,735	0	0	3,439	20,090
2114	5,904	6,698	0	0	3,439	16,040
2115	5,251	4,739	0	0	3,439	13,429
2116	3,889	623	0	0	3,448	7,959
2117	3,853	2,428	0	0	13,415	19,696
2118	1,124	887	20	177	1,957	4,164
Total	833,039	420,929	21,282	83,454	535,865	1,894,569

Note: Columns may not add due to rounding

TABLE 3.15
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2033	19,545	696	741	25	4,394	25,400
2034	48,890	4,345	1,864	527	26,418	82,043
2035	15,648	2,269	524	148	16,938	35,529
2036	11,694	763	374	20	17,085	29,936
2037	16,619	15,634	373	20	17,038	49,684
2038	23,866	40,813	340	18	15,144	80,181
2039	4,979	322	186	11	6,235	11,733
2040	4,992	323	187	11	6,252	11,765
2041	4,979	322	186	11	6,235	11,733
2042	4,979	322	186	11	6,235	11,733
2043	4,979	322	186	11	6,235	11,733
2044	4,992	323	187	11	6,252	11,765
2045	6,493	4,864	186	11	6,235	17,790
2046	5,988	3,350	186	11	6,235	15,771
2047	5,988	3,350	186	11	6,235	15,771
2048	4,992	323	187	11	6,252	11,765
2049	5,988	3,350	186	11	6,235	15,771
2050	6,493	4,864	186	11	6,235	17,790
2051	6,438	4,700	186	11	6,235	17,571
2052	6,506	4,865	187	11	6,252	17,822
2053	4,979	322	186	11	6,235	11,733
2054	4,979	322	186	11	6,235	11,733
2055	6,493	4,864	186	11	6,235	17,790
2056	6,002	3,351	187	11	6,252	15,803
2057	5,988	3,350	186	11	6,235	15,771
2058	4,979	322	186	11	6,235	11,733
2059	5,933	3,186	186	11	6,235	15,552
2060	6,002	3,351	187	11	6,252	15,803
2061	5,988	3,350	186	11	6,235	15,771
2062	4,979	322	186	11	6,235	11,733

TABLE 3.15 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2063	8,007	9,407	186	11	6,235	23,846
2064	6,956	6,215	187	11	6,252	19,622
2065	5,988	3,350	186	11	6,235	15,771
2066	4,979	322	186	11	6,235	11,733
2067	4,979	322	186	11	6,235	11,733
2068	7,011	6,379	187	11	6,252	19,841
2069	6,493	4,864	186	11	6,235	17,790
2070	4,979	322	186	11	6,235	11,733
2071	4,979	322	186	11	6,235	11,733
2072	7,461	7,729	187	11	6,252	21,640
2073	4,979	322	186	11	6,235	11,733
2074	4,979	322	186	11	6,235	11,733
2075	7,862	8,972	186	11	6,235	23,266
2076	4,992	323	187	11	6,252	11,765
2077	4,979	322	186	11	6,235	11,733
2078	7,502	7,893	186	11	6,235	21,827
2079	4,979	322	186	11	6,235	11,733
2080	4,992	323	187	11	6,252	11,765
2081	4,979	322	186	11	6,235	11,733
2082	7,393	7,564	186	11	6,235	21,389
2083	4,979	322	186	11	6,235	11,733
2084	4,992	323	187	11	6,252	11,765
2085	4,979	322	186	11	6,235	11,733
2086	4,979	322	186	11	6,235	11,733
2087	27,646	3,201	1,088	1,062	6,473	39,471
2088	64,790	52,925	1,866	5,020	7,262	131,862
2089	57,854	29,888	1,771	26,522	11,174	127,210
2090	43,227	14,760	1,506	21,569	10,052	91,115
2091	37,320	8,651	1,398	19,568	9,599	76,538
2092	7,957	887	150	1,355	6,078	16,428

TABLE 3.15 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2093	20,910	4,123	299	28	5,612	30,972
2094	15,845	8,460	186	0	4,930	29,421
2095	13,995	10,675	135	0	4,502	29,307
2096	4,694	3,037	0	0	3,392	11,123
2097	4,684	3,037	0	0	3,383	11,104
2098	3,671	0	0	0	3,383	7,054
2099	4,684	3,037	0	0	3,383	11,104
2100	5,190	4,556	0	0	3,383	13,129
2101	5,190	4,556	0	0	3,383	13,129
2102	5,190	4,556	0	0	3,383	13,129
2103	3,671	0	0	0	3,383	7,054
2104	3,681	0	0	0	3,392	7,073
2105	5,190	4,556	0	0	3,383	13,129
2106	4,684	3,037	0	0	3,383	11,104
2107	4,684	3,037	0	0	3,383	11,104
2108	3,681	0	0	0	3,392	7,073
2109	4,684	3,037	0	0	3,383	11,104
2110	4,684	3,037	0	0	3,383	11,104
2111	4,684	3,037	0	0	3,383	11,104
2112	3,681	0	0	0	3,392	7,073
2113	6,709	9,112	0	0	3,383	19,204
2114	5,696	6,075	0	0	3,383	15,154
2115	5,043	4,117	0	0	3,383	12,543
2116	3,681	0	0	0	3,392	7,073
2117	3,671	0	0	0	3,383	7,054
2118	5,696	6,075	0	0	3,383	15,154
2119	5,190	4,556	0	0	3,383	13,129
2120	3,681	0	0	0	3,392	7,073
2121	3,671	0	0	0	3,383	7,054
2122	6,202	7,594	0	0	3,383	17,179

TABLE 3.15 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2123	3,671	0	0	0	3,383	7,054
2124	3,681	0	0	0	3,392	7,073
2125	6,202	7,594	0	0	3,383	17,179
2126	3,671	0	0	0	3,383	7,054
2127	3,671	0	0	0	3,383	7,054
2128	6,212	7,594	0	0	3,392	17,198
2129	3,671	0	0	0	3,383	7,054
2130	3,671	0	0	0	3,383	7,054
2131	3,671	0	0	0	3,383	7,054
2132	6,212	7,594	0	0	3,392	17,198
2133	3,671	0	0	0	3,383	7,054
2134	3,671	0	0	0	3,383	7,054
2135	3,671	0	0	0	3,383	7,054
2136	3,681	0	0	0	3,392	7,073
2137	3,671	0	0	0	3,383	7,054
2138	18,858	45,562	0	0	3,383	67,803
2139	3,671	0	0	0	3,383	7,054
2140	3,681	0	0	0	3,392	7,073
2141	3,671	0	0	0	3,383	7,054
2142	3,671	0	0	0	3,383	7,054
2143	3,671	0	0	0	3,383	7,054
2144	3,681	0	0	0	3,392	7,073
2145	5,190	4,556	0	0	3,383	13,129
2146	4,684	3,037	0	0	3,383	11,104
2147	4,684	3,037	0	0	3,383	11,104
2148	3,681	0	0	0	3,392	7,073
2149	4,684	3,037	0	0	3,383	11,104
2150	5,190	4,556	0	0	3,383	13,129
2151	5,190	4,556	0	0	3,383	13,129
2152	5,200	4,556	0	0	3,392	13,148

TABLE 3.15 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2153	3,671	0	0	0	3,383	7,054
2154	3,671	0	0	0	3,383	7,054
2155	5,550	5,635	0	0	3,383	14,568
2156	4,694	3,037	0	0	3,392	11,123
2157	4,684	3,037	0	0	3,383	11,104
2158	3,671	0	0	0	3,383	7,054
2159	4,684	3,037	0	0	3,383	11,104
2160	4,694	3,037	0	0	3,392	11,123
2161	4,684	3,037	0	0	3,383	11,104
2162	3,671	0	0	0	3,383	7,054
2163	6,709	9,112	0	0	3,383	19,204
2164	5,706	6,075	0	0	3,392	15,173
2165	4,684	3,037	0	0	3,383	11,104
2166	3,671	0	0	0	3,383	7,054
2167	3,671	0	0	0	3,383	7,054
2168	5,706	6,075	0	0	3,392	15,173
2169	5,190	4,556	0	0	3,383	13,129
2170	3,671	0	0	0	3,383	7,054
2171	3,671	0	0	0	3,383	7,054
2172	6,212	7,594	0	0	3,392	17,198
2173	3,671	0	0	0	3,383	7,054
2174	3,671	0	0	0	3,383	7,054
2175	6,202	7,594	0	0	3,383	17,179
2176	3,681	0	0	0	3,392	7,073
2177	3,671	0	0	0	3,383	7,054
2178	6,202	7,594	0	0	3,383	17,179
2179	3,671	0	0	0	3,383	7,054
2180	3,681	0	0	0	3,392	7,073
2181	3,671	0	0	0	3,383	7,054
2182	6,202	7,594	0	0	3,383	17,179

TABLE 3.15 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2183	3,671	0	0	0	3,383	7,054
2184	3,681	0	0	0	3,392	7,073
2185	3,671	0	0	0	3,383	7,054
2186	3,671	0	0	0	3,383	7,054
2187	3,671	0	0	0	3,383	7,054
2188	18,868	45,562	0	0	3,392	67,822
2189	3,671	0	0	0	3,383	7,054
2190	3,671	0	0	0	3,383	7,054
2191	3,671	0	0	0	3,383	7,054
2192	3,681	0	0	0	3,392	7,073
2193	3,775	311	0	0	3,383	7,469
2194	3,931	778	0	0	3,383	8,092
2195	5,809	6,414	0	0	3,383	15,606
2196	5,005	3,972	0	0	3,392	12,369
2197	4,839	3,504	0	0	3,383	11,727
2198	4,034	1,090	0	0	3,383	8,507
2199	4,839	3,504	0	0	3,383	11,727
2200	5,294	4,868	0	0	3,383	13,544
2201	5,449	5,335	0	0	3,383	14,167
2202	5,449	5,335	0	0	3,383	14,167
2203	3,827	467	0	0	3,383	7,677
2204	3,889	623	0	0	3,392	7,904
2205	5,397	5,179	0	0	3,383	13,959
2206	4,839	3,504	0	0	3,383	11,727
2207	4,891	3,660	0	0	3,383	11,934
2208	3,889	623	0	0	3,392	7,904
2209	4,839	3,504	0	0	3,383	11,727
2210	4,891	3,660	0	0	3,383	11,934
2211	4,891	3,660	0	0	3,383	11,934
2212	3,889	623	0	0	3,392	7,904

TABLE 3.15 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2213	6,916	9,735	0	0	3,383	20,034
2214	5,904	6,698	0	0	3,383	15,984
2215	4,891	3,660	0	0	3,383	11,934
2216	3,889	623	0	0	3,392	7,904
2217	3,853	2,428	0	0	13,362	19,642
2218	1,124	887	20	177	1,957	4,164
Total	1,277,333	705,634	21,590	76,570	887,128	2,968,256

Note: Columns may not add due to rounding

TABLE 3.16
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2034	7,675	305	327	11	3,559	11,877
2035	47,508	5,797	1,864	350	27,380	82,899
2036	27,600	3,076	856	464	19,987	51,983
2037	21,435	15,692	373	24	15,859	53,383
2038	27,847	40,864	340	21	14,170	83,243
2039	5,035	341	186	11	6,223	11,795
2040	5,048	342	187	11	6,240	11,828
2041	5,035	341	186	11	6,223	11,795
2042	5,035	341	186	11	6,223	11,795
2043	5,035	341	186	11	6,223	11,795
2044	5,048	342	187	11	6,240	11,828
2045	6,549	4,883	186	11	6,223	17,852
2046	6,044	3,369	186	11	6,223	15,833
2047	6,044	3,369	186	11	6,223	15,833
2048	5,048	342	187	11	6,240	11,828
2049	6,044	3,369	186	11	6,223	15,833
2050	6,549	4,883	186	11	6,223	17,852
2051	6,494	4,719	186	11	6,223	17,633
2052	6,562	4,884	187	11	6,240	17,884
2053	5,035	341	186	11	6,223	11,795
2054	5,035	341	186	11	6,223	11,795
2055	6,549	4,883	186	11	6,223	17,852
2056	6,058	3,370	187	11	6,240	15,865
2057	6,044	3,369	186	11	6,223	15,833
2058	5,035	341	186	11	6,223	11,795
2059	5,989	3,205	186	11	6,223	15,614
2060	6,058	3,370	187	11	6,240	15,865
2061	6,044	3,369	186	11	6,223	15,833
2062	5,035	341	186	11	6,223	11,795
2063	8,063	9,426	186	11	6,223	23,908

TABLE 3.16 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2064	7,012	6,234	187	11	6,240	19,684
2065	6,044	3,369	186	11	6,223	15,833
2066	5,035	341	186	11	6,223	11,795
2067	5,035	341	186	11	6,223	11,795
2068	7,067	6,398	187	11	6,240	19,903
2069	6,549	4,883	186	11	6,223	17,852
2070	5,035	341	186	11	6,223	11,795
2071	5,035	341	186	11	6,223	11,795
2072	7,517	7,748	187	11	6,240	21,703
2073	5,035	341	186	11	6,223	11,795
2074	5,035	341	186	11	6,223	11,795
2075	7,918	8,991	186	11	6,223	23,329
2076	5,048	342	187	11	6,240	11,828
2077	5,035	341	186	11	6,223	11,795
2078	7,558	7,911	186	11	6,223	21,890
2079	5,035	341	186	11	6,223	11,795
2080	5,048	342	187	11	6,240	11,828
2081	5,035	341	186	11	6,223	11,795
2082	7,449	7,583	186	11	6,223	21,451
2083	5,035	341	186	11	6,223	11,795
2084	5,048	342	187	11	6,240	11,828
2085	5,035	341	186	11	6,223	11,795
2086	5,035	341	186	11	6,223	11,795
2087	5,035	341	186	11	6,223	11,795
2088	38,955	48,954	1,447	4,466	6,983	100,805
2089	37,814	12,311	1,841	7,041	7,394	66,402
2090	57,989	30,995	1,771	25,884	10,995	127,634
2091	59,766	13,027	1,427	24,007	9,736	107,963
2092	55,869	10,125	1,253	20,460	9,106	96,813
2093	26,036	6,851	299	28	5,933	39,148

TABLE 3.16 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2094	18,616	14,797	186	0	6,093	39,692
2095	15,999	15,258	135	0	5,343	36,736
2096	4,694	3,037	0	0	3,392	11,123
2097	4,684	3,037	0	0	3,383	11,104
2098	3,671	0	0	0	3,383	7,054
2099	4,684	3,037	0	0	3,383	11,104
2100	5,190	4,556	0	0	3,383	13,129
2101	5,190	4,556	0	0	3,383	13,129
2102	5,190	4,556	0	0	3,383	13,129
2103	3,671	0	0	0	3,383	7,054
2104	3,681	0	0	0	3,392	7,073
2105	5,190	4,556	0	0	3,383	13,129
2106	4,684	3,037	0	0	3,383	11,104
2107	4,684	3,037	0	0	3,383	11,104
2108	3,681	0	0	0	3,392	7,073
2109	4,684	3,037	0	0	3,383	11,104
2110	4,684	3,037	0	0	3,383	11,104
2111	4,684	3,037	0	0	3,383	11,104
2112	3,681	0	0	0	3,392	7,073
2113	6,709	9,112	0	0	3,383	19,204
2114	5,696	6,075	0	0	3,383	15,154
2115	5,043	4,117	0	0	3,383	12,543
2116	3,681	0	0	0	3,392	7,073
2117	3,671	0	0	0	3,383	7,054
2118	5,696	6,075	0	0	3,383	15,154
2119	5,190	4,556	0	0	3,383	13,129
2120	3,681	0	0	0	3,392	7,073
2121	3,671	0	0	0	3,383	7,054
2122	6,202	7,594	0	0	3,383	17,179
2123	3,671	0	0	0	3,383	7,054

TABLE 3.16 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2124	3,681	0	0	0	3,392	7,073
2125	6,202	7,594	0	0	3,383	17,179
2126	3,671	0	0	0	3,383	7,054
2127	3,671	0	0	0	3,383	7,054
2128	6,212	7,594	0	0	3,392	17,198
2129	3,671	0	0	0	3,383	7,054
2130	3,671	0	0	0	3,383	7,054
2131	3,671	0	0	0	3,383	7,054
2132	6,212	7,594	0	0	3,392	17,198
2133	3,671	0	0	0	3,383	7,054
2134	3,671	0	0	0	3,383	7,054
2135	3,671	0	0	0	3,383	7,054
2136	3,681	0	0	0	3,392	7,073
2137	3,671	0	0	0	3,383	7,054
2138	18,858	45,562	0	0	3,383	67,803
2139	3,671	0	0	0	3,383	7,054
2140	3,681	0	0	0	3,392	7,073
2141	3,671	0	0	0	3,383	7,054
2142	3,671	0	0	0	3,383	7,054
2143	3,671	0	0	0	3,383	7,054
2144	3,681	0	0	0	3,392	7,073
2145	5,190	4,556	0	0	3,383	13,129
2146	4,684	3,037	0	0	3,383	11,104
2147	4,684	3,037	0	0	3,383	11,104
2148	3,681	0	0	0	3,392	7,073
2149	4,684	3,037	0	0	3,383	11,104
2150	5,190	4,556	0	0	3,383	13,129
2151	5,190	4,556	0	0	3,383	13,129
2152	5,200	4,556	0	0	3,392	13,148
2153	3,671	0	0	0	3,383	7,054

TABLE 3.16 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2154	3,671	0	0	0	3,383	7,054
2155	5,550	5,635	0	0	3,383	14,568
2156	4,694	3,037	0	0	3,392	11,123
2157	4,684	3,037	0	0	3,383	11,104
2158	3,671	0	0	0	3,383	7,054
2159	4,684	3,037	0	0	3,383	11,104
2160	4,694	3,037	0	0	3,392	11,123
2161	4,684	3,037	0	0	3,383	11,104
2162	3,671	0	0	0	3,383	7,054
2163	6,709	9,112	0	0	3,383	19,204
2164	5,706	6,075	0	0	3,392	15,173
2165	4,684	3,037	0	0	3,383	11,104
2166	3,671	0	0	0	3,383	7,054
2167	3,671	0	0	0	3,383	7,054
2168	5,706	6,075	0	0	3,392	15,173
2169	5,190	4,556	0	0	3,383	13,129
2170	3,671	0	0	0	3,383	7,054
2171	3,671	0	0	0	3,383	7,054
2172	6,212	7,594	0	0	3,392	17,198
2173	3,671	0	0	0	3,383	7,054
2174	3,671	0	0	0	3,383	7,054
2175	6,202	7,594	0	0	3,383	17,179
2176	3,681	0	0	0	3,392	7,073
2177	3,671	0	0	0	3,383	7,054
2178	6,202	7,594	0	0	3,383	17,179
2179	3,671	0	0	0	3,383	7,054
2180	3,681	0	0	0	3,392	7,073
2181	3,671	0	0	0	3,383	7,054
2182	6,202	7,594	0	0	3,383	17,179
2183	3,671	0	0	0	3,383	7,054

TABLE 3.16 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

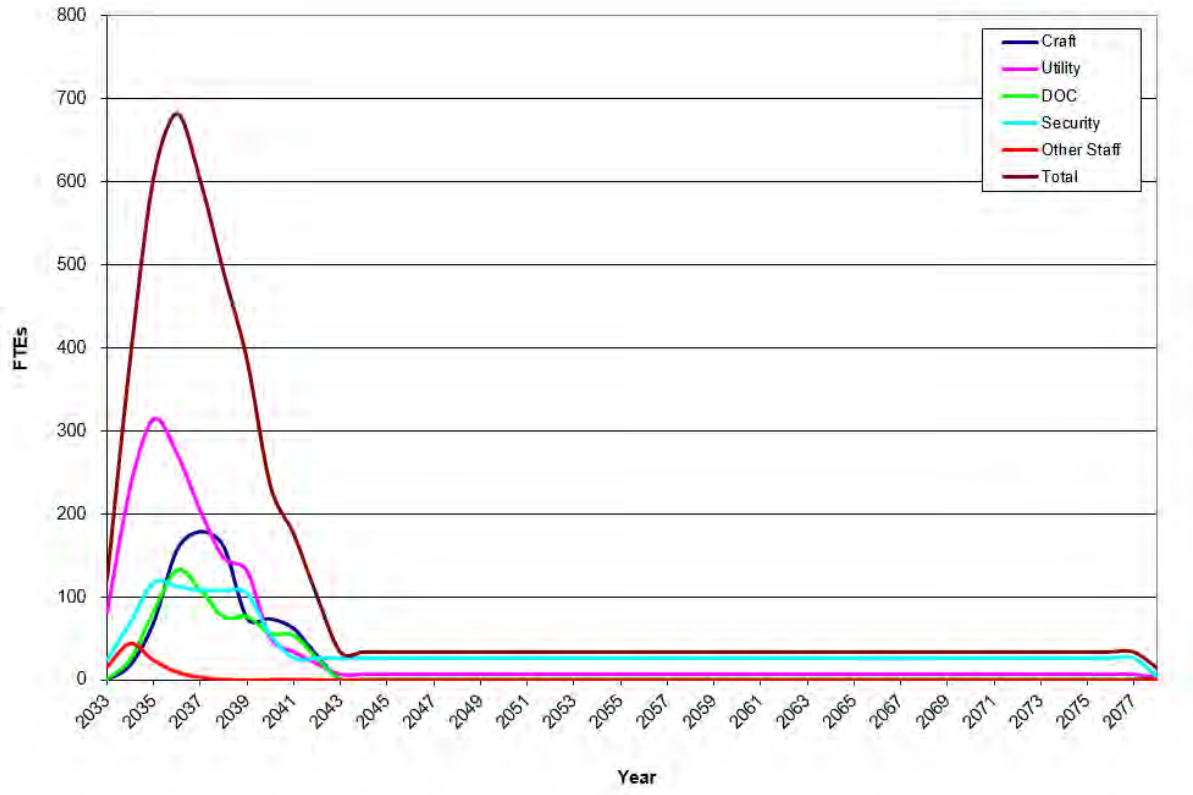
Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2184	3,681	0	0	0	3,392	7,073
2185	3,671	0	0	0	3,383	7,054
2186	3,671	0	0	0	3,383	7,054
2187	3,671	0	0	0	3,383	7,054
2188	18,868	45,562	0	0	3,392	67,822
2189	3,671	0	0	0	3,383	7,054
2190	3,671	0	0	0	3,383	7,054
2191	3,671	0	0	0	3,383	7,054
2192	3,681	0	0	0	3,392	7,073
2193	3,775	311	0	0	3,383	7,469
2194	3,931	778	0	0	3,383	8,092
2195	5,809	6,414	0	0	3,383	15,606
2196	5,005	3,972	0	0	3,392	12,369
2197	4,839	3,504	0	0	3,383	11,727
2198	4,034	1,090	0	0	3,383	8,507
2199	4,839	3,504	0	0	3,383	11,727
2200	5,294	4,868	0	0	3,383	13,544
2201	5,449	5,335	0	0	3,383	14,167
2202	5,449	5,335	0	0	3,383	14,167
2203	3,827	467	0	0	3,383	7,677
2204	3,889	623	0	0	3,392	7,904
2205	5,397	5,179	0	0	3,383	13,959
2206	4,839	3,504	0	0	3,383	11,727
2207	4,891	3,660	0	0	3,383	11,934
2208	3,889	623	0	0	3,392	7,904
2209	4,839	3,504	0	0	3,383	11,727
2210	4,891	3,660	0	0	3,383	11,934
2211	4,891	3,660	0	0	3,383	11,934
2212	3,889	623	0	0	3,392	7,904
2213	6,916	9,735	0	0	3,383	20,034

TABLE 3.16 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2214	5,904	6,698	0	0	3,383	15,984
2215	4,891	3,660	0	0	3,383	11,934
2216	3,889	623	0	0	3,392	7,904
2217	3,853	2,428	0	0	13,362	19,642
2218	1,124	887	20	177	1,957	4,164
Total	1,302,354	726,832	21,282	83,454	872,596	3,006,518

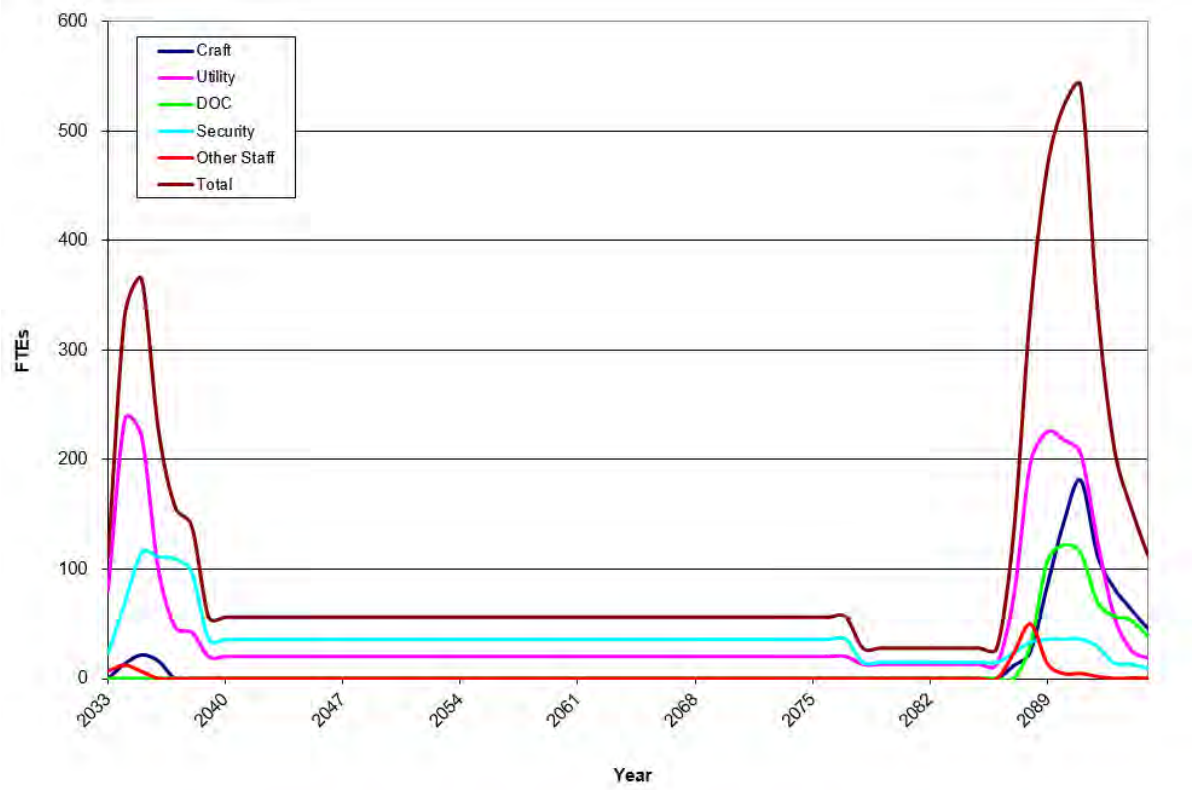
Note: Columns may not add due to rounding

FIGURE 3.1
SCENARIO 2: DECON WITH 60 YEAR DFS
PRAIRIE ISLAND NUCLEAR GENERATING PLANT
MANPOWER LEVELS



Note that the labor hour basis of this chart was taken from Appendix D; however not all line items in Appendix D have labor hour values available (e.g. spent fuel canister loading estimates from Xcel Energy)

FIGURE 3.2
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
PRAIRIE ISLAND NUCLEAR GENERATING PLANT
MANPOWER LEVELS



Note that the labor hour basis of this chart was taken from Appendix H; however not all line items in Appendix I have labor hour values available (e.g. spent fuel canister loading estimates from Xcel Energy)

4. SCHEDULE ESTIMATE

The schedules for the decommissioning scenarios considered in this study follow the sequence presented in the AIF/NESP-036 study, with minor changes to reflect recent experience and site-specific constraints. In addition, the scheduling has been revised to reflect the spent fuel management plans described in Section 3.4.1.

A schedule or sequence of activities for the DECON alternative is presented in Figure 4.1. The schedule is also representative of the work activities identified in the delayed dismantling scenarios, absent any spent fuel constraints. The scheduling sequence is based on the fuel being removed from the spent fuel pool within the first four years after operations cease. The key activities listed in the schedule do not reflect a one-to-one correspondence with those activities in the cost tables, but reflect dividing some activities for clarity and combining others for convenience. The schedule was prepared using the "Microsoft Project Professional" computer software. [44]

4.1 SCHEDULE ESTIMATE ASSUMPTIONS

The schedule reflects the results of a precedence network developed for the site decommissioning activities, i.e., a PERT (Program Evaluation and Review Technique) Software Package. The work activity durations used in the precedence network reflect the actual man-hour estimates from the cost table, adjusted by stretching certain activities over their slack range and shifting the start and end dates of others. The following assumptions were made in the development of the decommissioning schedule:

- The fuel handling area of the auxiliary building is isolated until such time that all spent fuel has been discharged from the storage pool to the ISFSI. Decontamination and dismantling of the spent fuel storage pool is initiated once the transfer of spent fuel is complete (DECON option).
- All work (except vessel and internals removal) is performed during an 8-hour workday, 5 days per week, with no overtime. There are eleven paid holidays per year.
- Reactor and internals removal activities are performed by using separate crews for different activities working on different shifts, with a corresponding backshift charge for the second shift.
- Multiple crews work parallel activities to the maximum extent possible, consistent with optimum efficiency, adequate access for cutting, removal and laydown space, and with the stringent safety measures necessary during demolition of heavy components and structures.

- For plant systems removal, the systems with the longest removal durations in areas on the critical path are considered to determine the duration of the activity.

4.2 PROJECT SCHEDULE

The period-dependent costs presented in the detailed cost tables are based upon the durations developed in the schedules for decommissioning Prairie Island. Durations are established between several milestones in each project period; these durations are used to establish a critical path for the entire project. In turn, the critical path duration for each period is used as the basis for determining the period-dependent costs. A second parallel path is also shown for the spent fuel cooling period, which determines the release of the auxiliary building for final decontamination.

Project timelines are provided in Figures 4.2 through 4.9 with milestone dates based on a 2033/2034 shutdown dates. The spent fuel pool is emptied approximately four years after shutdown, while ISFSI operations continue until the DOE completes the transfer of assemblies. Deferred decommissioning operations in all scenarios are assumed to commence so that the operating licenses are terminated within a 60-year period from the cessation of operations.

FIGURE 4.1
DECON ACTIVITY SCHEDULE

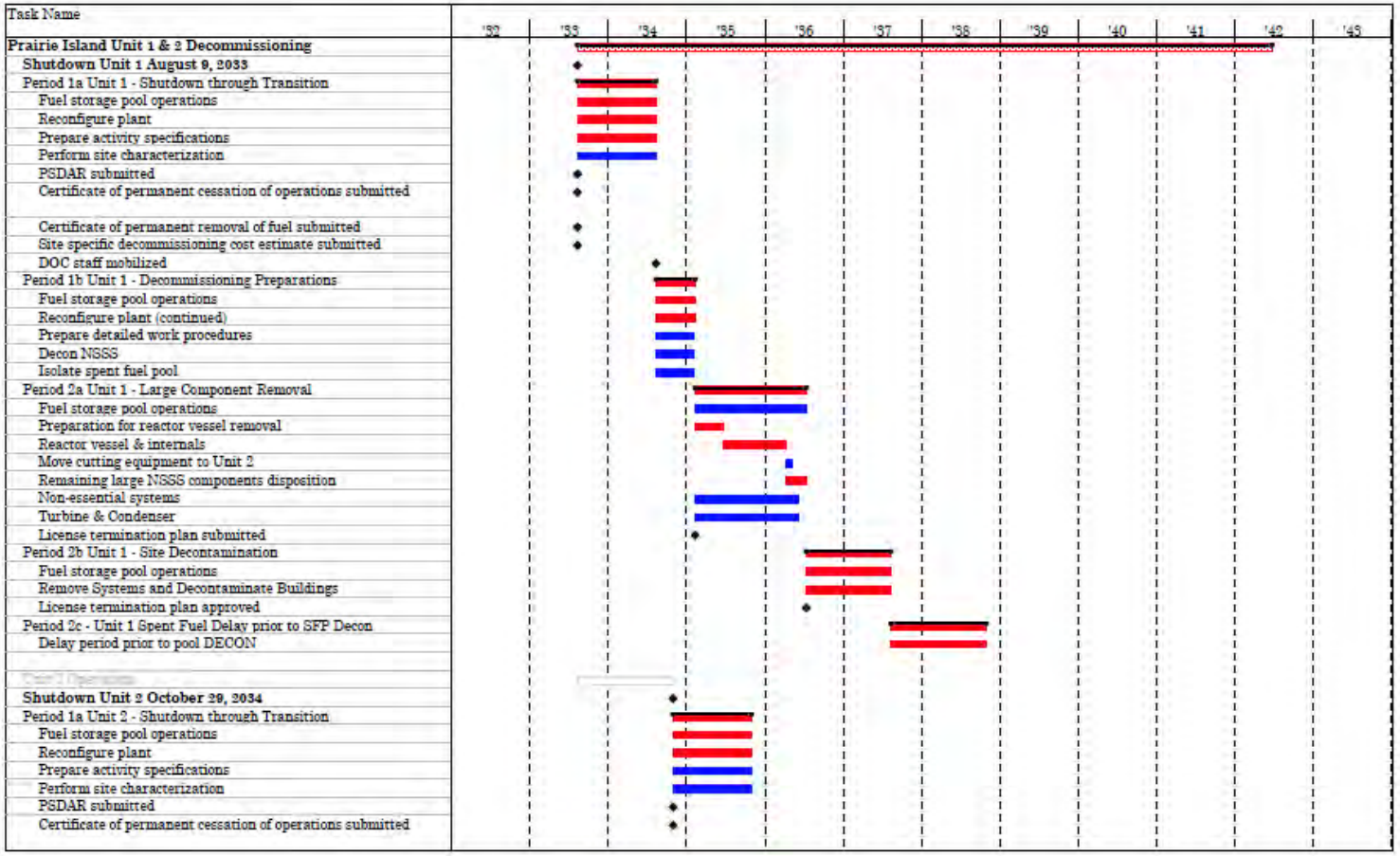
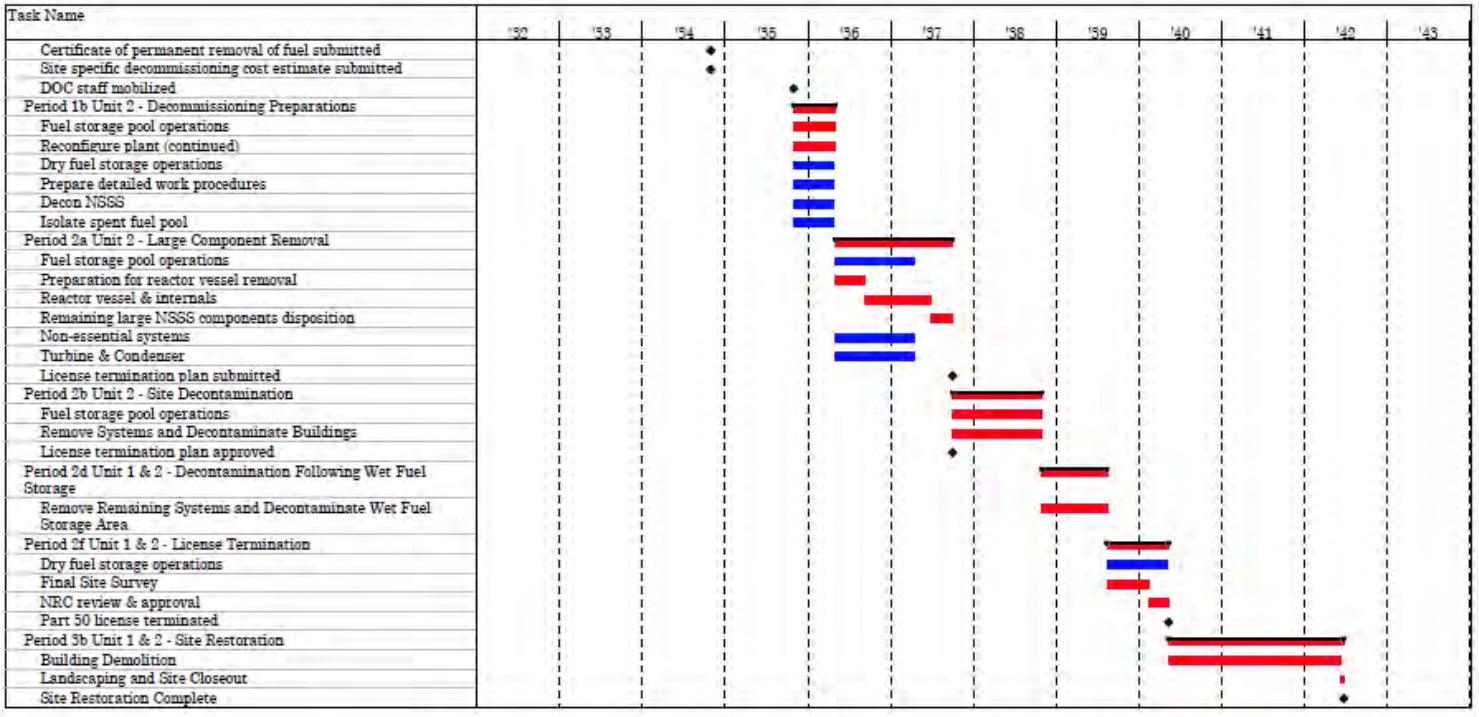


FIGURE 4.1 (continued)
DECON ACTIVITY SCHEDULE



1. Red scheduling bars indicate critical path activities
2. Blue scheduling bars associated with non-critical path activities
3. Diamond symbols indicate major milestones

FIGURE 4.2
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

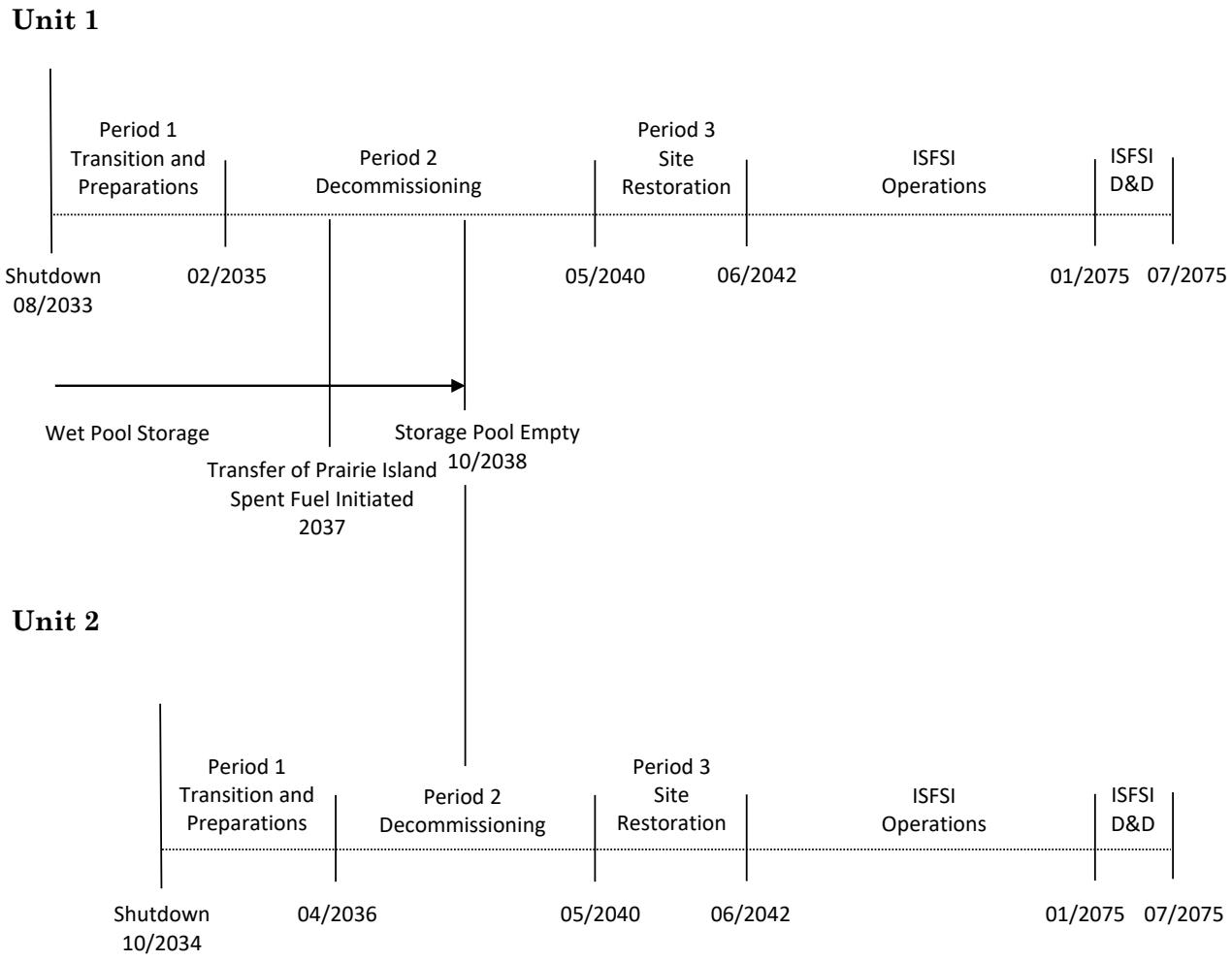
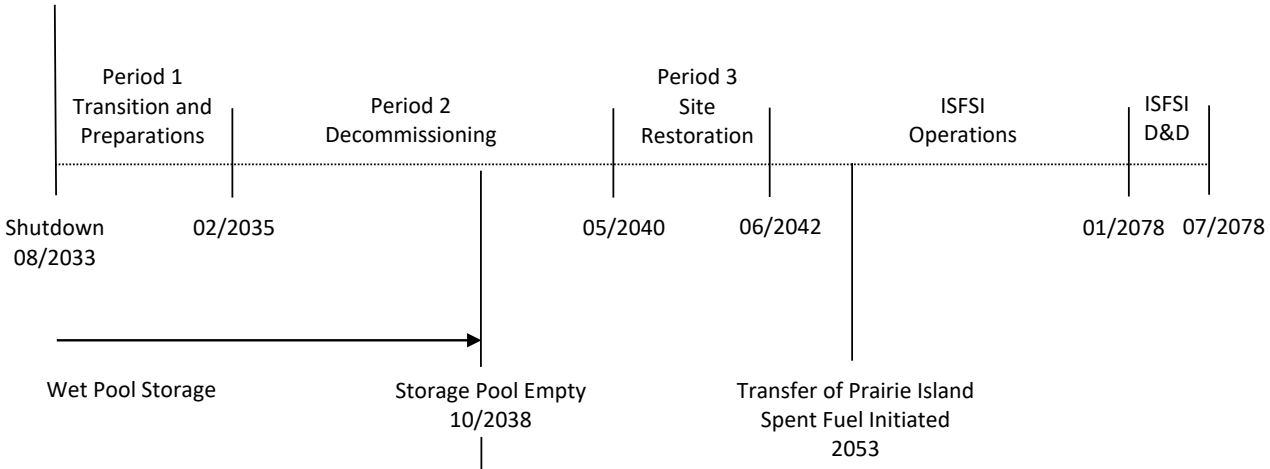


FIGURE 4.3
SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

Unit 1



Unit 2

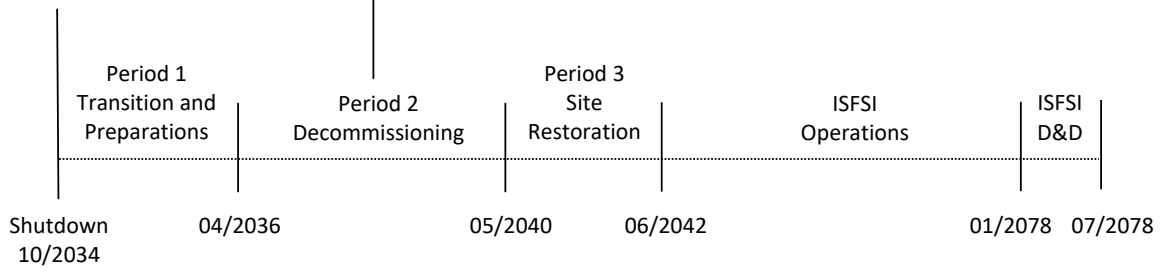


FIGURE 4.4
SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

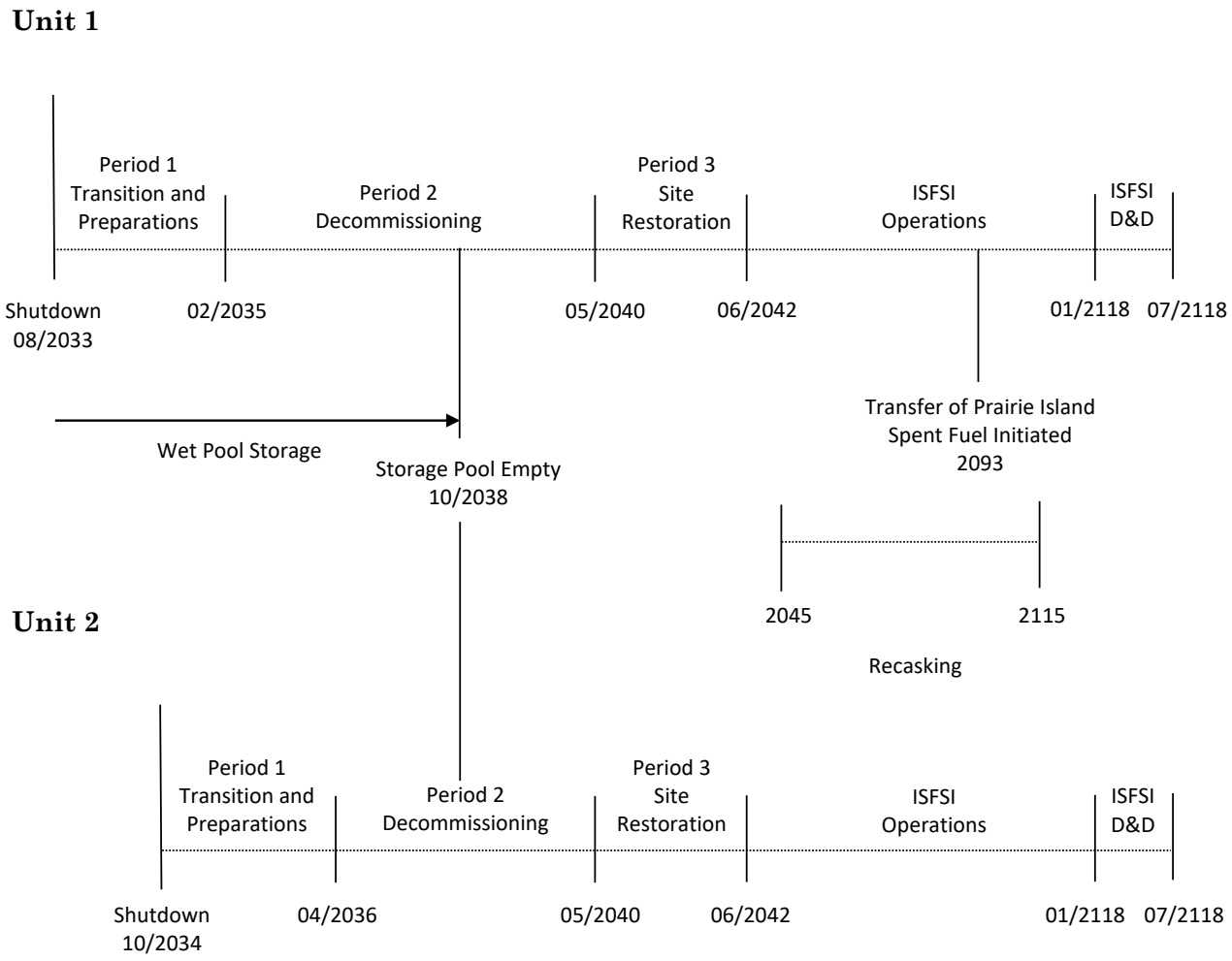


FIGURE 4.5
SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

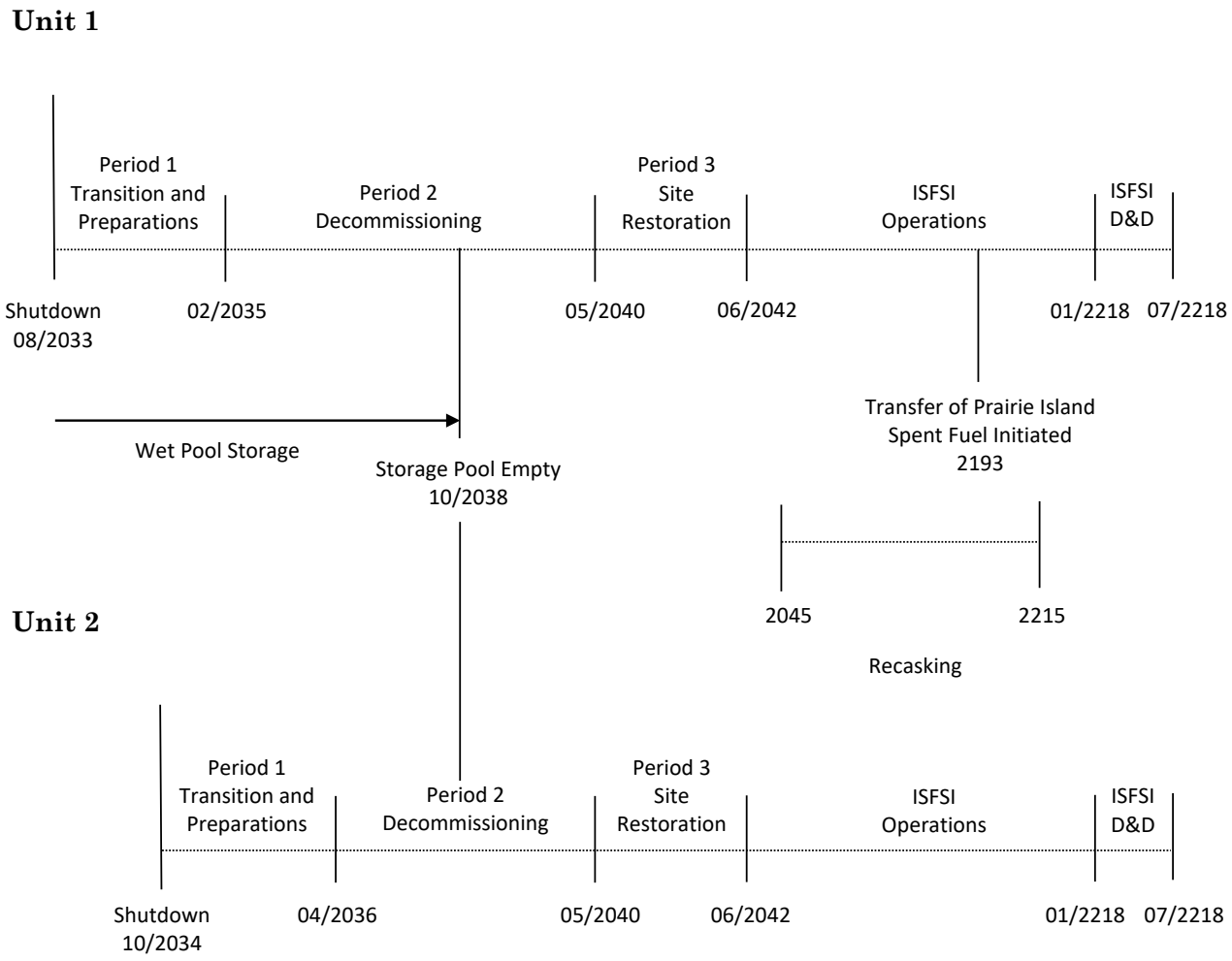


FIGURE 4.6
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

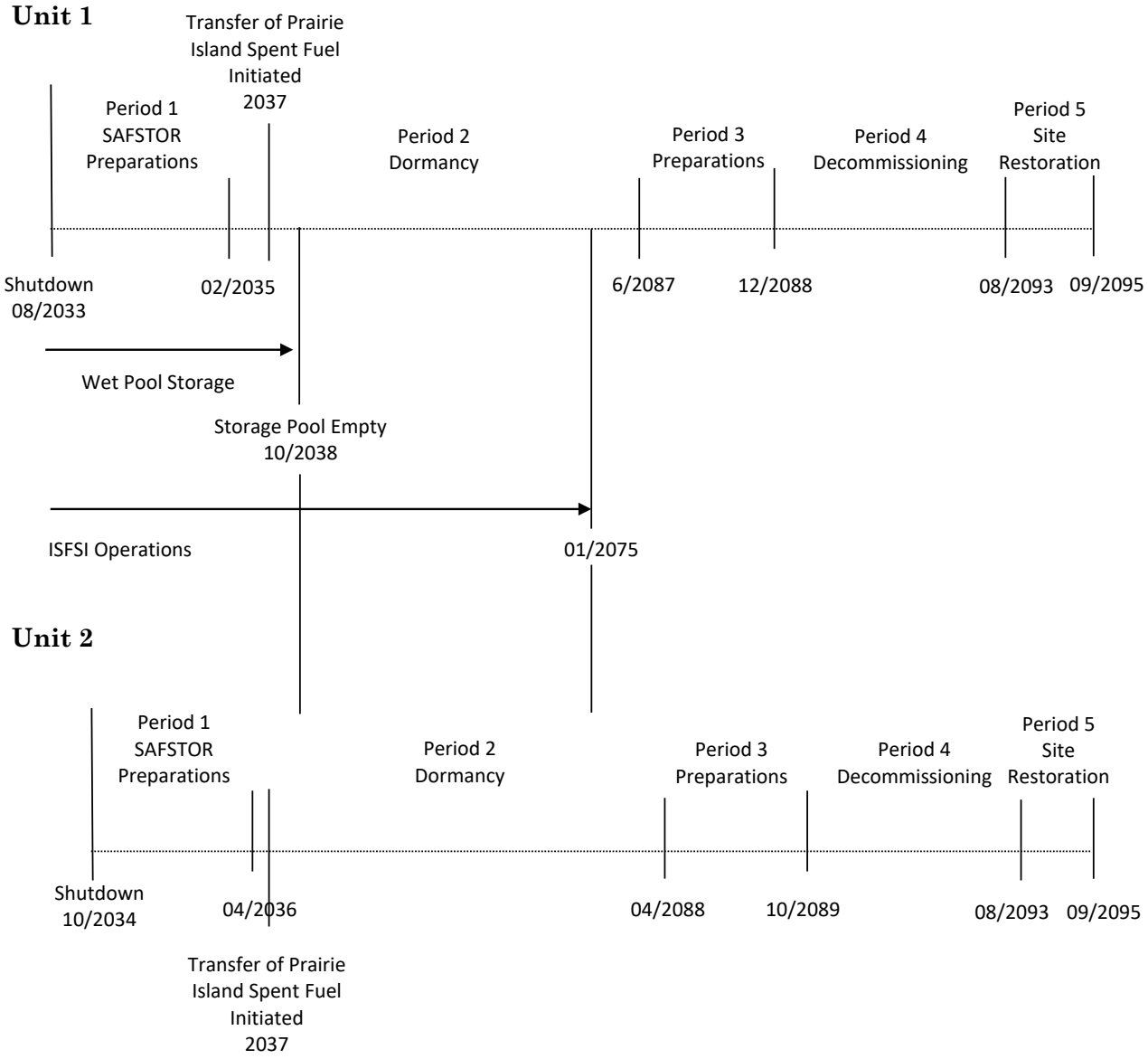
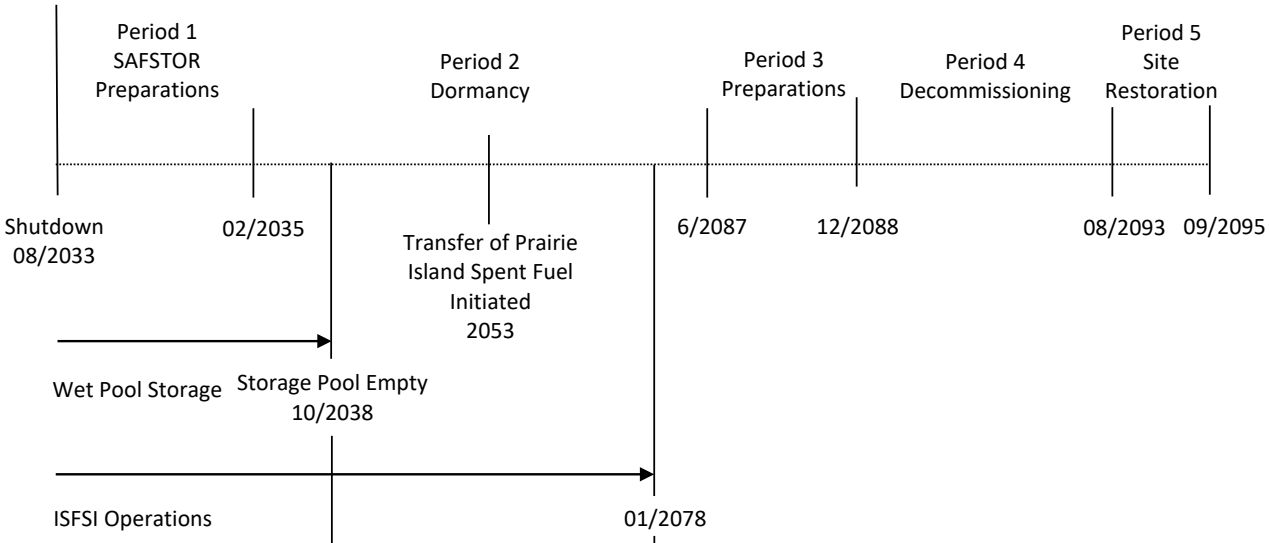


FIGURE 4.7
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

Unit 1



Unit 2

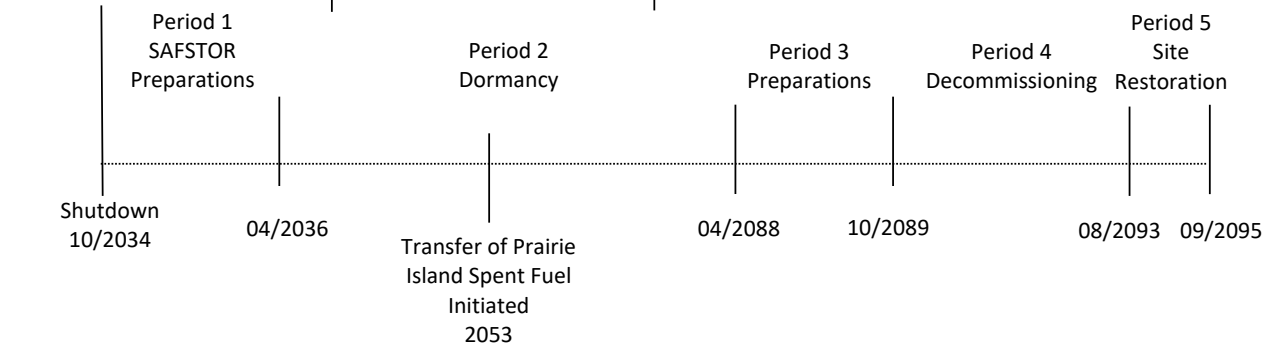
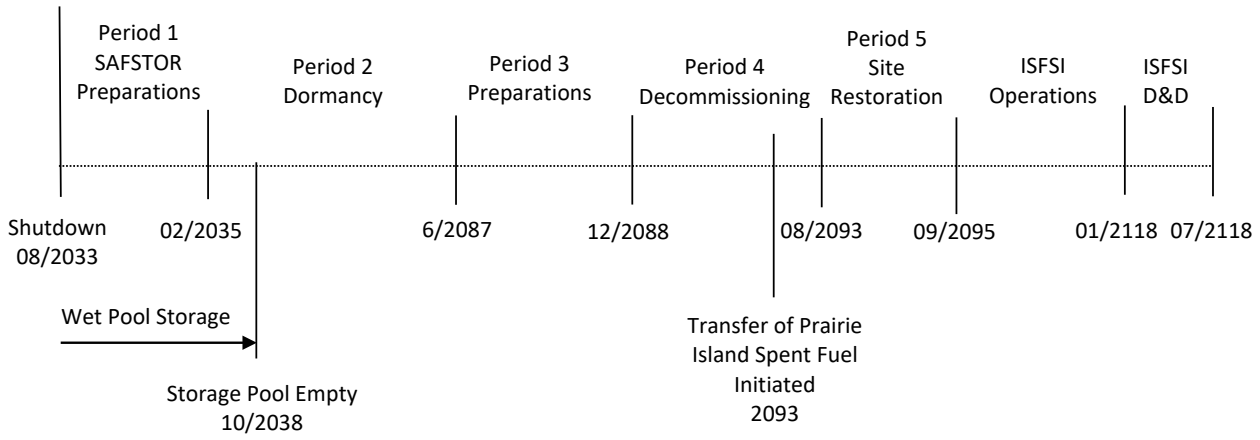
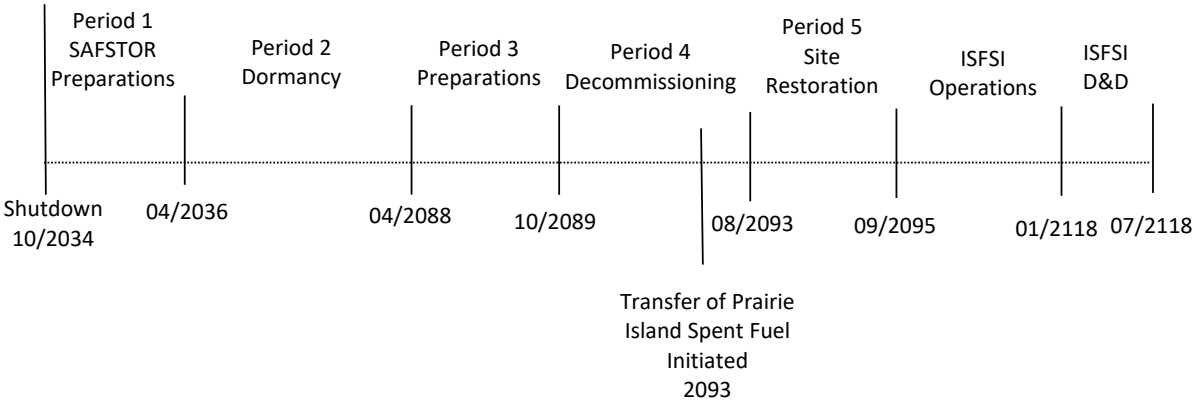


FIGURE 4.8
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

Unit 1



Unit 2

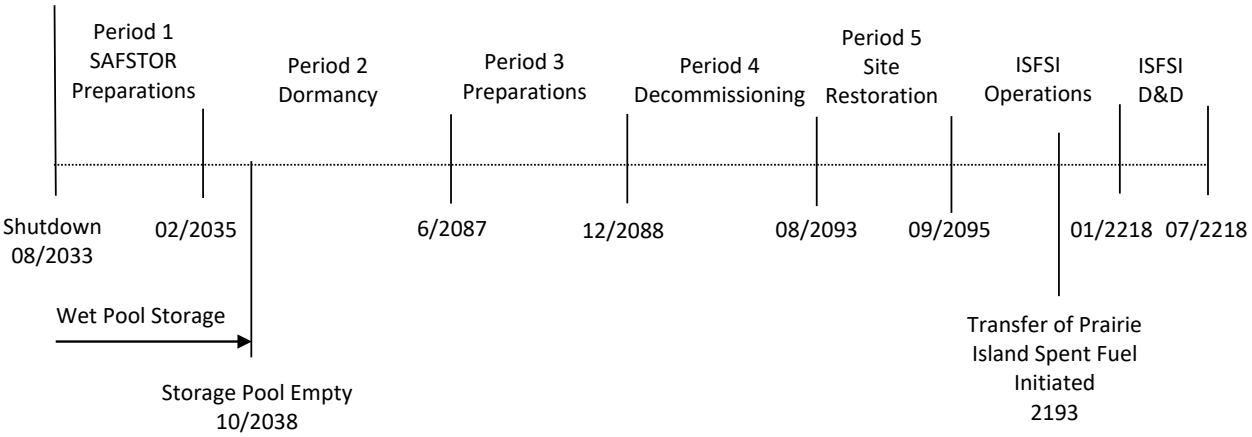


Recasking campaigns occur 2045 through 2088, and 2095 through 2115.

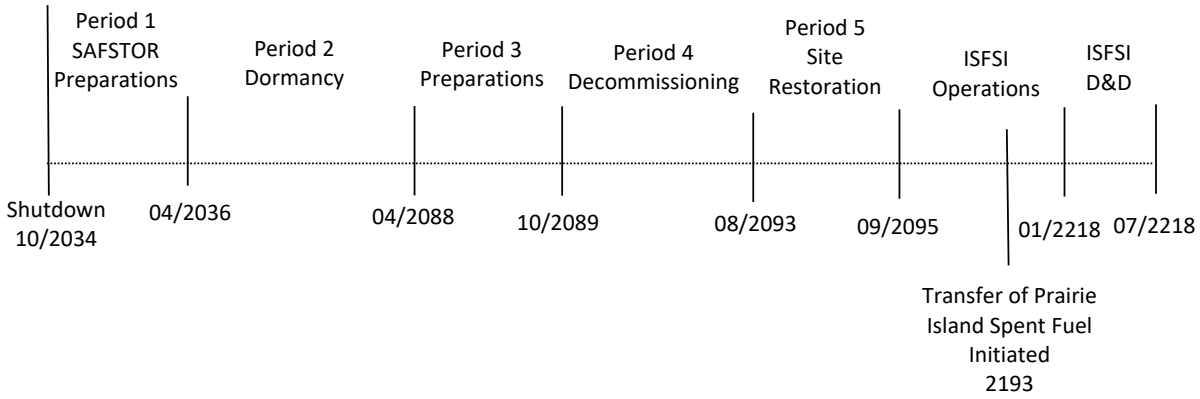
DOE pickup of fuel occurs from 2093 to 2118.

FIGURE 4.9
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)

Unit 1



Unit 2



Recasking campaigns occur 2045 through 2088, 2095 through 2138, 2145 through 2188, and 2195 through 2215.

DOE pickup of fuel occurs from 2193 to 2118.

5. RADIOACTIVE WASTES

The objectives of the decommissioning process are the removal of all radioactive material from the site that would restrict its future use and the termination of the NRC licenses. This currently requires the remediation of all radioactive material at the site in excess of applicable legal limits. Under the Atomic Energy Act, [45] the NRC is responsible for protecting the public from sources of ionizing radiation. Title 10 of the Code of Federal Regulations delineates the production, utilization, and disposal of radioactive materials and processes. In particular, Part 71 defines radioactive material as it pertains to transportation and Part 61 specifies its disposition.

Most of the materials being transported for controlled burial are categorized as Low Specific Activity (LSA) or Surface Contaminated Object (SCO) materials containing Type A quantities, as defined in 49 CFR Parts 173-178. Shipping containers are required to be Industrial Packages (IP-1, IP-2 or IP-3, as defined in 10 CFR §173.411). For this study, commercially available steel containers are presumed to be used for the disposal of piping, small components, and concrete. Larger components can serve as their own containers, with proper closure of all openings, access ways, and penetrations.

The destinations for the various waste streams from decommissioning are identified in Figures 5.1 and 5.2. The volumes of radioactive waste generated during the various decommissioning activities at the site are shown on a line-item basis in Appendices C through J and summarized in Tables 5.1 through 5.8. The quantified waste volume summaries shown in these tables are consistent with §61 classifications. The volumes are calculated based on the exterior dimensions for containerized material and on the displaced volume of components serving as their own waste containers.

The reactor vessel and internals are categorized as large quantity shipments and, accordingly, will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume, as well as the special handling requirements of the payload. Packaging efficiencies are lower for the highly activated materials (greater than Type A quantity waste), where high concentrations of gamma-emitting radionuclides limit the capacity of the shipping canisters.

No process system containing/handling radioactive substances at shutdown is presumed to meet material release criteria by decay alone, i.e., systems radioactive at shutdown will still be radioactive over the time period during which the decommissioning is accomplished, due to the presence of long-lived radionuclides.

While the dose rates decrease with time, radionuclides such as ^{137}Cs will still control the disposition requirements.

The waste material generated in the decontamination and dismantling of Prairie Island is primarily generated during Period 2 of the DECON alternatives and Period 4 of the SAFSTOR alternatives. Material that is considered potentially contaminated when removed from the radiologically controlled area is sent to processing facilities in Tennessee for conditioning and disposal. Heavily contaminated components and activated materials are routed for controlled disposal. The disposal volumes reported in the tables reflect the savings resulting from reprocessing and recycling.

Disposal fees are calculated using representative costs, with surcharges added for the highly activated components, for example, generated in the segmentation of the reactor vessels. The cost to dispose of the majority of the material generated from the decontamination and dismantling activities is based upon representative rates.

Energy*Solutions* is not able to accept the higher activity waste (Class B and C) generated in the decontamination of the NSSS and segmentation of the components closest to the core. Waste disposal costs for the higher activity waste (Class B and C) are based upon preliminary and indicative information on the cost for such from WCS.

A small quantity of material generated during the Prairie Island decommissioning will not be considered suitable for near-surface disposal, and is assumed to be disposed of in a geologic repository, in a manner similar to that envisioned for spent fuel disposal. Such material, known as Greater-Than-Class-C or GTCC material, is estimated to require eight spent fuel storage canisters (or the equivalent) to dispose of the most radioactive portions of the reactor vessel internals. The volume and weight reported in Tables 5.1 through 5.8 represent the packaged weight and volume of the spent fuel storage canisters.

FIGURE 5.1
RADIOACTIVE WASTE DISPOSITION

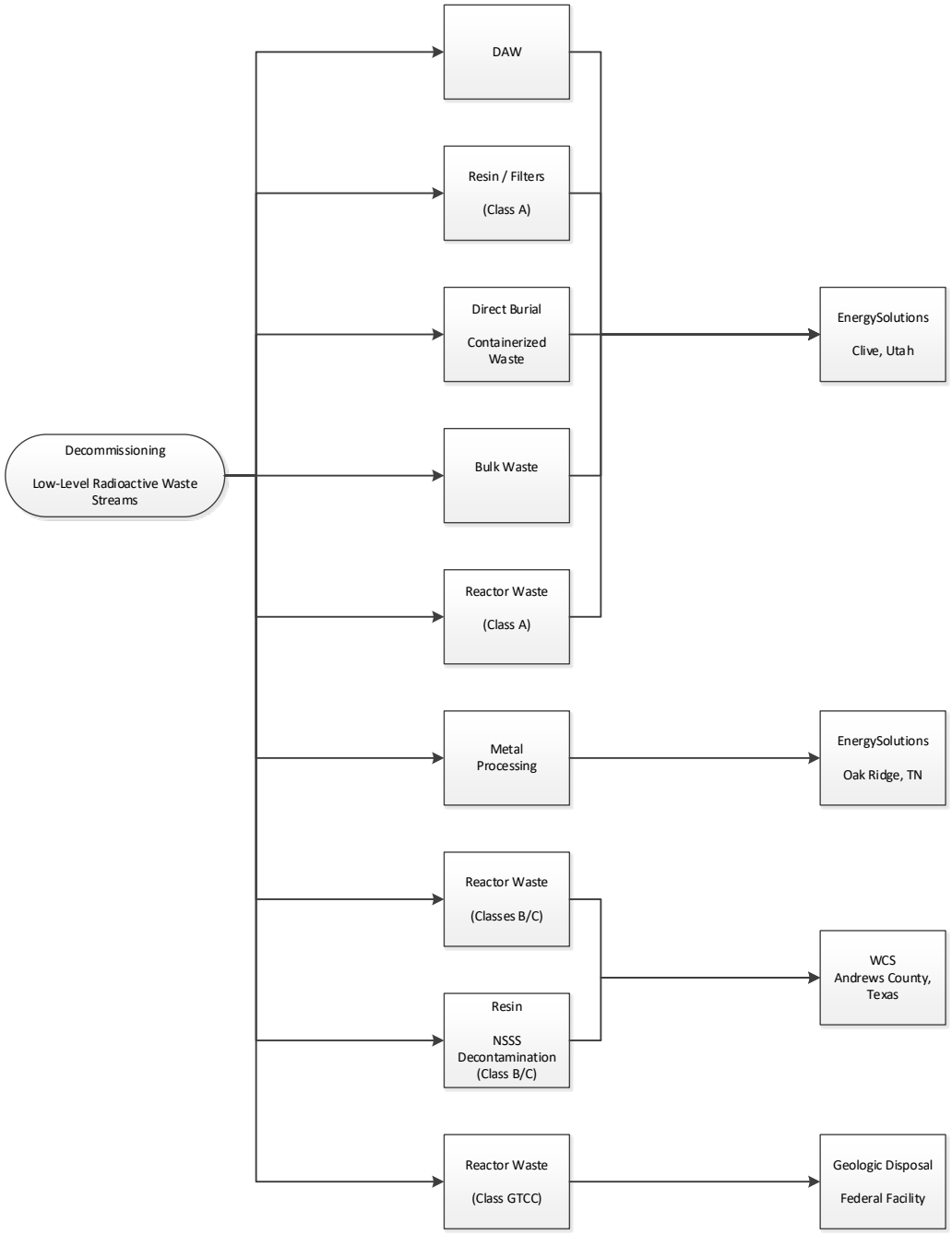
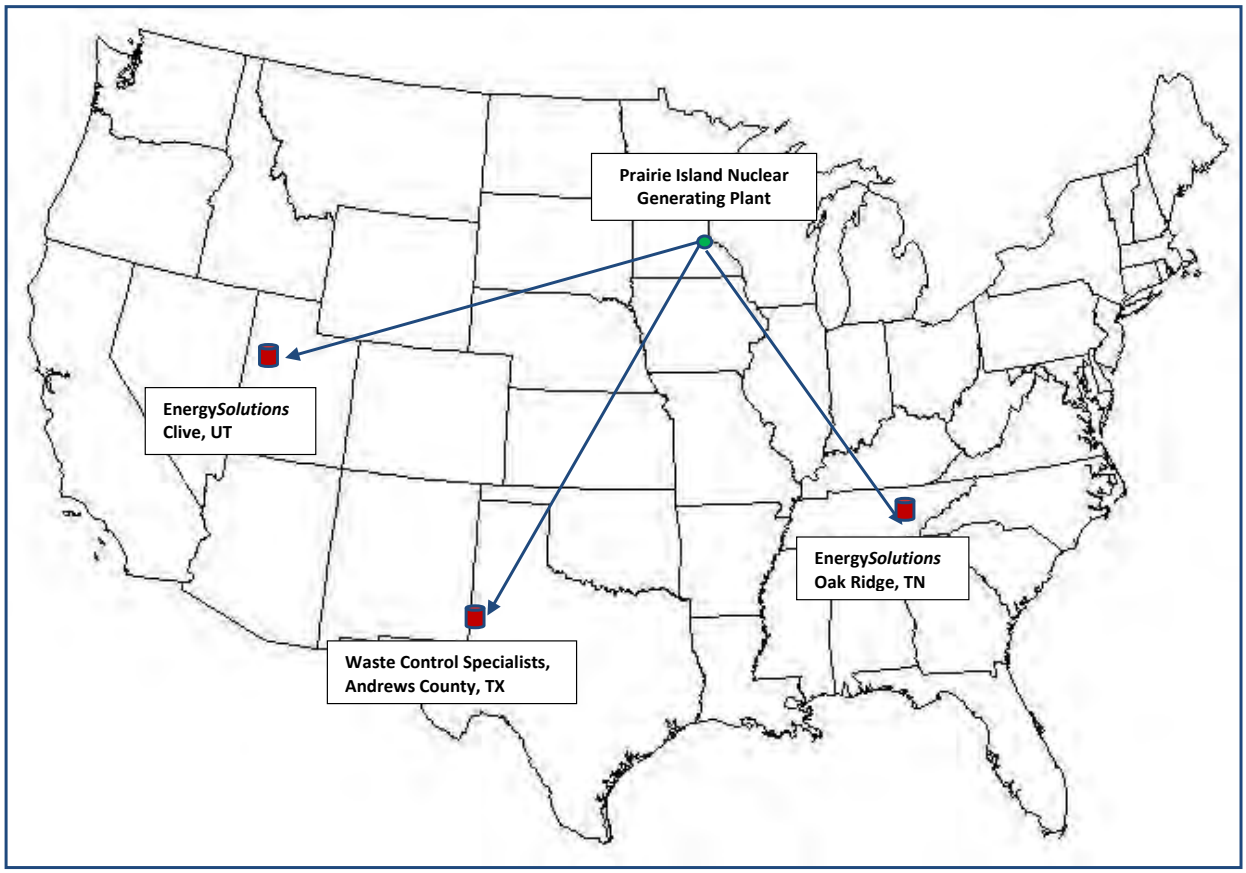


FIGURE 5.2
DECOMMISSIONING WASTE DESTINATIONS
RADIOLOGICAL



The figure indicates the destinations for the low-level radioactive waste designated for direct disposal (Clive, Utah) and processing/recovery (Oak Ridge, Tennessee).

Disposition of the Class B and C low-level radioactive waste will be at the Waste Control Specialists site in Andrews County, Texas.

Disposal options (and destinations) for GTCC are still being evaluated.

TABLE 5.1
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	205,136	11,929,447
	Energy*Solutions* Bulk	A	146,529	6,720,310
	Future LLRW Disposal Facility (Proxy)	B	1,651	176,286
	Future LLRW Disposal Facility (Proxy)	C	1,346	199,444
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	3,547	689,647
Total [2]			358,209	19,715,134
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	314,250	12,618,444
Scrap Metal				150,506,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.2
SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	205,136	11,929,447
	Energy*Solutions* Bulk	A	146,529	6,720,310
	Future LLRW Disposal Facility (Proxy)	B	1,651	176,286
	Future LLRW Disposal Facility (Proxy)	C	1,346	199,444
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	3,547	689,647
Total [2]			358,209	19,715,134
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	314,250	12,618,444
Scrap Metal				150,506,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.3
SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	205,136	11,933,347
	Energy*Solutions* Bulk	A	146,525	6,720,228
	Future LLRW Disposal Facility (Proxy)	B	1,651	176,286
	Future LLRW Disposal Facility (Proxy)	C	1,346	199,444
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	3,547	689,647
Total [2]			358,205	19,718,952
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	314,250	12,618,444
Scrap Metal				150,506,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.4
SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	205,136	11,933,347
	Energy*Solutions* Bulk	A	146,525	6,720,228
	Future LLRW Disposal Facility (Proxy)	B	1,651	176,286
	Future LLRW Disposal Facility (Proxy)	C	1,346	199,444
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	3,547	689,647
Total [2]			358,205	19,718,952
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	314,250	12,618,444
Scrap Metal				150,506,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.5
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	96,979	7,057,818
	Energy*Solutions* Bulk	A	221,053	9,973,926
	Future LLRW Disposal Facility (Proxy)	B	250	28,274
	Future LLRW Disposal Facility (Proxy)	C	1,416	199,712
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	3,547	689,647
Total [2]			323,245	17,949,377
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	319,950	12,861,542
Scrap Metal				150,818,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.6
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	96,979	7,057,818
	Energy*Solutions* Bulk	A	221,080	9,974,450
	Future LLRW Disposal Facility (Proxy)	B	250	28,274
	Future LLRW Disposal Facility (Proxy)	C	1,416	199,712
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	3,547	689,647
Total [2]			323,271	17,949,901
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	319,950	12,861,542
Scrap Metal				150,818,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.7
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	96,978	7,061,678
	Energy*Solutions* Bulk	A	221,166	9,976,186
	Future LLRW Disposal Facility (Proxy)	B	250	28,274
	Future LLRW Disposal Facility (Proxy)	C	1,416	199,712
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	3,547	689,647
Total [2]			323,357	17,955,497
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	319,950	12,861,542
Scrap Metal				150,818,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

TABLE 5.8
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
DECOMMISSIONING WASTE SUMMARY

Waste	Cost Basis	Class [1]	Waste Volume (cubic feet)	Mass (pounds)
Low-Level Radioactive Waste (near-surface disposal)	Energy*Solutions* Containerized	A	96,978	7,061,678
	Energy*Solutions* Bulk	A	221,166	9,976,186
	Future LLRW Disposal Facility (Proxy)	B	250	28,274
	Future LLRW Disposal Facility (Proxy)	C	1,416	199,712
Greater than Class C (geologic repository)	Spent Fuel Equivalent	GTCC	3,547	689,647
Total [2]			323,357	17,955,497
Processed/Conditioned (off-site recycling center)	Recycling Vendors	A	319,950	12,861,542
Scrap Metal				150,818,000

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

6. RESULTS

This report presents estimates of the cost to decommission Prairie Island for the selected decommissioning scenarios following the cessation of plant operations. The estimates are based on numerous fundamental assumptions, including regulatory requirements, project contingencies, low-level radioactive waste disposal practices, high-level radioactive waste management options, and site restoration requirements. While not an engineering study, the estimates provide Xcel Energy with sufficient information to assess their financial obligations, as they pertain to the eventual decommissioning of the nuclear station.

The decommissioning scenarios assume continued operation of the station's spent fuel pool for a minimum of four years following the cessation of operations for continued cooling of the assemblies. The existing ISFSI is expanded to accommodate the spent fuel, once sufficiently cooled, until such time that the DOE can complete the transfer of the assemblies to its repository.

Using Scenario 2 as the base case, the cost projected to promptly decommission the station, restore the site, and manage the spent fuel is estimated to be $2.048 billion (2020 dollars). The majority of this cost (approximately 58.0%) is associated with the physical decontamination and dismantling of the nuclear plant so that the operating licenses can be terminated. Another 36.0% is associated with the management, interim storage, and eventual transfer of the spent fuel. The remaining 6.0% is for the demolition of the designated structures and limited restoration of the site.

The primary cost contributors, identified in Tables 6.1 through 6.8, are either labor-related or associated with the management and disposition of the spent fuel or radioactive waste. Program management (including security) is the largest single contributor to the overall cost. The magnitude of the expense is a function of both the size of the organization required to manage the decommissioning, as well as the duration of the program. It is assumed, for purposes of this analysis, that Xcel Energy will hire a contractor to manage the decommissioning labor force. The size and composition of the management organizations varies with the decommissioning phase and associated site activities. However, once the operating licenses are amended or terminated, the staff is substantially reduced for the conventional demolition and restoration of the site, and the long-term care of the spent fuel (for the DECON alternative).

As described in this report, the spent fuel pool will remain operational for a minimum of four years following the cessation of operations. The pool will be isolated and an independent spent fuel island created. This will allow

decommissioning operations to proceed in and around the pool areas. Over the four-year period, the spent fuel will be packaged into transportable canisters for future loading into a DOE-provided transport cask or relocation to the ISFSI. The canisters will be stored in horizontal storage casks at the ISFSI until the DOE is able to receive them. Dry storage of the fuel provides additional flexibility in the event the DOE is not able to meet the current timetable for completing the transfer of assemblies to an off-site facility and minimizes the associated caretaking expenses.

The cost for waste disposal includes only those costs associated with the controlled disposition of the low-level radioactive waste generated from decontamination and dismantling activities, including plant equipment and components, structural material, filters, resins and dry-active waste. As described in Section 5, disposition of the majority of the low-level radioactive material requiring controlled disposal is at the Energy*Solutions* facility, with higher-activity waste sent to the WCS facility. Highly activated components, requiring additional isolation from the environment (GTCC), are packaged for geologic disposal. The cost of geologic disposal is based upon a cost equivalent for spent fuel.

A significant portion of the metallic waste is designated for additional processing and treatment at an off-site facility. Processing reduces the volume of material requiring controlled disposal through such techniques and processes as survey and sorting, decontamination, and volume reduction. The material that cannot be unconditionally released is packaged for controlled disposal at one of the currently operating facilities. The cost identified in the summary tables for processing is all-inclusive, incorporating the ultimate disposition of the material.

Removal costs reflect the labor-intensive nature of the decommissioning process, as well as the management controls required to ensure a safe and successful program. Decontamination and packaging costs also have a large labor component that is based upon prevailing wages. Non-radiological demolition is a natural extension of the decommissioning process. The methods employed in decontamination and dismantling are generally destructive and indiscriminate in inflicting collateral damage. With a work force mobilized to support decommissioning operations, non-radiological demolition can be an integrated activity and a logical expansion of the work being performed in the process of terminating the operating licenses.

The reported cost for transport includes the tariffs and surcharges associated with moving large components and/or overweight shielded casks overland, as well as the general expense, e.g., labor and fuel, of transporting material to the destinations identified in this report. For purposes of this analysis, material is moved overland by truck.

Decontamination is used to reduce the plant's radiation fields and minimize worker exposure. Slightly contaminated material or material located within a contaminated area is sent to an off-site processing center, i.e., this analysis does not assume that contaminated plant components and equipment can be decontaminated for uncontrolled release in-situ. Centralized processing centers have proven to be a more economical means of handling the large volumes of material produced in the dismantling of a nuclear plant.

License termination survey costs are associated with the labor intensive and complex activity of verifying that contamination has been removed from the site to the levels specified by the regulating agency. This process involves a systematic survey of all remaining plant surface areas and surrounding environs, sampling, isotopic analysis, and documentation of the findings. The status of any plant components and materials not removed in the decommissioning process will also require confirmation and will add to the expense of surveying the facilities alone.

The remaining costs include allocations for heavy equipment and temporary services, as well as for other expenses such as regulatory fees and the premiums for nuclear insurance. While site operating costs are greatly reduced following the final cessation of plant operations, certain administrative functions do need to be maintained either at a basic functional or regulatory level.

TABLE 6.1
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total	Percentage
Decontamination	12,109	19,308	31,417	1.6%
Removal	111,005	147,842	258,847	12.9%
Packaging	27,756	28,136	55,892	2.8%
Transportation	9,509	10,116	19,625	1.0%
Waste Disposal	75,656	79,069	154,725	7.7%
Off-site Waste Processing	26,049	30,811	56,860	2.8%
Program Management [1]	239,340	227,121	466,461	23.3%
Security	148,214	136,512	284,726	14.2%
Spent Fuel Pool Isolation	14,576	9,718	24,294	1.2%
Spent Fuel Storage (Direct Costs) [2]	114,819	111,649	226,467	11.3%
Insurance and Regulatory Fees	19,822	16,763	36,586	1.8%
Energy	10,742	9,033	19,775	1.0%
Characterization and Licensing Surveys	14,531	16,907	31,438	1.6%
Property Taxes	77,623	72,753	150,376	7.5%
Miscellaneous	7,729	7,430	15,159	0.8%
Railroad Track Maintenance	3,543	3,455	6,998	0.3%
Retention and Severance	26,985	26,985	53,970	2.7%
Security Modifications	5,000	5,000	10,000	0.5%
Prairie Island Indian Community Payments	51,745	50,219	101,964	5.1%
Total [2]	996,753	1,008,829	2,005,582	100.0%

Cost Element	Unit 1	Unit 2	Total	Percentage
NRC License Termination	595,962	590,962	1,186,924	59.2%
Spent Fuel Management	349,793	345,097	694,890	34.6%
Site Restoration	50,998	72,770	123,768	6.2%
Total [3]	996,753	1,008,829	2,005,582	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.2
SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total	Percentage
Decontamination	12,109	19,308	31,417	1.5%
Removal	111,005	147,842	258,847	12.6%
Packaging	27,756	28,136	55,892	2.7%
Transportation	9,509	10,116	19,625	1.0%
Waste Disposal	75,656	79,069	154,725	7.6%
Off-site Waste Processing	26,049	30,811	56,860	2.8%
Program Management [1]	241,656	229,438	471,094	23.0%
Security	155,731	144,029	299,759	14.6%
Spent Fuel Pool Isolation	14,576	9,718	24,294	1.2%
Spent Fuel Storage (Direct Costs) [2]	116,766	113,596	230,362	11.2%
Insurance and Regulatory Fees	20,622	17,563	38,185	1.9%
Energy	10,742	9,033	19,775	1.0%
Characterization and Licensing Surveys	14,531	16,907	31,438	1.5%
Property Taxes	82,188	77,319	159,507	7.8%
Miscellaneous	7,729	7,430	15,159	0.7%
Railroad Track Maintenance	3,759	3,671	7,430	0.4%
Retention and Severance	26,985	26,985	53,970	2.6%
Security Modifications	5,000	5,000	10,000	0.5%
Prairie Island Indian Community Payments	55,496	53,970	109,466	5.3%
Total [3]	1,017,865	1,029,941	2,047,805	100.0%

Cost Element	Unit 1	Unit 2	Total	Percentage
NRC License Termination	595,962	590,962	1,186,924	58.0%
Spent Fuel Management	370,904	366,208	737,113	36.0%
Site Restoration	50,998	72,770	123,768	6.0%
Total [3]	1,017,865	1,029,941	2,047,805	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.3
SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total	Percentage
Decontamination	12,109	19,308	31,417	1.0%
Removal	111,707	148,543	260,249	7.9%
Packaging	27,756	28,136	55,892	1.7%
Transportation	9,509	10,116	19,625	0.6%
Waste Disposal	75,656	79,069	154,724	4.7%
Off-site Waste Processing	26,049	30,811	56,860	1.7%
Program Management [1]	323,909	311,690	635,599	19.4%
Security	255,921	244,219	500,140	15.2%
Spent Fuel Pool Isolation	14,576	9,718	24,294	0.7%
Spent Fuel Storage (Direct Costs) [2]	425,553	422,384	847,937	25.8%
Insurance and Regulatory Fees	31,282	28,223	59,505	1.8%
Energy	10,742	9,033	19,775	0.6%
Characterization and Licensing Surveys	14,531	16,907	31,438	1.0%
Property Taxes	143,057	138,187	281,244	8.6%
Miscellaneous	7,729	7,430	15,159	0.5%
Railroad Track Maintenance	6,637	6,549	13,185	0.4%
Retention and Severance	26,985	26,985	53,970	1.6%
Security Modifications	5,000	5,000	10,000	0.3%
Prairie Island Indian Community Payments	105,493	103,966	209,459	6.4%
Total [3]	1,634,199	1,646,275	3,280,474	100.0%

Cost Element	Unit 1	Unit 2	Total	Percentage
NRC License Termination	596,408	591,409	1,187,817	36.2%
Spent Fuel Management	985,833	981,137	1,966,970	60.0%
Site Restoration	51,958	73,730	125,688	3.8%
Total [3]	1,634,199	1,646,275	3,280,474	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.4
SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total	Percentage
Decontamination	12,109	19,308	31,417	0.6%
Removal	111,707	148,543	260,249	4.7%
Packaging	27,756	28,136	55,892	1.0%
Transportation	9,509	10,116	19,625	0.4%
Waste Disposal	75,656	79,069	154,724	2.8%
Off-site Waste Processing	26,049	30,811	56,860	1.0%
Program Management [1]	468,903	456,684	925,587	16.6%
Security	506,407	494,705	1,001,112	18.0%
Spent Fuel Pool Isolation	14,576	9,718	24,294	0.4%
Spent Fuel Storage (Direct Costs) [2]	859,315	856,146	1,715,461	30.8%
Insurance and Regulatory Fees	57,933	54,874	112,807	2.0%
Energy	10,742	9,033	19,775	0.4%
Characterization and Licensing Surveys	14,531	16,907	31,438	0.6%
Property Taxes	295,229	290,360	585,589	10.5%
Miscellaneous	7,729	7,430	15,159	0.3%
Railroad Track Maintenance	13,831	13,743	27,575	0.5%
Retention and Severance	26,985	26,985	53,970	1.0%
Security Modifications	5,000	5,000	10,000	0.2%
Prairie Island Indian Community Payments	230,489	228,963	459,452	8.3%
Total [3]	2,774,456	2,786,532	5,560,987	100.0%

Cost Element	Unit 1	Unit 2	Total	Percentage
NRC License Termination	596,408	591,409	1,187,817	21.4%
Spent Fuel Management	2,126,089	2,121,393	4,247,483	76.4%
Site Restoration	51,958	73,730	125,688	2.3%
Total [3]	2,774,456	2,786,532	5,560,987	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.5
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total	Percentage
Decontamination	8,262	17,629	25,891	1.0%
Removal	118,236	154,208	272,444	10.4%
Packaging	21,286	21,654	42,940	1.6%
Transportation	7,988	8,587	16,575	0.6%
Waste Disposal	59,926	62,040	121,966	4.7%
Off-site Waste Processing	26,624	31,387	58,012	2.2%
Program Management [1]	321,644	315,246	636,891	24.4%
Security	216,744	170,639	387,383	14.8%
Spent Fuel Pool Isolation	14,576	9,718	24,294	0.9%
Spent Fuel Storage (Direct Costs) [2]	109,664	106,495	216,159	8.3%
Insurance and Regulatory Fees	47,122	43,899	91,021	3.5%
Energy	21,571	21,262	42,833	1.6%
Characterization and Licensing Surveys	15,797	18,173	33,970	1.3%
Property Taxes	214,410	209,541	423,951	16.2%
Miscellaneous	18,316	22,688	41,004	1.6%
Railroad Track Maintenance	4,733	4,645	9,377	0.4%
Retention and Severance	26,985	26,985	53,970	2.1%
Security Modifications	5,000	5,000	10,000	0.4%
Prairie Island Indian Community Payments	51,745	50,219	101,964	3.9%
Total [3]	1,310,629	1,300,016	2,610,645	100.0%

Cost Element	Unit 1	Unit 2	Total	Percentage
NRC License Termination	970,442	944,187	1,914,629	73.3%
Spent Fuel Management	281,510	275,338	556,848	21.3%
Site Restoration	58,677	80,490	139,167	5.3%
Total [3]	1,310,629	1,300,016	2,610,645	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.6
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total	Percentage
Decontamination	8,262	17,629	25,891	1.0%
Removal	118,240	154,230	272,471	10.3%
Packaging	21,286	21,654	42,940	1.6%
Transportation	7,988	8,588	16,575	0.6%
Waste Disposal	59,926	62,042	121,968	4.6%
Off-site Waste Processing	26,624	31,387	58,012	2.2%
Program Management [1]	322,356	318,247	640,604	24.2%
Security	218,124	180,276	398,401	15.1%
Spent Fuel Pool Isolation	14,576	9,718	24,294	0.9%
Spent Fuel Storage (Direct Costs) [2]	111,541	108,372	219,913	8.3%
Insurance and Regulatory Fees	47,872	44,607	92,479	3.5%
Energy	21,571	21,262	42,833	1.6%
Characterization and Licensing Surveys	15,797	18,173	33,970	1.3%
Property Taxes	218,698	213,829	432,527	16.3%
Miscellaneous	18,316	22,688	41,004	1.5%
Railroad Track Maintenance	4,733	4,645	9,377	0.4%
Retention and Severance	26,985	26,985	53,970	2.0%
Security Modifications	5,000	5,000	10,000	0.4%
Prairie Island Indian Community Payments	55,496	53,970	109,466	4.1%
Total [3]	1,323,393	1,323,304	2,646,697	100.0%

Cost Element	Unit 1	Unit 2	Total	Percentage
NRC License Termination	968,306	952,576	1,920,882	72.6%
Spent Fuel Management	296,410	290,238	586,648	22.2%
Site Restoration	58,677	80,490	139,167	5.3%
Total [3]	1,323,393	1,323,304	2,646,697	100.0%

[1] Includes engineering

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.7
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total	Percentage
Decontamination	8,262	17,447	25,709	0.7%
Removal	119,002	155,038	274,040	7.3%
Packaging	25,596	25,964	51,560	1.4%
Transportation	7,988	8,588	16,576	0.4%
Waste Disposal	59,928	62,049	121,977	3.3%
Off-site Waste Processing	26,624	31,387	58,012	1.5%
Program Management [1]	359,684	363,609	723,293	19.3%
Security	279,245	272,250	551,495	14.7%
Spent Fuel Pool Isolation	14,576	9,718	24,294	0.6%
Spent Fuel Storage (Direct Costs) [2]	420,010	416,736	836,746	22.3%
Insurance and Regulatory Fees	57,899	54,267	112,167	3.0%
Energy	21,590	21,282	42,872	1.1%
Characterization and Licensing Surveys	15,797	18,173	33,970	0.9%
Property Taxes	278,005	273,136	551,141	14.7%
Miscellaneous	18,316	22,688	41,004	1.1%
Railroad Track Maintenance	6,373	6,285	12,659	0.3%
Retention and Severance	26,985	26,985	53,970	1.4%
Security Modifications	5,000	5,000	10,000	0.3%
Prairie Island Indian Community Payments	105,493	103,966	209,459	5.6%
Total [3]	1,856,374	1,894,569	3,750,943	100.0%

Cost Element	Unit 1	Unit 2	Total	Percentage
NRC License Termination	963,420	983,908	1,947,327	51.9%
Spent Fuel Management	836,113	832,007	1,668,119	44.5%
Site Restoration	56,842	78,655	135,496	3.6%
Total [3]	1,856,374	1,894,569	3,750,943	100.0%

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

TABLE 6.8
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

Cost Element	Unit 1	Unit 2	Total	Percentage
Decontamination	8,262	17,447	25,709	0.4%
Removal	119,002	155,038	274,040	4.6%
Packaging	25,596	25,964	51,560	0.9%
Transportation	7,988	8,588	16,576	0.3%
Waste Disposal	59,928	62,049	121,977	2.0%
Off-site Waste Processing	26,624	31,387	58,012	1.0%
Program Management [1]	504,679	508,603	1,013,282	17.0%
Security	501,598	494,603	996,201	16.7%
Spent Fuel Pool Isolation	14,576	9,718	24,294	0.4%
Spent Fuel Storage (Direct Costs) [2]	853,529	850,323	1,703,853	28.5%
Insurance and Regulatory Fees	84,550	80,918	165,469	2.8%
Energy	21,590	21,282	42,872	0.7%
Characterization and Licensing Surveys	15,797	18,173	33,970	0.6%
Property Taxes	430,177	425,308	855,485	14.3%
Miscellaneous	18,316	22,688	41,004	0.7%
Railroad Track Maintenance	13,568	13,480	27,048	0.5%
Retention and Severance	26,985	26,985	53,970	0.9%
Security Modifications	5,000	5,000	10,000	0.2%
Prairie Island Indian Community Payments	230,489	228,963	459,452	7.7%
Total [3]	2,968,256	3,006,518	5,974,774	100.0%

Cost Element	Unit 1	Unit 2	Total	Percentage
NRC License Termination	963,419	983,907	1,947,327	32.6%
Spent Fuel Management	1,947,994	1,943,956	3,891,950	65.1%
Site Restoration	56,842	78,655	135,496	2.3%
Total [3]	2,968,256	3,006,518	5,974,774	100.0%

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

7. REFERENCES

1. "Decommissioning Cost Analysis for the Prairie Island Nuclear Generating Plant," Document No. X01-1725-001, Rev. 0, TLG Services, Inc., October 2017 [Open]

2. U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70 and 72, "General Requirements for Decommissioning Nuclear Facilities," Nuclear Regulatory Commission, 53 Fed. Reg. 24018, June 27, 1988 [Open]

3. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors," Rev. 2, October 2011 [Open]

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7. U.S. Code of Federal Regulations, Title 10, Parts 20, 30, 40, 50, 70, and 72, "Decommissioning Planning," Nuclear Regulatory Commission, Federal Register Volume 76, (p 35512 et seq.), June 17, 2011 [Open]

8. "Nuclear Waste Policy Act of 1982," 42 U.S. Code 10101, et seq. [Open]

9. Charter of the Blue Ribbon Commission on America's Nuclear Future, "Objectives and Scope of Activities," 2010 [Open]

10. "Blue Ribbon Commission on America's Nuclear Future, Report to the Secretary of Energy," p. 27, 32, January 2012 [Open]

11. "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," U.S. DOE, January 11, 2013 [Open]

12. United States Court of Appeals for the District of Columbia Circuit, In Re: Aiken County, et al., August 2013 [Open]

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13. U.S. Code of Federal Regulations, Title 10, Part 961.11, Article IV – Responsibilities of the Parties, B. DOE Responsibilities, 5.(a) … DOE shall issue an annual acceptance priority ranking for receipt of SNF and/or HLW at the DOE repository. This priority ranking shall be based on the age of SNF and/or HLW as calculated from the date of discharge of such materials from the civilian nuclear power reactor. The oldest fuel or waste will have the highest priority for acceptance …"

14. Minnesota Statute 216B.2445, "Nuclear Power Plant Decommissioning and Storage of Used Nuclear Fuel" [Open]

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APPENDIX A

UNIT COST FACTOR DEVELOPMENT

APPENDIX A
UNIT COST FACTOR DEVELOPMENT

Example: Unit Factor for Removal of Contaminated Heat Exchanger < 3,000 lbs.

1. SCOPE

Heat exchangers weighing < 3,000 lbs. will be removed in one piece using a crane or small hoist. They will be disconnected from the inlet and outlet piping. The heat exchanger will be sent to the waste processing area.

2. CALCULATIONS

Act ID	Activity Description	Activity Duration (minutes)	Critical Duration (minutes)*
a	Remove insulation	60	(b)
b	Mount pipe cutters	60	60
c	Install contamination controls	20	(b)
d	Disconnect inlet and outlet lines	60	60
e	Cap openings	20	(d)
f	Rig for removal	30	30
g	Unbolt from mounts	30	30
h	Remove contamination controls	15	15
i	Remove, wrap, send to waste processing area	60	60
	Totals (Activity/Critical)	355	255

Duration adjustment(s):	
+ Respiratory protection adjustment (50 of critical duration)	128
+ Radiation/ALARA adjustment (37.1 of critical duration)	95
Adjusted work duration	478
+ Protective clothing adjustment (30 of adjusted duration)	143
Productive work duration	621
+ Work break adjustment (8.33 of productive duration)	52
Total work duration (minutes)	673

***** Total duration = 11.217 hr *****

* alpha designators indicate activities that can be performed in parallel

APPENDIX A
(continued)

3. LABOR REQUIRED

Crew	Number	Duration (hours)	Rate ($/hr)	Cost
Laborers	3.00	11.217	$61.19	$2,059.10
Craftsmen	2.00	11.217	$76.98	$1,726.97
Foreman	1.00	11.217	$80.56	$903.64
General Foreman	0.25	11.217	$82.83	$232.28
Fire Watch	0.05	11.217	$61.19	$34.32
Health Physics Technician	1.00	11.217	$53.89	$604.48
Total Labor Cost				$5,560.79

4. EQUIPMENT & CONSUMABLES COSTS

Equipment Costs	none
Consumables/Materials Costs	
• Universal Sorbent 50 @ $0.63 sq ft {1}	$31.50
• Tarpaulins (oil resistant/fire retardant) 50 @ $0.47/sq ft {2}	$23.50
• Gas torch consumables 1 @ $20.79/hr x 1 hr {3}	$20.79
Subtotal cost of equipment and materials	$75.79
Overhead & profit on equipment and materials @ 16.88%	$12.79
Total costs, equipment & material	$88.58

TOTAL COST:

Removal of contaminated heat exchanger <3000 pounds:	**$5,649.37**
Total labor cost:	$5,560.79
Total equipment/material costs:	$88.58
Total craft labor man-hours required per unit:	81.88

5. NOTES AND REFERENCES

- Work difficulty factors were developed in conjunction with the Atomic Industrial Forum's (now NEI) program to standardize nuclear decommissioning cost estimates and are delineated in Volume 1, Chapter 5 of the "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986.

- References for equipment & consumables costs:

    1. www.mcmaster.com online catalog, McMaster Carr Spill Control (7193T88)
    2. R.S. Means (2020) Division 01 56, Section 13.60-0600, page 23
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- Material and consumable costs were adjusted using the regional indices for Minneapolis, Minnesota.

APPENDIX B

UNIT COST FACTOR LISTING
(DECON: Power Block Structures Only)

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of clean instrument and sampling tubing, $/linear foot	0.66
Removal of clean pipe 0.25 to 2 inches diameter, $/linear foot	7.12
Removal of clean pipe >2 to 4 inches diameter, $/linear foot	10.11
Removal of clean pipe >4 to 8 inches diameter, $/linear foot	19.57
Removal of clean pipe >8 to 14 inches diameter, $/linear foot	37.91
Removal of clean pipe >14 to 20 inches diameter, $/linear foot	49.31
Removal of clean pipe >20 to 36 inches diameter, $/linear foot	72.55
Removal of clean pipe >36 inches diameter, $/linear foot	86.19
Removal of clean valve >2 to 4 inches	129.76
Removal of clean valve >4 to 8 inches	195.71
Removal of clean valve >8 to 14 inches	379.11
Removal of clean valve >14 to 20 inches	493.15
Removal of clean valve >20 to 36 inches	725.51
Removal of clean valve >36 inches	861.88
Removal of clean pipe hanger for small bore piping	44.86
Removal of clean pipe hanger for large bore piping	160.36
Removal of clean pump, <300 pound	330.75
Removal of clean pump, 300-1000 pound	912.91
Removal of clean pump, 1000-10,000 pound	3,610.60
Removal of clean pump, >10,000 pound	6,985.07
Removal of clean pump motor, 300-1000 pound	381.58
Removal of clean pump motor, 1000-10,000 pound	1,500.12
Removal of clean pump motor, >10,000 pound	3,375.27
Removal of clean heat exchanger <3000 pound	1,938.88
Removal of clean heat exchanger >3000 pound	4,883.83
Removal of clean feedwater heater/deaerator	13,767.02
Removal of clean moisture separator/reheater	28,301.27
Removal of clean tank, <300 gallons	425.41
Removal of clean tank, 300-3000 gallon	1,340.19
Removal of clean tank, >3000 gallons, $/square foot surface area	11.21

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of clean electrical equipment, <300 pound	179.24
Removal of clean electrical equipment, 300-1000 pound	621.24
Removal of clean electrical equipment, 1000-10,000 pound	1,242.49
Removal of clean electrical equipment, >10,000 pound	2,945.34
Removal of clean electrical transformer < 30 tons	2,045.49
Removal of clean electrical transformer > 30 tons	5,890.69
Removal of clean standby diesel generator, <100 kW	2,089.30
Removal of clean standby diesel generator, 100 kW to 1 MW	4,663.46
Removal of clean standby diesel generator, >1 MW	9,654.30
Removal of clean electrical cable tray, $/linear foot	16.85
Removal of clean electrical conduit, $/linear foot	7.36
Removal of clean mechanical equipment, <300 pound	179.24
Removal of clean mechanical equipment, 300-1000 pound	621.24
Removal of clean mechanical equipment, 1000-10,000 pound	1,242.49
Removal of clean mechanical equipment, >10,000 pound	2,945.34
Removal of clean HVAC equipment, <300 pound	216.74
Removal of clean HVAC equipment, 300-1000 pound	746.48
Removal of clean HVAC equipment, 1000-10,000 pound	1,487.73
Removal of clean HVAC equipment, >10,000 pound	2,945.34
Removal of clean HVAC ductwork, $/pound	0.70
Removal of contaminated instrument and sampling tubing, $/linear foot	1.95
Removal of contaminated pipe 0.25 to 2 inches diameter, $/linear foot	27.83
Removal of contaminated pipe >2 to 4 inches diameter, $/linear foot	47.82
Removal of contaminated pipe >4 to 8 inches diameter, $/linear foot	74.97
Removal of contaminated pipe >8 to 14 inches diameter, $/linear foot	148.05
Removal of contaminated pipe >14 to 20 inches diameter, $/linear foot	177.91
Removal of contaminated pipe >20 to 36 inches diameter, $/linear foot	246.21
Removal of contaminated pipe >36 inches diameter, $/linear foot	290.98
Removal of contaminated valve >2 to 4 inches	566.48
Removal of contaminated valve >4 to 8 inches	683.58

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of contaminated valve >8 to 14 inches	1,416.26
Removal of contaminated valve >14 to 20 inches	1,800.59
Removal of contaminated valve >20 to 36 inches	2,397.86
Removal of contaminated valve >36 inches	2,845.51
Removal of contaminated pipe hanger for small bore piping	185.80
Removal of contaminated pipe hanger for large bore piping	626.86
Removal of contaminated pump, <300 pound	1,220.24
Removal of contaminated pump, 300-1000 pound	2,838.77
Removal of contaminated pump, 1000-10,000 pound	9,387.15
Removal of contaminated pump, >10,000 pound	22,866.23
Removal of contaminated pump motor, 300-1000 pound	1,207.55
Removal of contaminated pump motor, 1000-10,000 pound	3,819.10
Removal of contaminated pump motor, >10,000 pound	8,574.33
Removal of contaminated heat exchanger <3000 pound	5,649.37
Removal of contaminated heat exchanger >3000 pound	16,380.03
Removal of contaminated tank, <300 gallons	2,028.43
Removal of contaminated tank, >300 gallons, $/square foot	39.80
Removal of contaminated electrical equipment, <300 pound	945.74
Removal of contaminated electrical equipment, 300-1000 pound	2,314.59
Removal of contaminated electrical equipment, 1000-10,000 pound	4,458.19
Removal of contaminated electrical equipment, >10,000 pound	8,760.92
Removal of contaminated electrical cable tray, $/linear foot	45.77
Removal of contaminated electrical conduit, $/linear foot	22.38
Removal of contaminated mechanical equipment, <300 pound	1,052.10
Removal of contaminated mechanical equipment, 300-1000 pound	2,556.07
Removal of contaminated mechanical equipment, 1000-10,000 pound	4,915.22
Removal of contaminated mechanical equipment, >10,000 pound	8,760.92
Removal of contaminated HVAC equipment, <300 pound	1,052.10
Removal of contaminated HVAC equipment, 300-1000 pound	2,556.07
Removal of contaminated HVAC equipment, 1000-10,000 pound	4,915.22

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Removal of contaminated HVAC equipment, >10,000 pound	8,760.92
Removal of contaminated HVAC ductwork, $/pound	2.68
Removal/plasma arc cut of contaminated thin metal components, $/linear in.	5.12
Additional decontamination of surface by washing, $/square foot	10.44
Additional decontamination of surfaces by hydrolasing, $/square foot	45.13
Decontamination rig hook up and flush, $/ 250 foot length	8,868.24
Chemical flush of components/systems, $/gallon	21.45
Removal of clean standard reinforced concrete, $/cubic yard	79.61
Removal of grade slab concrete, $/cubic yard	90.55
Removal of clean concrete floors, $/cubic yard	462.49
Removal of sections of clean concrete floors, $/cubic yard	1,391.41
Removal of clean heavily rein concrete w/#9 rebar, $/cubic yard	115.01
Removal of contaminated heavily rein concrete w/#9 rebar, $/cubic yard	2,710.44
Removal of clean heavily rein concrete w/#18 rebar, $/cubic yard	155.87
Removal of contaminated heavily rein concrete w/#18 rebar, $/cubic yard	3,585.77
Removal heavily rein concrete w/#18 rebar & steel embedments, $/cubic yard	569.09
Removal of below-grade suspended floors, $/cubic yard	218.61
Removal of clean monolithic concrete structures, $/cubic yard	1,160.53
Removal of contaminated monolithic concrete structures, $/cubic yard	2,698.05
Removal of clean foundation concrete, $/cubic yard	910.88
Removal of contaminated foundation concrete, $/cubic yard	2,513.39
Explosive demolition of bulk concrete, $/cubic yard	61.22
Removal of clean hollow masonry block wall, $/cubic yard	27.85
Removal of contaminated hollow masonry block wall, $/cubic yard	72.43
Removal of clean solid masonry block wall, $/cubic yard	27.85
Removal of contaminated solid masonry block wall, $/cubic yard	72.43
Backfill of below-grade voids, $/cubic yard	36.73
Removal of subterranean tunnels/voids, $/linear foot	143.29
Placement of concrete for below-grade voids, $/cubic yard	142.84
Excavation of clean material, $/cubic yard	3.38

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Excavation of contaminated material, $/cubic yard	48.85
Removal of clean concrete rubble (tipping fee included), $/cubic yard	28.06
Removal of contaminated concrete rubble, $/cubic yard	30.63
Removal of building by volume, $/cubic foot	0.35
Removal of clean building metal siding, $/square foot	1.77
Removal of contaminated building metal siding, $/square foot	5.62
Removal of standard asphalt roofing, $/square foot	3.11
Removal of transite panels, $/square foot	2.87
Scarifying contaminated concrete surfaces (drill & spall), $/square foot	15.31
Scabbling contaminated concrete floors, $/square foot	9.92
Scabbling contaminated concrete walls, $/square foot	26.57
Scabbling contaminated ceilings, $/square foot	91.53
Scabbling structural steel, $/square foot	7.86
Removal of clean overhead crane/monorail < 10 ton capacity	863.80
Removal of contaminated overhead crane/monorail < 10 ton capacity	2,333.62
Removal of clean overhead crane/monorail >10-50 ton capacity	2,073.11
Removal of contaminated overhead crane/monorail >10-50 ton capacity	5,599.73
Removal of polar crane > 50 ton capacity	8,638.20
Removal of gantry crane > 50 ton capacity	32,889.62
Removal of structural steel, $/pound	0.25
Removal of clean steel floor grating, $/square foot	6.20
Removal of contaminated steel floor grating, $/square foot	17.35
Removal of clean free standing steel liner, $/square foot	16.81
Removal of contaminated free standing steel liner, $/square foot	46.59
Removal of clean concrete-anchored steel liner, $/square foot	8.40
Removal of contaminated concrete-anchored steel liner, $/square foot	54.30
Placement of scaffolding in clean areas, $/square foot	18.98
Placement of scaffolding in contaminated areas, $/square foot	31.88
Landscaping with topsoil, $/acre	25,606.43
Cost of CPC B-88 LSA box & preparation for use	2,185.35

APPENDIX B

UNIT COST FACTOR LISTING
(Power Block Structures Only)

Unit Cost Factor	Cost/Unit
Cost of CPC B-25 LSA box & preparation for use	1,785.70
Cost of CPC B-12V 12 gauge LSA box & preparation for use	1,711.40
Cost of CPC B-144 LSA box & preparation for use	10,802.18
Cost of LSA drum & preparation for use	260.77
Cost of cask liner for CNSI 8 120A cask (resins)	12,915.06
Cost of cask liner for CNSI 8 120A cask (filters)	9,404.10
Decontamination of surfaces with vacuuming, $/square foot	1.04

APPENDIX C

DETAILED COST ANALYSIS

SCENARIO 1: DECON with 42 Year DFS

Page

Prairie Island Nuclear Generating Plant, Unit 1 ..... C-2

Prairie Island Nuclear Generating Plant, Unit 2 ..... C-12

Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	632	95	727	654	-	73	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Biological shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Steam generators	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
1a.1.17.10	Main Condensers	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
1a.1.17.11	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
1a.1.17.12	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.13	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	4,861	729	5,591	4,923	-	668	-	-	-	-	-	-	-	37,827
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	15,945	2,392	18,336	17,669	-	668	-	-	-	-	-	-	-	78,157
Period 1a Additional Costs																					
1a.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1a.2	Subtotal Period 1a Additional Costs	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
Period 1a Collateral Costs																					
1a.3.1	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	50	-	14	82	82	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,137	114	1,251	1,251	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	26,931	4,040	30,971	30,971	-	-	-	-	-	-	-	-	-	422,240

Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	5	-	50	47,456	6,970	55,860	52,918	2,942	-	-	610	-	-	-	12,190	20	544,960
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	5	-	50	77,325	11,263	90,022	85,163	4,191	668	-	610	-	-	-	12,190	20	623,117
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	321	48	369	369	-	-	-	-	-	-	-	-	-	2,500
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD cooling assembly	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	CRD housings & ICI tubes	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
1b.1.1.10	Missile shields	-	-	-	-	-	-	58	9	67	67	-	-	-	-	-	-	-	-	-	450
1b.1.1.11	Biological shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.12	Steam generators	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1b.1.1.13	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
1b.1.1.14	Main Turbine	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
1b.1.1.15	Main Condensers	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
1b.1.1.16	Auxiliary building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1.17	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,272	641	4,913	3,989	-	924	-	-	-	-	-	-	-	33,243
1b.1.2	Decon primary loop	572	-	-	-	-	-	-	286	859	859	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	572	-	-	-	-	-	4,272	927	5,772	4,848	-	924	-	-	-	-	-	-	1,067	33,243
Period 1b Additional Costs																					
1b.2.1	Site Characterization	-	-	-	-	-	-	3,520	1,056	4,576	4,576	-	-	-	-	-	-	-	-	21,020	8,332
1b.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
1b.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
1b.2	Subtotal Period 1b Additional Costs	-	2,526	356	244	178	1,369	3,520	2,129	10,321	10,321	-	-	6,132	12,843	-	-	-	518,936	44,275	8,332
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	25	-	16	29	-	66	-	35	172	172	-	-	-	152	-	-	-	9,127	30	-
1b.3.4	Process decommissioning chemical flush waste	2	-	61	199	-	3,889	-	1,009	5,159	5,159	-	-	-	-	588	-	-	62,689	110	-
1b.3.5	Small tool allowance	-	36	-	-	-	-	-	5	42	42	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	163	25	188	-	188	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	1,032	155	1,187	1,187	-	-	-	-	-	-	-	-	-	-
1b.3.10	Prairie Island Indian Community Payments	-	-	-	-	-	-	623	-	623	-	623	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,185	1,236	77	228	-	3,955	3,082	2,072	13,836	13,025	811	-	-	152	588	-	-	71,815	140	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	828	83	910	910	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,806	181	1,987	1,987	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	475	-	-	-	-	-	119	594	594	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	3	-	29	-	8	48	48	-	-	-	356	-	-	-	7,122	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,617	243	1,859	1,859	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	323	32	355	355	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,084	108	1,193	-	1,193	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	4,153	623	4,775	4,775	-	-	-	-	-	-	-	-	-	61,192
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,846	877	6,723	6,723	-	-	-	-	-	-	-	-	-	63,266
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	13,505	2,026	15,531	15,531	-	-	-	-	-	-	-	-	-	211,579

Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
1b.4	Subtotal Period 1b Period-Dependent Costs	38	851	7	3	-	29	30,149	4,513	35,590	34,123	1,467	-	-	356	-	-	-	7,122	12	336,037
1b.0	TOTAL PERIOD 1b COST	3,795	4,613	440	475	178	5,354	41,023	9,641	65,519	62,317	2,278	924	6,132	13,351	588	-	-	597,873	45,493	377,612
PERIOD 1 TOTALS		3,795	5,980	452	480	178	5,404	118,348	20,903	155,540	147,480	6,468	1,592	6,132	13,961	588	-	-	610,063	45,513	1,000,729
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Reactor Coolant Piping	54	47	10	18	-	187	-	89	406	406	-	-	-	508	-	-	-	35,411	1,421	-
2a.1.1.2	Pressurizer Relief Tank	24	21	6	12	-	125	-	51	238	238	-	-	-	338	-	-	-	23,594	630	-
2a.1.1.3	Reactor Coolant Pumps & Motors	57	68	110	93	-	463	-	186	977	977	-	-	-	2,332	-	-	-	295,800	2,049	100
2a.1.1.4	Pressurizer	-	77	503	97	-	776	-	278	1,732	1,732	-	-	-	2,196	-	-	-	185,015	1,666	938
2a.1.1.5	Steam Generators	-	3,307	2,269	1,770	2,409	4,001	-	2,681	16,437	16,437	-	-	18,672	11,316	-	-	-	1,689,435	11,613	2,875
2a.1.1.6	CRDMs/ICIs/Service Structure Removal	302	281	218	66	-	938	-	488	2,294	2,294	-	-	-	4,797	-	-	-	177,400	8,104	-
2a.1.1.7	Reactor Vessel Internals	82	4,861	13,621	929	-	9,015	307	11,878	40,693	40,693	-	-	-	501	125	673	-	164,987	25,123	1,163
2a.1.1.8	Reactor Vessel	94	6,046	2,028	728	-	2,975	307	6,804	18,982	18,982	-	-	-	8,073	-	-	-	576,524	25,123	1,163
2a.1.1	Totals	613	14,709	18,764	3,714	2,409	18,480	614	22,455	81,759	81,759	-	-	18,672	30,062	125	673	-	3,148,166	75,729	6,240
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	331	172	64	527	377	-	283	1,752	1,752	-	-	2,131	1,187	-	-	-	203,265	4,667	-
2a.1.3	Main Condensers	-	2,801	109	62	705	533	-	960	5,170	5,170	-	-	3,800	1,587	-	-	-	271,824	39,151	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
2a.1.4	Totals	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
Disposal of Plant Systems																					
2a.1.5.1	Air Removal	-	31	-	-	-	-	-	5	36	-	-	36	-	-	-	-	-	-	452	-
2a.1.5.2	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	670	-
2a.1.5.3	Auxiliary Feedwater - RCA	-	47	0	2	36	-	-	17	102	102	-	-	215	-	-	-	-	8,722	601	-
2a.1.5.4	Bleed Steam	-	90	-	-	-	-	-	14	104	-	-	104	-	-	-	-	-	-	1,335	-
2a.1.5.5	Caustic Addition - RCA	-	38	0	2	39	-	-	16	95	95	-	-	233	-	-	-	-	9,453	444	-
2a.1.5.6	Chemical Feed	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	304	-
2a.1.5.7	Chemical Feed - RCA	-	1	0	0	1	-	-	0	3	3	-	-	6	-	-	-	-	243	12	-
2a.1.5.8	Circulating Water	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	619	-
2a.1.5.9	Condensate	-	474	-	-	-	-	-	71	545	-	-	545	-	-	-	-	-	-	6,837	-
2a.1.5.10	Condensate Polishing	-	235	-	-	-	-	-	35	271	-	-	271	-	-	-	-	-	-	3,420	-
2a.1.5.11	Condensate Polishing - RCA	-	183	4	15	348	-	-	101	651	651	-	-	2,078	-	-	-	-	84,395	2,329	-
2a.1.5.12	Electro-hydraulic	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	127	-
2a.1.5.13	Feedwater	-	153	-	-	-	-	-	23	175	-	-	175	-	-	-	-	-	-	2,215	-
2a.1.5.14	Feedwater - RCA	-	195	7	24	537	-	-	133	895	895	-	-	3,208	-	-	-	-	130,294	2,651	-
2a.1.5.15	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	505	-
2a.1.5.16	Heater Drain	-	400	-	-	-	-	-	60	460	-	-	460	-	-	-	-	-	-	5,881	-
2a.1.5.17	Internal Circ Water & CDSR	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	389	-
2a.1.5.18	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
2a.1.5.19	Main Steam	-	115	-	-	-	-	-	17	133	-	-	133	-	-	-	-	-	-	1,690	-
2a.1.5.20	Main Steam - RCA	-	366	10	37	844	-	-	225	1,482	1,482	-	-	5,044	-	-	-	-	204,825	4,956	-
2a.1.5.21	Steam Generator Blowdown	-	478	22	29	340	234	-	235	1,337	1,337	-	-	2,031	686	-	-	-	126,640	6,667	-
2a.1.5.22	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
2a.1.5.23	Turbine & Moisture Separators	-	386	-	-	-	-	-	58	444	-	-	444	-	-	-	-	-	-	5,609	-
2a.1.5.24	Turbine Oil Purification	-	70	-	-	-	-	-	11	81	-	-	81	-	-	-	-	-	-	1,003	-
2a.1.5	Totals	-	3,445	44	108	2,144	234	-	1,048	7,023	4,565	-	2,458	12,815	686	-	-	-	564,572	48,794	-
2a.1.6	Scaffolding in support of decommissioning	-	930	3	1	26	4	-	238	1,202	1,202	-	-	138	12	-	-	-	6,985	6,368	-
2a.1	Subtotal Period 2a Activity Costs	613	23,011	19,092	3,950	5,810	19,628	614	25,102	97,819	95,362	-	2,458	37,556	33,533	125	673	-	4,194,811	182,298	6,240
Period 2a Additional Costs																					
2a.2.1	Retired RPV Upper Internals Package	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
2a.2	Subtotal Period 2a Additional Costs	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	48	-	32	58	-	130	-	68	337	337	-	-	-	299	-	-	-	17,968	58	-
2a.3.3	Small tool allowance	-	239	-	-	-	-	-	36	274	247	-	27	-	-	-	-	-	-	-	-

Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes: Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2a Collateral Costs (continued)																					
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,639	246	1,885	-	1,885	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	12,780	1,917	14,697	14,697	-	-	-	-	-	-	-	-	-	-
2a.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,780	-	1,780	-	1,780	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	48	239	32	58	-	130	16,198	2,267	18,972	15,281	3,664	27	-	299	-	-	-	17,968	58	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	107	-	-	-	-	-	-	27	134	134	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	690	69	759	759	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	5,009	501	5,510	5,510	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	1,950	-	-	-	-	-	487	2,437	2,437	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,565	-	-	-	-	-	535	4,100	4,100	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	73	30	-	303	-	88	493	493	-	-	-	3,681	-	-	-	73,619	120	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,194	329	2,523	2,523	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	842	84	926	926	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,647	265	2,912	-	2,912	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	1,695	254	1,949	1,949	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	602	90	692	-	692	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	80	12	92	-	92	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	318	48	366	366	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,596	239	1,835	1,835	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	11,727	1,759	13,486	13,486	-	-	-	-	-	-	-	-	-	172,726
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	20,663	3,099	23,763	23,763	-	-	-	-	-	-	-	-	-	225,210
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	26,905	4,036	30,941	30,941	-	-	-	-	-	-	-	-	-	417,453
2a.4	Subtotal Period 2a Period-Dependent Costs	107	5,515	73	30	-	303	74,968	11,922	92,918	89,223	3,696	-	-	3,681	-	-	-	73,619	120	815,389
2a.0	TOTAL PERIOD 2a COST	768	29,021	19,584	4,254	5,810	21,456	91,780	40,333	213,006	203,161	7,360	2,485	37,556	37,889	237	673	-	4,336,562	185,810	821,762
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	Aux Bldg Normal Ventilation	-	2	0	0	1	-	-	1	3	3	-	-	3	-	-	-	-	140	29	-
2b.1.1.2	Battery Rm Special Ventilation	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	6	-
2b.1.1.3	Buildings Maintenance	-	5	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	65	-
2b.1.1.4	Chemical & Volume Control	1,120	1,389	89	90	753	973	-	1,286	5,700	5,700	-	-	4,498	2,846	-	-	-	366,565	34,533	-
2b.1.1.5	Component Cooling - RCA	-	858	25	91	2,079	-	-	543	3,597	3,597	-	-	12,427	-	-	-	-	504,675	11,242	-
2b.1.1.6	Containment Cooling	-	74	-	-	-	-	-	11	85	-	-	85	-	-	-	-	-	-	1,086	-
2b.1.1.7	Containment Cooling - RCA	-	304	7	25	569	-	-	166	1,070	1,070	-	-	3,400	-	-	-	-	138,090	3,971	-
2b.1.1.8	Containment Hydrogen Control - RCA	-	30	0	1	18	-	-	10	59	59	-	-	105	-	-	-	-	4,278	401	-
2b.1.1.9	Containment Spray - RCA	-	93	2	6	145	-	-	46	293	293	-	-	868	-	-	-	-	35,249	1,217	-
2b.1.1.10	Containment Ventilation	-	255	24	51	828	248	-	260	1,667	1,667	-	-	4,951	737	-	-	-	247,952	3,668	-
2b.1.1.11	Cooling Water	-	163	-	-	-	-	-	24	187	-	-	187	-	-	-	-	-	-	2,396	-
2b.1.1.12	Cooling Water - RCA	-	658	16	57	1,293	-	-	368	2,392	2,392	-	-	7,728	-	-	-	-	313,832	8,594	-
2b.1.1.13	D1 Emergency Diesel	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	730	-
2b.1.1.14	D2 Emergency Diesel	-	36	-	-	-	-	-	5	41	-	-	41	-	-	-	-	-	-	522	-
2b.1.1.15	Diesel Rooms Ventilation	-	9	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	135	-
2b.1.1.16	Electrical - Clean	-	1,905	-	-	-	-	-	286	2,191	-	-	2,191	-	-	-	-	-	-	26,981	-
2b.1.1.17	Electrical - Contaminated	-	611	7	20	423	32	-	228	1,321	1,321	-	-	2,527	95	-	-	-	108,690	8,377	-
2b.1.1.18	Electrical - Decontaminated	-	3,787	48	173	3,940	-	-	1,569	9,518	9,518	-	-	23,551	-	-	-	-	956,401	49,378	-
2b.1.1.19	Fuel Handling	-	121	6	11	152	73	-	74	436	436	-	-	908	218	-	-	-	50,723	1,784	-
2b.1.1.20	Fuel Oil	-	121	-	-	-	-	-	18	140	-	-	140	-	-	-	-	-	-	1,697	-
2b.1.1.21	HVAC - Clean	-	120	-	-	-	-	-	18	138	-	-	138	-	-	-	-	-	-	1,891	-
2b.1.1.22	HVAC - Contaminated	-	374	9	26	546	41	-	190	1,186	1,186	-	-	3,261	123	-	-	-	140,257	5,032	-
2b.1.1.23	Incore Instrumentation	0	28	1	2	10	19	-	14	74	74	-	-	60	57	-	-	-	6,058	425	-
2b.1.1.24	Misc Drains & Vents	-	233	15	13	65	176	-	115	618	618	-	-	390	514	-	-	-	49,062	3,091	-
2b.1.1.25	Reactor Coolant	153	311	21	18	58	265	-	234	1,060	1,060	-	-	344	777	-	-	-	64,085	6,470	-
2b.1.1.26	Reactor Hot Sampling	149	136	12	7	11	118	-	142	576	576	-	-	66	342	-	-	-	25,063	3,946	-
2b.1.1.27	Reactor Makeup	-	73	-	-	-	-	-	11	84	-	-	84	-	-	-	-	-	-	1,042	-
2b.1.1.28	Reactor Vessel	9	21	1	0	4	5	-	12	52	52	-	-	26	14	-	-	-	2,000	425	-
2b.1.1.29	Residual Heat Removal	357	419	85	86	484	1,105	-	654	3,190	3,190	-	-	2,895	3,252	-	-	-	326,425	7,621	-
2b.1.1.30	Safeguards Chilled Water	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	259	-
2b.1.1.31	Safety Injection	-	893	42	73	1,136	393	-	507	3,044	3,044	-	-	6,788	1,156	-	-	-	349,908	12,561	-
2b.1.1.32	Sampling	-	60	4	3	10	37	-	26	140	140	-	-	59	107	-	-	-	9,420	811	-
2b.1.1.33	Shield Bldg Ventilation	-	140	14	26	360	165	-	135	839	839	-	-	2,152	491	-	-	-	118,583	2,030	-
2b.1.1.34	Station & Instrument Air	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	300	-

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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2b.1.1.35	Station & Instrument Air - RCA	-	81	1	2	56	-	-	29	169	169	-	-	332	-	-	-	-	13,496	1,053	-
2b.1.1.36	Turbine Bldg Traps & Drains	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	767	-
2b.1.1.37	Unit Coolers	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	611	-
2b.1.1.38	Unit Coolers - RCA	-	55	0	2	39	-	-	20	115	115	-	-	230	-	-	-	-	9,348	683	-
2b.1.1	Totals	1,789	13,544	429	786	12,979	3,651	-	7,032	40,209	37,119	-	3,091	77,571	10,728	-	-	-	3,840,299	205,829	-
2b.1.2	Scaffolding in support of decommissioning	-	1,163	4	2	32	5	-	297	1,503	1,503	-	-	173	15	-	-	-	8,731	7,960	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor	1,215	2,807	240	1,236	373	13,624	-	4,981	24,476	24,476	-	-	2,230	83,429	-	-	-	3,633,417	50,950	-
2b.1.3.2	Backwash Waste Receiving Tank	-	28	3	17	-	97	-	34	179	179	-	-	-	929	-	-	-	43,896	301	-
2b.1.3	Totals	1,215	2,835	243	1,253	373	13,721	-	5,015	24,655	24,655	-	-	2,230	84,358	-	-	-	3,677,313	51,251	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	3,004	17,542	675	2,041	13,384	17,377	526	12,423	66,973	63,882	-	3,091	79,974	95,101	-	-	-	7,526,343	265,040	4,096
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
2b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	7,411	-
2b.2.3	Security Modifications	-	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,175	11	36	606	-	-	4,573	1,077	7,478	7,478	-	-	5,880	-	-	-	-	147,000	7,427	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	108	-	74	132	-	298	-	156	768	768	-	-	-	684	-	-	-	41,053	133	-
2b.3.2	Process decommissioning chemical flush waste	2	-	90	296	-	677	-	224	1,289	1,289	-	-	-	875	-	-	-	93,252	164	-
2b.3.3	Small tool allowance	-	315	-	-	-	-	-	47	362	362	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	7,142	1,071	8,213	-	8,213	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	6,141	921	7,063	7,063	-	-	-	-	-	-	-	-	-	-
2b.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,348	-	1,348	-	1,348	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	110	315	164	428	-	975	14,631	2,419	19,043	9,482	9,561	-	-	1,559	-	-	-	134,305	297	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	511	-	-	-	-	-	-	128	639	639	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	523	52	575	575	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	3,435	344	3,779	3,779	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,140	-	-	-	-	-	535	2,675	2,675	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,774	-	-	-	-	-	416	3,190	3,190	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	70	28	-	290	-	84	472	472	-	-	-	3,521	-	-	-	70,425	115	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,313	197	1,509	1,509	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	638	64	701	701	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,006	201	2,207	-	2,207	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	1,284	193	1,477	1,477	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	456	68	524	-	524	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	229	34	264	264	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	60	9	69	-	69	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	67	10	78	78	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,209	181	1,391	1,391	-	-	-	-	-	-	-	-	-	-
2b.4.16	Security Staff Cost	-	-	-	-	-	-	8,259	1,239	9,497	9,497	-	-	-	-	-	-	-	-	-	121,244
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	10,738	1,611	12,348	12,348	-	-	-	-	-	-	-	-	-	121,244
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	13,928	2,089	16,017	16,017	-	-	-	-	-	-	-	-	-	225,649
2b.4	Subtotal Period 2b Period-Dependent Costs	511	4,914	70	28	-	290	44,145	7,454	57,412	54,612	2,800	-	-	3,521	-	-	-	70,425	115	468,137
2b.0	TOTAL PERIOD 2b COST	3,626	23,946	920	2,533	13,990	18,642	63,876	23,374	150,907	135,455	12,362	3,091	85,854	100,182	-	-	-	7,878,073	272,879	472,233
PERIOD 2c - Spent fuel delay prior to SFP decon																					
Period 2c Direct Decommissioning Activities																					
Period 2c Collateral Costs																					
2c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	51,417	7,713	59,130	-	59,130	-	-	-	-	-	-	-	-	-
2c.3.2	Retention and Severance	-	-	-	-	-	-	3,512	527	4,039	4,039	-	-	-	-	-	-	-	-	-	-
2c.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,526	-	1,526	-	1,526	-	-	-	-	-	-	-	-	-
2c.3	Subtotal Period 2c Collateral Costs	-	-	-	-	-	-	56,456	8,239	64,695	4,039	60,656	-	-	-	-	-	-	-	-	-

Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes: Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	592	59	651	651	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	3,512	351	3,863	3,863	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	263	-	-	-	-	-	66	328	328	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	9	4	-	38	-	11	61	61	-	-	-	457	-	-	-	9,141	15	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	1,486	223	1,709	1,709	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	687	69	756	756	-	-	-	-	-	-	-	-	-	-
2c.4.7	Emergency Planning Fees	-	-	-	-	-	-	2,271	227	2,498	-	2,498	-	-	-	-	-	-	-	-	-
2c.4.8	Fixed Overhead	-	-	-	-	-	-	1,454	218	1,672	1,672	-	-	-	-	-	-	-	-	-	-
2c.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	516	77	593	-	593	-	-	-	-	-	-	-	-	-
2c.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	260	39	298	298	-	-	-	-	-	-	-	-	-	-
2c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	68	10	79	-	79	-	-	-	-	-	-	-	-	-
2c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	76	11	88	88	-	-	-	-	-	-	-	-	-	-
2c.4.13	Security Staff Cost	-	-	-	-	-	-	9,348	1,402	10,751	10,751	-	-	-	-	-	-	-	-	-	137,246
2c.4.14	Utility Staff Cost	-	-	-	-	-	-	1,195	179	1,375	1,375	-	-	-	-	-	-	-	-	-	19,062
2c.4	Subtotal Period 2c Period-Dependent Costs	-	263	9	4	-	38	21,465	2,943	24,721	21,552	3,170	-	-	457	-	-	-	9,141	15	156,308
2c.0	TOTAL PERIOD 2c COST	-	263	9	4	-	38	77,921	11,183	89,417	25,591	63,826	-	-	457	-	-	-	9,141	15	156,308
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	347	35	86	41	-	703	-	373	1,585	1,585	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
2d.1.2.1	Electrical - Contaminated - Fuel Pool	-	152	2	5	103	8	-	56	325	325	-	-	615	23	-	-	-	26,449	2,077	-
2d.1.2.2	Electrical - Decontaminated - Fuel Pool	-	947	12	43	986	-	-	392	2,380	2,380	-	-	5,893	-	-	-	-	239,327	12,340	-
2d.1.2.3	HVAC - Contaminated - Fuel Pool	-	160	4	11	234	18	-	82	508	508	-	-	1,398	53	-	-	-	60,110	2,157	-
2d.1.2.4	Safeguards Chilled Water - RCA	-	85	1	4	83	-	-	34	207	207	-	-	495	-	-	-	-	20,100	1,019	-
2d.1.2.5	Spent Fuel Pool Cooling	303	357	34	32	135	450	-	382	1,693	1,693	-	-	806	1,325	-	-	-	117,816	7,613	-
2d.1.2.6	Station & Instrument Air - RCA Fuel Pool	-	20	0	1	14	-	-	7	42	42	-	-	83	-	-	-	-	3,374	263	-
2d.1.2	Totals	303	1,721	52	96	1,554	476	-	954	5,157	5,157	-	-	9,290	1,401	-	-	-	467,176	25,468	-
Decontamination of Site Buildings																					
2d.1.4	Scaffolding in support of decommissioning	-	233	1	0	6	1	-	59	301	301	-	-	35	3	-	-	-	1,746	1,592	-
2d.1	Subtotal Period 2d Activity Costs	650	1,989	139	138	1,561	1,180	-	1,386	7,042	7,042	-	-	9,325	3,496	-	-	-	601,841	27,637	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	30	-	21	38	-	86	-	44	220	220	-	-	-	197	-	-	-	11,793	38	-
2d.3.2	Process decommissioning chemical flush waste	1	-	34	110	-	251	-	83	478	478	-	-	-	324	-	-	-	34,576	61	-
2d.3.3	Small tool allowance	-	37	-	-	-	-	-	6	42	42	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,159	174	1,333	-	1,333	-	-	-	-	-	-	-	-	-
2d.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	975	-	975	-	975	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	31	37	185	215	1,112	514	2,135	541	4,770	2,462	2,308	-	6,000	1,050	-	-	-	349,977	246	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	59	-	-	-	-	-	-	15	73	73	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	378	38	416	416	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	2,004	200	2,204	2,204	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	575	-	-	-	-	-	144	719	719	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	2,007	-	-	-	-	-	301	2,308	2,308	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	16	7	-	68	-	20	111	111	-	-	-	830	-	-	-	16,609	27	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	506	76	582	582	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	439	44	483	483	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	58	6	64	-	64	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	929	139	1,068	1,068	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	332	50	381	381	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	44	7	50	-	50	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	49	7	56	56	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	875	131	1,006	1,006	-	-	-	-	-	-	-	-	-	-

Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2d Period-Dependent Costs (continued)																					
2d.4.15	Security Staff Cost	-	-	-	-	-	-	5,782	867	6,649	4,694	1,955	-	-	-	-	-	-	-	-	84,454
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	6,401	960	7,361	7,361	-	-	-	-	-	-	-	-	-	70,243
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	8,100	1,215	9,315	8,858	456	-	-	-	-	-	-	-	-	126,681
2d.4	Subtotal Period 2d Period-Dependent Costs	59	2,582	16	7	-	68	25,896	4,220	32,848	30,323	2,525	-	-	830	-	-	-	16,609	27	281,377
2d.0	TOTAL PERIOD 2d COST	740	4,608	340	360	2,673	1,763	29,067	6,458	46,008	41,175	4,834	-	15,325	5,377	-	-	-	968,427	27,910	287,617
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	603	90	693	-	693	-	-	-	-	-	-	-	-	-
2f.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	934	-	934	-	934	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	2,801	280	3,081	1,454	1,628	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	362	36	398	398	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,771	177	1,948	1,948	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	501	-	-	-	-	-	125	626	626	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	3	-	28	-	8	45	45	-	-	-	334	-	-	-	6,685	11	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	422	42	465	465	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	42	6	48	-	48	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	5,538	831	6,369	4,497	1,873	-	-	-	-	-	-	-	-	80,898
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	4,011	602	4,613	4,175	438	-	-	-	-	-	-	-	-	59,507
2f.4	Subtotal Period 2f Period-Dependent Costs	-	501	7	3	-	28	17,620	2,646	20,803	18,384	2,420	-	-	334	-	-	-	6,685	11	186,687
2f.0	TOTAL PERIOD 2f COST	-	501	7	3	-	28	23,786	3,935	28,259	24,212	4,048	-	-	334	-	-	-	6,685	40,542	189,807
PERIOD 2 TOTALS		5,134	58,338	20,860	7,153	22,473	41,926	286,430	85,282	527,597	429,593	92,428	5,576	138,734	144,239	237	673	-	13,198,890	527,156	1,927,726
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor	-	4,644	-	-	-	-	-	697	5,341	-	-	5,341	-	-	-	-	-	-	44,669	-
3b.1.1.2	Condensate Storage Tank Foundation	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	16	-
3b.1.1.3	Structures below 3' below grade	-	1,651	-	-	-	-	-	248	1,899	-	-	1,899	-	-	-	-	-	-	8,411	-
3b.1.1.4	Turbine	-	2,139	-	-	-	-	-	321	2,460	-	-	2,460	-	-	-	-	-	-	21,985	-
3b.1.1.5	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
3b.1.1	Totals	-	8,803	-	-	-	-	-	1,320	10,123	-	-	10,123	-	-	-	-	-	-	76,939	-
Site Closeout Activities																					
3b.1.2	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
3b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	9,251	-	-	-	-	200	1,418	10,869	231	-	10,639	-	-	-	-	-	-	77,859	1,560
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	2,242	-	-	-	-	5	337	2,583	-	-	2,583	-	-	-	-	-	-	8,386	-
3b.2.2	Intake Structure Cofferdam	-	623	-	-	-	-	-	93	716	-	-	716	-	-	-	-	-	-	5,168	-
3b.2.3	Construction Debris	-	-	-	-	-	-	10	2	12	-	-	12	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	3,011	-	-	-	-	-	452	3,462	-	-	3,462	-	-	-	-	-	-	2,904	-

Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
3b.2	Subtotal Period 3b Additional Costs	-	5,875	-	-	-	-	15	883	6,773	-	-	6,773	-	-	-	-	-	-	16,458	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	120	-	-	-	-	-	18	138	-	-	138	-	-	-	-	-	-	-	-
3b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,636	245	1,882	-	1,882	-	-	-	-	-	-	-	-	-
3b.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,649	-	2,649	-	2,649	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	120	-	-	-	-	4,285	263	4,669	-	4,531	138	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	513	51	565	565	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	4,167	417	4,583	-	4,583	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	395	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	218	22	239	-	239	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	157	16	173	-	173	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	397	781	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	119	18	136	-	136	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	361	54	416	153	263	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	4,616	692	5,308	-	5,308	-	-	-	-	-	-	-	-	57,340
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,004	751	5,755	-	1,237	4,517	-	-	-	-	-	-	-	74,431
3b.4	Subtotal Period 3b Period-Dependent Costs	-	7,144	-	-	-	-	27,444	4,935	39,523	1,114	13,117	25,292	-	-	-	-	-	-	-	248,656
3b.0	TOTAL PERIOD 3b COST	-	22,390	-	-	-	-	31,944	7,500	61,834	1,345	17,647	42,842	-	-	-	-	-	-	94,317	250,216
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	13,208	1,981	15,189	-	15,189	-	-	-	-	-	-	-	-	-
3c.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	40,613	-	40,613	-	40,613	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	53,820	1,981	55,801	-	55,801	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	7,872	787	8,659	-	8,659	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	45,095	4,509	49,604	-	49,604	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	5,076	508	5,583	-	5,583	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	2,410	241	2,651	-	2,651	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	5,298	795	6,092	-	6,092	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	1,820	273	2,092	-	2,092	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	2,033	305	2,338	-	2,338	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	70,770	10,615	81,385	-	81,385	-	-	-	-	-	-	-	-	879,133
3c.4.10	Utility Staff Cost	-	-	-	-	-	-	16,510	2,477	18,987	-	18,987	-	-	-	-	-	-	-	-	228,237
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	156,883	20,510	177,392	-	177,392	-	-	-	-	-	-	-	-	1,107,370
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	210,703	22,491	233,194	-	233,194	-	-	-	-	-	-	-	-	1,107,370
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	-	1,773	344,823	-	-
3d.1.1	Totals	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	-	1,773	344,823	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	-	1,773	344,823	-	-
Period 3d Collateral Costs																					
3d.3.1	Prairie Island Indian Community Payments	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	9	1	10	10	-	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	53	5	58	58	-	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	4	0	4	-	4	-	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	3	0	3	-	3	-	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-	-

Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3d Period-Dependent Costs (continued)																					
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	2	0	3	3	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	83	13	96	96	-	-	-	-	-	-	-	-	-	1,037
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	269
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	181	24	204	197	7	-	-	-	-	-	-	-	-	1,306
3d.0	TOTAL PERIOD 3d COST	-	-	1,444	-	-	8,680	229	1,687	12,039	11,984	55	-	-	-	-	-	1,773	344,823	-	1,306
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	24	81	435	-	2,532	839	978	4,890	4,890	-	-	-	9,355	-	-	-	1,123,457	3,762	1,065
3e.2	Subtotal Period 3e Additional Costs	-	24	81	435	-	2,532	839	978	4,890	4,890	-	-	-	9,355	-	-	-	1,123,457	3,762	1,065
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	93	23	116	116	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	56	14	69	69	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	11	3	13	13	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	54	14	68	68	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	21	5	26	26	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	174	43	217	217	-	-	-	-	-	-	-	-	-	2,500
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	129	32	161	161	-	-	-	-	-	-	-	-	-	1,896
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	536	134	670	670	-	-	-	-	-	-	-	-	-	4,396
3e.0	TOTAL PERIOD 3e COST	-	24	81	435	-	2,532	1,375	1,112	5,560	5,560	-	-	-	9,355	-	-	-	1,123,457	3,762	5,460
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	515	-	-	-	-	68	87	670	-	-	670	-	-	-	-	-	-	2,219	80
3f.2	Subtotal Period 3f Additional Costs	-	515	-	-	-	-	68	87	670	-	-	670	-	-	-	-	-	-	2,219	80
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	28	3	31	-	-	31	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	59	-	-	-	-	-	9	68	-	-	68	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	6	-	-	6	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	28	4	32	-	-	32	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	11	2	12	-	-	12	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	89	13	102	-	-	102	-	-	-	-	-	-	-	1,281
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	55	8	63	-	-	63	-	-	-	-	-	-	-	795
3f.4	Subtotal Period 3f Period-Dependent Costs	-	59	-	-	-	-	216	40	315	-	-	315	-	-	-	-	-	-	-	2,076
3f.0	TOTAL PERIOD 3f COST	-	577	-	-	-	-	284	128	989	-	-	989	-	-	-	-	-	-	2,219	2,156
PERIOD 3 TOTALS		-	22,992	1,525	435	-	11,212	244,535	32,917	313,616	18,889	250,896	43,831	-	9,355	-	-	1,773	1,468,280	100,298	1,366,508
TOTAL COST TO DECOMMISSION		8,929	87,309	22,838	8,068	22,651	58,542	649,313	139,103	996,753	595,962	349,793	50,998	144,866	167,555	826	673	1,773	15,277,230	672,967	4,294,963

Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			

TOTAL COST TO DECOMMISSION WITH 16.22% CONTINGENCY:	**$996,753**	**thousands of 2020 dollars**	
TOTAL NRC LICENSE TERMINATION COST IS 59.79% OR:	**$595,962**	**thousands of 2020 dollars**	
SPENT FUEL MANAGEMENT COST IS 35.09% OR:	**$349,793**	**thousands of 2020 dollars**	
NON-NUCLEAR DEMOLITION COST IS 5.12% OR:	**$50,998**	**thousands of 2020 dollars**	
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**169,054**	**Cubic Feet**	
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**	
TOTAL SCRAP METAL REMOVED:	**32,925**	**Tons**	
TOTAL CRAFT LABOR REQUIREMENTS:	**672,967**	**Man-hours**	

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.10	End product description	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.12	Define major work sequence	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
1a.1.13	Perform SER and EA	-	-	-	-	-	-	170	26	196	196	-	-	-	-	-	-	-	-	-	1,326
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	275	41	316	316	-	-	-	-	-	-	-	-	-	2,138
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	270	41	311	280	-	31	-	-	-	-	-	-	-	2,104
1a.1.17.2	Plant systems	-	-	-	-	-	-	229	34	263	237	-	26	-	-	-	-	-	-	-	1,782
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	27	4	32	32	-	-	-	-	-	-	-	-	-	214
1a.1.17.4	Reactor internals	-	-	-	-	-	-	390	59	449	449	-	-	-	-	-	-	-	-	-	3,036
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	357	54	411	411	-	-	-	-	-	-	-	-	-	2,779
1a.1.17.6	Biological shield	-	-	-	-	-	-	27	4	32	32	-	-	-	-	-	-	-	-	-	214
1a.1.17.7	Steam generators	-	-	-	-	-	-	171	26	197	197	-	-	-	-	-	-	-	-	-	1,334
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	88	13	101	51	-	51	-	-	-	-	-	-	-	684
1a.1.17.9	Main Turbine	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
1a.1.17.10	Main Condensers	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
1a.1.17.11	Plant structures & buildings	-	-	-	-	-	-	171	26	197	99	-	99	-	-	-	-	-	-	-	1,334
1a.1.17.12	Waste management	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
1a.1.17.13	Facility & site closeout	-	-	-	-	-	-	49	7	57	28	-	28	-	-	-	-	-	-	-	385
1a.1.17	Total	-	-	-	-	-	-	2,079	312	2,391	2,105	-	286	-	-	-	-	-	-	-	16,175
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	132	20	152	152	-	-	-	-	-	-	-	-	-	1,026
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	77	12	88	88	-	-	-	-	-	-	-	-	-	599
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	68	10	78	78	-	-	-	-	-	-	-	-	-	526
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	10,195	1,529	11,724	11,439	-	286	-	-	-	-	-	-	-	33,420
Period 1a Additional Costs																					
1a.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
1a.2	Subtotal Period 1a Additional Costs	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,330	199	1,529	-	1,529	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	8,394	1,259	9,653	9,653	-	-	-	-	-	-	-	-	-	-
1a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	10,973	1,459	12,432	9,653	2,779	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	578	-	-	-	-	-	144	722	722	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	11	5	-	47	-	13	76	76	-	-	-	565	-	-	-	11,299	18	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	638	64	702	702	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-

Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1a Period-Dependent Costs (continued)																					
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	21,681	3,252	24,933	24,933	-	-	-	-	-	-	-	-	-	345,280
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,331	11	5	-	47	41,706	6,122	49,221	46,279	2,942	-	-	565	-	-	-	11,299	18	468,000
1a.0	TOTAL PERIOD 1a COST	-	1,331	11	5	-	47	71,324	10,377	83,095	77,089	5,720	286	-	565	-	-	-	11,299	18	501,420
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	260	39	299	269	-	30	-	-	-	-	-	-	-	2,024
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.3	Reactor internals	-	-	-	-	-	-	137	21	158	158	-	-	-	-	-	-	-	-	-	1,069
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	74	11	85	21	-	64	-	-	-	-	-	-	-	577
1b.1.1.5	CRD cooling assembly	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.6	CRD housings & ICI tubes	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.7	Incore instrumentation	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	199	30	229	229	-	-	-	-	-	-	-	-	-	1,552
1b.1.1.9	Facility closeout	-	-	-	-	-	-	66	10	76	38	-	38	-	-	-	-	-	-	-	513
1b.1.1.10	Missile shields	-	-	-	-	-	-	25	4	28	28	-	-	-	-	-	-	-	-	-	192
1b.1.1.11	Biological shield	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	513
1b.1.1.12	Steam generators	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
1b.1.1.13	Reinforced concrete	-	-	-	-	-	-	55	8	63	32	-	32	-	-	-	-	-	-	-	428
1b.1.1.14	Main Turbine	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
1b.1.1.15	Main Condensers	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
1b.1.1.16	Auxiliary building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
1b.1.1.17	Reactor building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
1b.1.1	Total	-	-	-	-	-	-	1,827	274	2,101	1,706	-	395	-	-	-	-	-	-	-	14,215
1b.1.2	Decon primary loop	572	-	-	-	-	-	-	286	859	859	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	572	-	-	-	-	-	1,827	560	2,959	2,564	-	395	-	-	-	-	-	-	1,067	14,215
Period 1b Additional Costs																					
1b.2.1	Site Characterization	-	-	-	-	-	-	1,505	451	1,956	1,956	-	-	-	-	-	-	-	-	8,988	3,563
1b.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
1b.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
1b.2	Subtotal Period 1b Additional Costs	-	2,526	356	244	178	1,369	1,505	1,524	7,702	7,702	-	-	6,132	12,843	-	-	-	518,936	32,243	3,563
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	25	-	16	29	-	66	-	35	172	172	-	-	-	152	-	-	-	9,127	30	-
1b.3.4	Process decommissioning chemical flush waste	2	-	61	199	-	3,889	-	1,009	5,159	5,159	-	-	-	-	588	-	-	62,689	110	-
1b.3.5	Small tool allowance	-	36	-	-	-	-	-	5	42	42	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	399	60	459	-	459	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	4,017	603	4,620	4,620	-	-	-	-	-	-	-	-	-	-
1b.3.10	Prairie Island Indian Community Payments	-	-	-	-	-	-	623	-	623	-	623	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,185	1,236	77	228	-	3,955	6,303	2,555	17,540	16,458	1,082	-	-	152	588	-	-	71,815	140	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	828	83	910	910	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,713	171	1,884	1,884	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	449	-	-	-	-	-	112	561	561	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	6	3	-	27	-	8	43	43	-	-	-	324	-	-	-	6,473	11	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,617	243	1,859	1,859	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	196	20	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,084	108	1,193	-	1,193	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-

Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 1b Period-Dependent Costs (continued)																					
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	4,153	623	4,775	4,775	-	-	-	-	-	-	-	-	-	61,192
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	4,182	627	4,810	4,810	-	-	-	-	-	-	-	-	-	46,672
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	10,811	1,622	12,432	12,432	-	-	-	-	-	-	-	-	-	172,167
1b.4	Subtotal Period 1b Period-Dependent Costs	38	825	6	3	-	27	25,571	3,830	30,299	28,832	1,467	-	-	324	-	-	-	6,473	11	280,031
1b.0	TOTAL PERIOD 1b COST	3,795	4,586	440	475	178	5,351	35,206	8,470	58,501	55,557	2,549	395	6,132	13,319	588	-	-	597,225	33,460	297,808
PERIOD 1 TOTALS		3,795	5,917	451	479	178	5,398	106,531	18,847	141,595	132,646	8,269	681	6,132	13,884	588	-	-	608,524	33,478	799,228
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Reactor Coolant Piping	54	47	10	18	-	187	-	89	406	406	-	-	-	508	-	-	-	35,411	1,421	-
2a.1.1.2	Pressurizer Relief Tank	24	21	6	12	-	125	-	51	238	238	-	-	-	338	-	-	-	23,594	630	-
2a.1.1.3	Reactor Coolant Pumps & Motors	57	68	110	93	-	463	-	186	977	977	-	-	-	2,332	-	-	-	295,800	2,049	100
2a.1.1.4	Pressurizer	-	77	503	97	-	776	-	278	1,732	1,732	-	-	-	2,196	-	-	-	185,015	1,666	938
2a.1.1.5	Steam Generators	-	3,307	2,269	1,770	2,409	4,001	-	2,681	16,437	16,437	-	-	18,672	11,316	-	-	-	1,689,435	11,613	2,875
2a.1.1.6	CRDMs/ICIs/Service Structure Removal	302	281	218	66	-	938	-	488	2,294	2,294	-	-	-	4,797	-	-	-	177,400	8,104	-
2a.1.1.7	Reactor Vessel Internals	82	4,861	13,621	929	-	9,015	307	11,878	40,693	40,693	-	-	-	501	125	673	-	164,987	25,123	1,163
2a.1.1.8	Reactor Vessel	94	6,046	2,028	728	-	2,975	307	6,804	18,982	18,982	-	-	-	8,073	-	-	-	576,524	25,123	1,163
2a.1.1	Totals	613	14,709	18,764	3,714	2,409	18,480	614	22,455	81,759	81,759	-	-	18,672	30,062	125	673	-	3,148,166	75,729	6,240
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	331	172	64	527	377	-	283	1,752	1,752	-	-	2,131	1,187	-	-	-	203,265	4,667	-
2a.1.3	Main Condensers	-	2,801	109	62	705	533	-	960	5,170	5,170	-	-	3,800	1,587	-	-	-	271,824	39,151	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
2a.1.4.2	Auxiliary	-	221	-	-	-	-	-	33	254	254	-	-	-	-	-	-	-	-	1,309	-
2a.1.4.3	Radwaste	-	9	-	-	-	-	-	1	10	10	-	-	-	-	-	-	-	-	65	-
2a.1.4	Totals	-	1,023	-	-	-	-	-	154	1,177	1,177	-	-	-	-	-	-	-	-	8,963	-
Disposal of Plant Systems																					
2a.1.5.1	Admin Bldg Ventilation	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	90	-
2a.1.5.2	Air Removal	-	29	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	422	-
2a.1.5.3	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	676	-
2a.1.5.4	Auxiliary Feedwater - RCA	-	38	0	1	30	-	-	14	84	84	-	-	178	-	-	-	-	7,214	486	-
2a.1.5.5	Bleed Steam	-	90	-	-	-	-	-	13	103	-	-	103	-	-	-	-	-	-	1,331	-
2a.1.5.6	Caustic Addition - RCA	-	40	0	2	40	-	-	16	99	99	-	-	240	-	-	-	-	9,761	468	-
2a.1.5.7	Chemical Feed	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	261	-
2a.1.5.8	Chemical Feed - RCA	-	3	0	0	3	-	-	1	7	7	-	-	16	-	-	-	-	634	31	-
2a.1.5.9	Circulating Water	-	27	-	-	-	-	-	4	32	-	-	32	-	-	-	-	-	-	401	-
2a.1.5.10	Condensate	-	525	-	-	-	-	-	79	603	-	-	603	-	-	-	-	-	-	7,537	-
2a.1.5.11	Condensate Polishing	-	208	-	-	-	-	-	31	239	-	-	239	-	-	-	-	-	-	2,987	-
2a.1.5.12	Condensate Polishing - RCA	-	38	1	4	81	-	-	22	145	145	-	-	483	-	-	-	-	19,616	493	-
2a.1.5.13	Electro-Hydraulic	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	143	-
2a.1.5.14	External Circulating Water	-	26	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	385	-
2a.1.5.15	External Circulating Water - RCA	-	72	1	5	121	-	-	37	237	237	-	-	721	-	-	-	-	29,284	938	-
2a.1.5.16	Feedwater	-	127	-	-	-	-	-	19	146	-	-	146	-	-	-	-	-	-	1,840	-
2a.1.5.17	Feedwater - RCA	-	248	8	31	694	-	-	171	1,152	1,152	-	-	4,147	-	-	-	-	168,414	3,377	-
2a.1.5.18	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	504	-
2a.1.5.19	Heater Drain	-	384	-	-	-	-	-	58	441	-	-	441	-	-	-	-	-	-	5,638	-
2a.1.5.20	Hypobromous Acid Feed	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	86	-
2a.1.5.21	Hypobromous Acid Feed - RCA	-	1	0	0	0	-	-	0	2	2	-	-	2	-	-	-	-	100	12	-
2a.1.5.22	Internal Circ Water & CDSR	-	25	-	-	-	-	-	4	29	-	-	29	-	-	-	-	-	-	366	-
2a.1.5.23	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
2a.1.5.24	Main Steam	-	101	-	-	-	-	-	15	116	-	-	116	-	-	-	-	-	-	1,482	-
2a.1.5.25	Main Steam - RCA	-	380	11	38	864	-	-	231	1,525	1,525	-	-	5,166	-	-	-	-	209,799	5,146	-
2a.1.5.26	Repairable Spare Snubbers	-	6	0	0	2	-	-	2	10	10	-	-	12	-	-	-	-	490	82	-
2a.1.5.27	Steam Exclusion	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	32	-
2a.1.5.28	Steam Exclusion - RCA	-	4	0	0	4	-	-	2	10	10	-	-	24	-	-	-	-	966	47	-
2a.1.5.29	Steam Generator Blowdown	-	416	21	27	319	215	-	212	1,210	1,210	-	-	1,906	631	-	-	-	118,130	5,778	-
2a.1.5.30	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
2a.1.5.31	Turbine & Moisture Separators	-	377	-	-	-	-	-	57	434	-	-	434	-	-	-	-	-	-	5,472	-

Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2a.1.5.32	Turbine Oil Purification	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	757	-
2a.1.5.33	Water Treatment	-	453	-	-	-	-	-	68	521	-	-	521	-	-	-	-	-	-	6,677	-
2a.1.5.34	Water Treatment - RCA	-	20	0	1	19	-	-	8	49	49	-	-	115	-	-	-	-	4,652	252	-
2a.1.5	Totals	-	3,817	43	108	2,177	215	-	1,100	7,461	4,528	-	2,933	13,010	631	-	-	-	569,060	54,280	-
2a.1.6	Scaffolding in support of decommissioning	-	3,020	22	10	188	30	-	794	4,064	4,064	-	-	1,012	89	-	-	-	51,216	26,270	-
2a.1	Subtotal Period 2a Activity Costs	613	25,702	19,110	3,959	6,005	19,635	614	25,745	101,384	98,450	-	2,933	38,625	33,556	125	673	-	4,243,531	209,060	6,240
Period 2a Additional Costs																					
2a.2.1	Retired RPV Upper Internals Package	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
2a.2	Subtotal Period 2a Additional Costs	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	49	-	33	60	-	134	-	70	347	347	-	-	-	308	-	-	-	18,487	60	-
2a.3.3	Small tool allowance	-	269	-	-	-	-	-	40	309	278	-	31	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	8,862	1,329	10,192	-	10,192	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	8,215	1,232	9,447	9,447	-	-	-	-	-	-	-	-	-	-
2a.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,780	-	1,780	-	1,780	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	49	269	33	60	-	134	18,857	2,672	22,074	10,072	11,971	31	-	308	-	-	-	18,487	60	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	107	-	-	-	-	-	-	27	134	134	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	690	69	759	759	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	4,548	455	5,002	5,002	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,103	-	-	-	-	-	526	2,629	2,629	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,565	-	-	-	-	-	535	4,100	4,100	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	86	35	-	358	-	103	582	582	-	-	-	4,345	-	-	-	86,891	142	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,194	329	2,523	2,523	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	526	53	578	578	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,647	265	2,912	-	2,912	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	1,695	254	1,949	1,949	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	602	90	692	-	692	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	80	12	92	-	92	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	318	48	366	366	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,596	239	1,835	1,835	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	10,900	1,635	12,534	12,534	-	-	-	-	-	-	-	-	-	160,018
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	20,663	3,099	23,763	23,763	-	-	-	-	-	-	-	-	-	225,210
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	27,056	4,058	31,115	31,115	-	-	-	-	-	-	-	-	-	419,049
2a.4	Subtotal Period 2a Period-Dependent Costs	107	5,668	86	35	-	358	73,514	11,797	91,565	87,870	3,696	-	-	4,345	-	-	-	86,891	142	804,276
2a.0	TOTAL PERIOD 2a COST	770	31,895	19,616	4,270	6,005	21,522	92,985	41,255	218,319	199,687	15,667	2,964	38,625	38,584	237	673	-	4,399,073	212,595	810,649
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	ADT & Misc Ventilation	-	25	1	1	26	3	-	11	66	66	-	-	153	9	-	-	-	6,803	363	-
2b.1.1.2	Aux Bldg Normal Ventilation	-	69	2	6	116	13	-	39	246	246	-	-	692	39	-	-	-	30,595	1,013	-
2b.1.1.3	Aux Bldg Special Ventilation	-	14	0	1	12	2	-	6	34	34	-	-	70	6	-	-	-	3,234	197	-
2b.1.1.4	Battery Rm Special Ventilation	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	24	-
2b.1.1.5	Boron Recycle	0	4	0	0	0	3	-	2	10	10	-	-	3	9	-	-	-	700	50	-
2b.1.1.6	Chemical & Volume Control	749	942	62	57	394	677	-	853	3,736	3,736	-	-	2,356	1,977	-	-	-	223,753	23,197	-
2b.1.1.7	Cold Chemical Lab Ventilation	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
2b.1.1.8	Component Cooling - RCA	-	647	25	88	2,007	-	-	479	3,246	3,246	-	-	11,996	-	-	-	-	487,169	8,583	-
2b.1.1.9	Containment Cooling	-	35	-	-	-	-	-	5	40	-	-	40	-	-	-	-	-	-	502	-
2b.1.1.10	Containment Cooling - RCA	-	302	6	20	459	-	-	148	934	934	-	-	2,743	-	-	-	-	111,390	3,949	-
2b.1.1.11	Containment Hydrogen Control - RCA	-	36	0	1	24	-	-	13	74	74	-	-	141	-	-	-	-	5,742	494	-
2b.1.1.12	Containment Spray - RCA	-	194	3	11	243	-	-	87	538	538	-	-	1,453	-	-	-	-	59,019	2,617	-
2b.1.1.13	Containment Ventilation	-	235	23	49	790	243	-	248	1,587	1,587	-	-	4,721	722	-	-	-	237,643	3,375	-
2b.1.1.14	Control/Relay/Cmptr Rm Vent	-	31	1	2	44	7	-	17	102	102	-	-	260	20	-	-	-	11,878	454	-
2b.1.1.15	Cooling Water	-	159	-	-	-	-	-	24	183	-	-	183	-	-	-	-	-	-	2,344	-
2b.1.1.16	Cooling Water - RCA	-	476	17	62	1,412	-	-	342	2,310	2,310	-	-	8,442	-	-	-	-	342,822	6,311	-
2b.1.1.17	Cranes/Hoists/Elevators - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2b.1.1.18	D3 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-
2b.1.1.19	D4 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-

Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
2b.1.1.20	D5 Emergency Diesel	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
2b.1.1.21	Electrical - Clean	-	1,714	-	-	-	-	-	257	1,972	-	-	1,972	-	-	-	-	-	-	24,276	-
2b.1.1.22	Electrical - Contaminated	-	475	5	16	334	25	-	178	1,034	1,034	-	-	1,997	75	-	-	-	85,887	6,503	-
2b.1.1.23	Electrical - Decontaminated	-	2,955	38	138	3,138	-	-	1,234	7,503	7,503	-	-	18,753	-	-	-	-	761,569	38,423	-
2b.1.1.24	Filter Rm Ventilation	-	5	0	0	4	0	-	2	11	11	-	-	24	1	-	-	-	1,017	69	-
2b.1.1.25	Fire Protection & Detection	-	204	-	-	-	-	-	31	235	-	-	235	-	-	-	-	-	-	3,009	-
2b.1.1.26	Fire Protection & Detection - RCA	-	246	4	13	306	-	-	110	679	679	-	-	1,828	-	-	-	-	74,245	3,134	-
2b.1.1.27	Fuel Handling	-	74	1	2	34	17	-	28	156	156	-	-	200	49	-	-	-	11,273	1,101	-
2b.1.1.28	Fuel Oil	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
2b.1.1.29	HVAC - Clean	-	151	-	-	-	-	-	23	174	-	-	174	-	-	-	-	-	-	2,373	-
2b.1.1.30	HVAC - Contaminated	-	1,231	29	87	1,798	136	-	627	3,908	3,908	-	-	10,745	405	-	-	-	462,103	16,579	-
2b.1.1.31	Heating	-	322	-	-	-	-	-	48	370	-	-	370	-	-	-	-	-	-	4,804	-
2b.1.1.32	Heating - RCA	-	337	4	14	319	-	-	135	809	809	-	-	1,907	-	-	-	-	77,458	4,086	-
2b.1.1.33	Hot Lab & Sample Rm Ventilation	-	20	0	1	18	1	-	8	48	48	-	-	107	4	-	-	-	4,622	285	-
2b.1.1.34	Incore Instrumentation	0	30	1	2	10	20	-	14	77	77	-	-	60	58	-	-	-	6,143	458	-
2b.1.1.35	Misc Drains & Vents	-	234	12	12	77	145	-	109	590	590	-	-	458	426	-	-	-	46,079	3,180	-
2b.1.1.36	Misc Lab & Service Areas Vent	-	129	8	8	62	84	-	65	356	356	-	-	370	244	-	-	-	30,899	1,713	-
2b.1.1.37	Miscellaneous Gas	-	72	-	-	-	-	-	11	83	-	-	83	-	-	-	-	-	-	1,073	-
2b.1.1.38	Miscellaneous Gas - RCA	-	134	1	4	100	-	-	49	289	289	-	-	600	-	-	-	-	24,378	1,636	-
2b.1.1.39	Radiation Monitoring	-	7	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	111	-
2b.1.1.40	Radiation Monitoring - RCA	-	65	1	2	53	-	-	25	145	145	-	-	316	-	-	-	-	12,826	782	-
2b.1.1.41	Reactor Coolant	163	236	20	16	38	249	-	213	937	937	-	-	229	730	-	-	-	56,440	5,517	-
2b.1.1.42	Reactor Hot Sampling	140	126	11	7	9	108	-	132	533	533	-	-	54	312	-	-	-	22,678	3,686	-
2b.1.1.43	Reactor Makeup	-	41	-	-	-	-	-	6	47	-	-	47	-	-	-	-	-	-	583	-
2b.1.1.44	Reactor Makeup - RCA	-	4	0	0	5	-	-	2	11	11	-	-	28	-	-	-	-	1,148	47	-
2b.1.1.45	Reactor Vessel	9	18	1	0	4	5	-	11	47	47	-	-	22	14	-	-	-	1,816	385	-
2b.1.1.46	Residual Heat Removal	348	393	84	86	477	1,102	-	641	3,132	3,132	-	-	2,853	3,244	-	-	-	324,232	7,112	-
2b.1.1.47	Safeguards Chilled Water	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
2b.1.1.48	Safety Injection	-	874	42	72	1,117	395	-	500	3,000	3,000	-	-	6,676	1,161	-	-	-	345,708	12,284	-
2b.1.1.49	Sampling	-	52	3	2	6	32	-	23	119	119	-	-	37	93	-	-	-	7,628	714	-
2b.1.1.50	Service Bldg & New Cmptr Vent	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	6	-
2b.1.1.51	Shield Bldg Ventilation	-	120	13	25	339	163	-	127	787	787	-	-	2,028	484	-	-	-	113,139	1,743	-
2b.1.1.52	Station & Instrument Air	-	161	-	-	-	-	-	24	185	-	-	185	-	-	-	-	-	-	2,424	-
2b.1.1.53	Station & Instrument Air - RCA	-	299	3	12	272	-	-	118	704	704	-	-	1,625	-	-	-	-	65,986	3,638	-
2b.1.1.54	Turbine Bldg Traps & Drains	-	30	-	-	-	-	-	5	35	-	-	35	-	-	-	-	-	-	462	-
2b.1.1.55	Turbine Bldg Traps & Drains - RCA	-	30	0	1	30	-	-	12	73	73	-	-	180	-	-	-	-	7,321	344	-
2b.1.1.56	Turbine Bldg Ventilation	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	655	-
2b.1.1.57	Unit Coolers	-	23	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	332	-
2b.1.1.58	Unit Coolers - RCA	-	56	0	2	39	-	-	20	117	117	-	-	232	-	-	-	-	9,413	690	-
2b.1.1.59	Waste Gas Disposal	553	479	43	45	410	464	-	585	2,581	2,581	-	-	2,453	1,358	-	-	-	187,339	14,308	-
2b.1.1.60	Waste Liquid Disposal	1,436	1,800	116	100	612	1,234	-	1,595	6,893	6,893	-	-	3,655	3,594	-	-	-	381,754	44,485	-
2b.1.1.61	Waste Solid Disposal	115	145	12	11	65	134	-	140	622	622	-	-	389	393	-	-	-	41,177	3,481	-
2b.1.1	Totals	3,515	16,542	596	980	15,220	5,264	-	9,399	51,516	48,072	-	3,444	90,963	15,429	-	-	-	4,689,210	270,390	-
2b.1.2	Scaffolding in support of decommissioning	-	3,775	27	13	235	37	-	993	5,081	5,081	-	-	1,265	112	-	-	-	64,020	32,837	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor	1,215	2,808	240	1,236	373	13,625	-	4,981	24,479	24,479	-	-	2,230	83,434	-	-	-	3,633,771	50,962	-
2b.1.3.2	Auxiliary	1,292	422	23	117	177	648	-	960	3,639	3,639	-	-	1,060	6,118	-	-	-	332,495	23,821	-
2b.1.3.3	Backwash Waste Receiving Tank	-	28	3	17	-	97	-	34	179	179	-	-	-	929	-	-	-	43,896	301	-
2b.1.3.4	Drum Transfer & Truck Loading Enclosure	18	9	1	3	3	14	-	16	63	63	-	-	19	135	-	-	-	7,118	369	-
2b.1.3.5	LLRW Storage Enclosure	123	54	3	17	6	96	-	103	403	403	-	-	38	920	-	-	-	44,971	2,426	-
2b.1.3.6	Radwaste	55	24	1	8	7	43	-	47	185	185	-	-	42	412	-	-	-	21,136	1,083	-
2b.1.3.7	Resin Disposal	16	12	1	3	14	14	-	17	76	76	-	-	83	124	-	-	-	9,271	383	-
2b.1.3	Totals	2,720	3,357	271	1,400	581	14,537	-	6,158	29,024	29,024	-	-	3,471	92,071	-	-	-	4,092,658	79,343	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	225	34	259	259	-	-	-	-	-	-	-	-	-	1,751
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	6,235	23,674	895	2,393	16,035	19,839	225	16,584	85,879	82,435	-	3,444	95,700	107,611	-	-	-	8,845,887	382,570	1,751
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
2b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
2b.2.3	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,175	11	36	606	-	4,573	1,077	7,478	7,478	-	-	5,880	-	-	-	-	147,000	7,427	-

Table C-2
Prairie Island DECON Unit 2
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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	166	-	113	203	-	456	-	239	1,176	1,176	-	-	-	1,047	-	-	-	62,844	204	-
2b.3.2	Process decommissioning chemical flush waste	3	-	119	390	-	893	-	295	1,699	1,699	-	-	-	1,154	-	-	-	122,948	216	-
2b.3.3	Small tool allowance	-	446	-	-	-	-	-	67	513	513	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	49,770	7,465	57,235	-	57,235	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	2,839	426	3,265	3,265	-	-	-	-	-	-	-	-	-	-
2b.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,348	-	1,348	-	1,348	-	-	-	-	-	-	-	-	-
2b.3.7	On-site survey and release of 0.437 tons clean metallic waste	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	169	446	232	592	-	1,349	53,958	8,492	65,237	6,654	58,583	-	-	2,201	-	-	-	185,792	420	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,219	-	-	-	-	-	-	305	1,524	1,524	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	523	52	575	575	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	3,075	308	3,383	3,383	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,866	-	-	-	-	-	716	3,582	3,582	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,774	-	-	-	-	-	416	3,190	3,190	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	103	42	-	429	-	124	698	698	-	-	-	5,209	-	-	-	104,172	170	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,313	197	1,509	1,509	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	398	40	438	438	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,006	201	2,207	-	2,207	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	1,284	193	1,477	1,477	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	456	68	524	-	524	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	229	34	264	264	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	60	9	69	-	69	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	67	10	78	78	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,209	181	1,391	1,391	-	-	-	-	-	-	-	-	-	-
2b.4.16	Security Staff Cost	-	-	-	-	-	-	8,259	1,239	9,497	9,497	-	-	-	-	-	-	-	-	-	-
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	15,117	2,268	17,385	17,385	-	-	-	-	-	-	-	-	-	163,904
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	19,642	2,946	22,588	22,588	-	-	-	-	-	-	-	-	-	304,233
2b.4	Subtotal Period 2b Period-Dependent Costs	1,219	5,640	103	42	-	429	53,639	9,307	70,380	67,579	2,800	-	-	5,209	-	-	-	104,172	170	589,381
2b.0	TOTAL PERIOD 2b COST	7,623	30,935	1,242	3,063	16,641	21,617	112,395	35,460	228,975	164,147	61,384	3,444	101,580	115,021	-	-	-	9,282,851	390,587	591,132
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	347	35	86	41	-	703	-	373	1,585	1,585	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
2d.1.2.1	Electrical - Contaminated - Fuel Pool	-	203	2	7	145	11	-	77	445	445	-	-	864	33	-	-	-	37,167	2,783	-
2d.1.2.2	Electrical - Decontaminated - Fuel Pool	-	1,269	17	59	1,350	-	-	530	3,225	3,225	-	-	8,069	-	-	-	-	327,668	16,495	-
2d.1.2.3	Fire Protection & Detection - RCA Fuel P	-	37	1	2	48	-	-	17	105	105	-	-	286	-	-	-	-	11,622	476	-
2d.1.2.4	HVAC - Contaminated - Fuel Pool	-	553	13	39	808	61	-	282	1,756	1,756	-	-	4,828	182	-	-	-	207,612	7,448	-
2d.1.2.5	Safeguards Chilled Water - RCA	-	5	0	0	4	-	-	2	11	11	-	-	26	-	-	-	-	1,045	51	-
2d.1.2.6	Spent Fuel Pool Cooling	32	36	3	2	6	37	-	36	152	152	-	-	39	107	-	-	-	8,481	882	-
2d.1.2.7	Spent Fuel Pool Normal Ventilation	-	27	1	2	44	4	-	15	93	93	-	-	265	12	-	-	-	11,505	394	-
2d.1.2	Totals	32	2,130	36	112	2,405	113	-	958	5,786	5,786	-	-	14,376	333	-	-	-	605,100	28,530	-
Decontamination of Site Buildings																					
2d.1.3.1	Fuel Handling of Aux Building	1,029	1,138	13	45	404	195	-	916	3,741	3,741	-	-	2,417	1,652	-	-	-	177,755	30,404	-
2d.1.3	Totals	1,029	1,138	13	45	404	195	-	916	3,741	3,741	-	-	2,417	1,652	-	-	-	177,755	30,404	-
2d.1.4	Scaffolding in support of decommissioning	-	755	5	3	47	7	-	199	1,016	1,016	-	-	253	22	-	-	-	12,804	6,567	-
2d.1	Subtotal Period 2d Activity Costs	1,408	4,058	141	202	2,857	1,018	-	2,445	12,128	12,128	-	-	17,046	4,099	-	-	-	928,579	66,078	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	45	-	31	56	-	126	-	65	323	323	-	-	-	288	-	-	-	17,293	56	-
2d.3.2	Process decommissioning chemical flush waste	0	-	1	5	-	10	-	3	20	20	-	-	-	13	-	-	-	1,422	2	-
2d.3.3	Small tool allowance	-	83	-	-	-	-	-	12	95	95	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,159	174	1,333	-	1,333	-	-	-	-	-	-	-	-	-
2d.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	975	-	975	-	975	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	45	83	162	128	1,112	314	2,135	490	4,468	2,160	2,308	-	6,000	831	-	-	-	322,324	206	-

Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	236	-	-	-	-	-	-	59	295	295	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	378	38	416	416	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	2,004	200	2,204	2,204	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	794	-	-	-	-	-	198	992	992	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	2,007	-	-	-	-	-	301	2,308	2,308	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	40	16	-	165	-	48	268	268	-	-	-	2,002	-	-	-	40,031	65	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	506	76	582	582	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	277	28	305	305	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	58	6	64	-	64	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	929	139	1,068	1,068	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	332	50	381	381	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	44	7	50	-	50	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	49	7	56	56	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	875	131	1,006	1,006	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	5,782	867	6,649	4,694	1,955	-	-	-	-	-	-	-	-	84,454
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	6,401	960	7,361	7,361	-	-	-	-	-	-	-	-	-	70,243
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	8,100	1,215	9,315	8,858	456	-	-	-	-	-	-	-	-	126,681
2d.4	Subtotal Period 2d Period-Dependent Costs	236	2,801	40	16	-	165	25,734	4,330	33,321	30,796	2,525	-	-	2,002	-	-	-	40,031	65	281,377
2d.0	TOTAL PERIOD 2d COST	1,689	6,941	343	346	3,969	1,496	28,905	7,576	51,265	46,432	4,834	-	23,046	6,931	-	-	-	1,290,933	66,348	287,617
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	603	90	693	-	693	-	-	-	-	-	-	-	-	-
2f.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	934	-	934	-	934	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	2,801	280	3,081	1,454	1,628	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	362	36	398	398	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,771	177	1,948	1,948	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	710	-	-	-	-	-	178	888	888	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	3	-	28	-	8	45	45	-	-	-	334	-	-	-	6,685	11	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	263	26	290	290	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	42	6	48	-	48	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	5,538	831	6,369	4,497	1,873	-	-	-	-	-	-	-	-	80,898
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	4,011	602	4,613	4,175	438	-	-	-	-	-	-	-	-	59,507
2f.4	Subtotal Period 2f Period-Dependent Costs	-	710	7	3	-	28	17,461	2,682	20,890	18,470	2,420	-	-	334	-	-	-	6,685	11	186,687
2f.0	TOTAL PERIOD 2f COST	-	710	7	3	-	28	27,470	5,124	33,341	29,294	4,048	-	-	334	-	-	-	6,685	100,906	189,807
PERIOD 2 TOTALS		10,081	70,482	21,208	7,682	26,615	44,663	261,754	89,416	531,900	439,560	85,932	6,408	163,252	160,871	237	673	-	14,979,540	770,436	1,879,206

Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor	-	4,645	-	-	-	-	-	697	5,342	-	-	5,342	-	-	-	-	-	-	44,679	-
3b.1.1.2	Auxiliary	-	1,993	-	-	-	-	-	299	2,291	-	-	2,291	-	-	-	-	-	-	11,902	-
3b.1.1.3	Condensate Storage Tank Foundation	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	33	-
3b.1.1.4	Construction Warehouse & Fab Shop	-	130	-	-	-	-	-	19	149	-	-	149	-	-	-	-	-	-	1,405	-
3b.1.1.5	D3/D4 Emergency Generator	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	84	-
3b.1.1.6	Drum Transfer & Truck Loading Enclosure	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	221	-
3b.1.1.7	Hydrogen House	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	47	-
3b.1.1.8	LLRW Storage Enclosure	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	853	-
3b.1.1.9	Misc Structures 2017	-	2,617	-	-	-	-	-	393	3,009	-	-	3,009	-	-	-	-	-	-	22,582	-
3b.1.1.10	Radwaste	-	176	-	-	-	-	-	26	202	-	-	202	-	-	-	-	-	-	1,400	-
3b.1.1.11	Resin Disposal	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	120	-
3b.1.1.12	Structures below 3' below grade	-	1,785	-	-	-	-	-	268	2,052	-	-	2,052	-	-	-	-	-	-	9,238	-
3b.1.1.13	Sulfuric Acid Tank Enclosure	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	35	-
3b.1.1.14	Turbine	-	2,140	-	-	-	-	-	321	2,461	-	-	2,461	-	-	-	-	-	-	21,997	-
3b.1.1.15	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
3b.1.1.16	Warehouse #2	-	24	-	-	-	-	-	4	27	-	-	27	-	-	-	-	-	-	213	-
3b.1.1.17	Waste Neutralizing Tank House	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	56	-
3b.1.1.18	Waste Oil Storage	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	70	-
3b.1.1.19	Water Treatment	-	324	-	-	-	-	-	49	373	-	-	373	-	-	-	-	-	-	2,690	-
3b.1.1.20	Fuel Handling of Aux Building	-	1,095	-	-	-	-	-	164	1,259	-	-	1,259	-	-	-	-	-	-	8,240	-
3b.1.1	Totals	-	15,501	-	-	-	-	-	2,325	17,826	-	-	17,826	-	-	-	-	-	-	127,723	-
Site Closeout Activities																					
3b.1.2	Remove Rubble	-	1,330	-	-	-	-	-	200	1,530	-	-	1,530	-	-	-	-	-	-	6,495	-
3b.1.3	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
3b.1.4	Final report to NRC	-	-	-	-	-	-	86	13	99	99	-	-	-	-	-	-	-	-	-	667
3b.1	Subtotal Period 3b Activity Costs	-	17,279	-	-	-	-	86	2,605	19,969	99	-	19,871	-	-	-	-	-	-	135,138	667
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	4,912	-	-	-	-	10	738	5,660	-	-	5,660	-	-	-	-	-	-	18,372	-
3b.2.2	Intake Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
3b.2.3	Construction Debris	-	-	-	-	-	-	2,150	323	2,473	-	-	2,473	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	9,257	-	-	-	-	-	1,388	10,645	-	-	10,645	-	-	-	-	-	-	9,327	-
3b.2	Subtotal Period 3b Additional Costs	-	14,610	-	-	-	-	2,160	2,516	19,286	-	-	19,286	-	-	-	-	-	-	31,251	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	212	-	-	-	-	-	32	244	-	-	244	-	-	-	-	-	-	-	-
3b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,636	245	1,882	-	1,882	-	-	-	-	-	-	-	-	-
3b.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,649	-	2,649	-	2,649	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	212	-	-	-	-	4,285	277	4,774	-	4,531	244	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	513	51	565	565	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	4,167	417	4,583	-	4,583	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	395	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	218	22	239	-	239	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	157	16	173	-	173	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	397	781	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	119	18	136	-	136	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	361	54	416	153	263	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	4,616	692	5,308	-	5,308	-	-	-	-	-	-	-	-	57,340
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,004	751	5,755	-	1,237	4,517	-	-	-	-	-	-	-	74,431
3b.4	Subtotal Period 3b Period-Dependent Costs	-	7,144	-	-	-	-	27,444	4,935	39,523	1,114	13,117	25,292	-	-	-	-	-	-	-	248,656
3b.0	TOTAL PERIOD 3b COST	-	39,245	-	-	-	-	33,975	10,333	83,552	1,213	17,647	64,692	-	-	-	-	-	-	166,388	249,323

Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	13,208	1,981	15,189	-	15,189	-	-	-	-	-	-	-	-	-
3c.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	40,613	-	40,613	-	40,613	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	53,820	1,981	55,801	-	55,801	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	7,872	787	8,659	-	8,659	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	45,095	4,509	49,604	-	49,604	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	5,076	508	5,583	-	5,583	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	2,410	241	2,651	-	2,651	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	5,298	795	6,092	-	6,092	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	1,820	273	2,092	-	2,092	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	2,033	305	2,338	-	2,338	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	70,770	10,615	81,385	-	81,385	-	-	-	-	-	-	-	-	879,133
3c.4.10	Utility Staff Cost	-	-	-	-	-	-	16,510	2,477	18,987	-	18,987	-	-	-	-	-	-	-	-	228,237
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	156,883	20,510	177,392	-	177,392	-	-	-	-	-	-	-	-	1,107,370
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	210,703	22,491	233,194	-	233,194	-	-	-	-	-	-	-	-	1,107,370
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1.1	Totals	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
Period 3d Collateral Costs																					
3d.3.1	Prairie Island Indian Community Payments	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	9	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	53	5	58	58	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	4	0	4	-	4	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	3	0	3	-	3	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	2	0	3	3	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	83	13	96	96	-	-	-	-	-	-	-	-	-	1,037
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	269
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	181	24	204	197	7	-	-	-	-	-	-	-	-	1,306
3d.0	TOTAL PERIOD 3d COST	-	-	1,444	-	-	8,680	229	1,687	12,039	11,984	55	-	-	-	-	-	1,773	344,823	-	1,306
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	24	81	435	-	2,532	839	978	4,890	4,890	-	-	-	9,355	-	-	-	1,123,457	3,762	1,065
3e.2	Subtotal Period 3e Additional Costs	-	24	81	435	-	2,532	839	978	4,890	4,890	-	-	-	9,355	-	-	-	1,123,457	3,762	1,065
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	93	23	116	116	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	56	14	69	69	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	11	3	13	13	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	54	14	68	68	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	21	5	26	26	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	174	43	217	217	-	-	-	-	-	-	-	-	-	2,500
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	129	32	161	161	-	-	-	-	-	-	-	-	-	1,896
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	536	134	670	670	-	-	-	-	-	-	-	-	-	4,396
3e.0	TOTAL PERIOD 3e COST	-	24	81	435	-	2,532	1,375	1,112	5,560	5,560	-	-	-	9,355	-	-	-	1,123,457	3,762	5,460

Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	515	-	-	-	-	68	87	670	-	-	670	-	-	-	-	-	-	2,219	80
3f.2	Subtotal Period 3f Additional Costs	-	515	-	-	-	-	68	87	670	-	-	670	-	-	-	-	-	-	2,219	80
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	28	3	31	-	-	31	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	59	-	-	-	-	-	9	68	-	-	68	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	6	-	-	6	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	28	4	32	-	-	32	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	11	2	12	-	-	12	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	89	13	102	-	-	102	-	-	-	-	-	-	-	1,281
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	55	8	63	-	-	63	-	-	-	-	-	-	-	795
3f.4	Subtotal Period 3f Period-Dependent Costs	-	59	-	-	-	-	216	40	315	-	-	315	-	-	-	-	-	-	-	2,076
3f.0	TOTAL PERIOD 3f COST	-	577	-	-	-	-	284	128	989	-	-	989	-	-	-	-	-	-	2,219	2,156
PERIOD 3 TOTALS		-	39,847	1,525	435	-	11,212	246,565	35,750	335,334	18,757	250,896	65,681	-	9,355	-	-	1,773	1,468,280	172,370	1,365,615
TOTAL COST TO DECOMMISSION		13,876	116,246	23,184	8,596	26,793	61,273	614,850	144,013	1,008,829	590,962	345,097	72,770	169,384	184,110	826	673	1,773	17,056,350	976,284	4,044,049

TOTAL COST TO DECOMMISSION WITH 16.65% CONTINGENCY:	**$1,008,829**	**thousands of 2020 dollars**	
TOTAL NRC LICENSE TERMINATION COST IS 58.58% OR:	**$590,962**	**thousands of 2020 dollars**	
SPENT FUEL MANAGEMENT COST IS 34.21% OR:	**$345,097**	**thousands of 2020 dollars**	
NON-NUCLEAR DEMOLITION COST IS 7.21% OR:	**$72,770**	**thousands of 2020 dollars**	
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**185,608**	**Cubic Feet**	
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**	
TOTAL SCRAP METAL REMOVED:	**42,328**	**Tons**	
TOTAL CRAFT LABOR REQUIREMENTS:	**976,284**	**Man-hours**	

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX D

DETAILED COST ANALYSIS

SCENARIO 2: DECON with 60 Year DFS

Page

Prairie Island Nuclear Generating Plant, Unit 1 .....D-2

Prairie Island Nuclear Generating Plant, Unit 2 .....D-12

Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	632	95	727	654	-	73	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Biological shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Steam generators	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
1a.1.17.10	Main Condensers	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
1a.1.17.11	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
1a.1.17.12	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.13	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	4,861	729	5,591	4,923	-	668	-	-	-	-	-	-	-	37,827
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	15,945	2,392	18,336	17,669	-	668	-	-	-	-	-	-	-	78,157
Period 1a Additional Costs																					
1a.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1a.2	Subtotal Period 1a Additional Costs	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
Period 1a Collateral Costs																					
1a.3.1	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	50	-	14	82	82	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,137	114	1,251	1,251	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	26,931	4,040	30,971	30,971	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	5	-	50	47,456	6,970	55,860	52,918	2,942	-	-	610	-	-	-	12,190	20	544,960

Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	5	-	50	77,325	11,263	90,022	85,163	4,191	668	-	610	-	-	-	12,190	20	623,117
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	321	48	369	369	-	-	-	-	-	-	-	-	-	2,500
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD cooling assembly	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	CRD housings & ICI tubes	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
1b.1.1.10	Missile shields	-	-	-	-	-	-	58	9	67	67	-	-	-	-	-	-	-	-	-	450
1b.1.1.11	Biological shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.12	Steam generators	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1b.1.1.13	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
1b.1.1.14	Main Turbine	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
1b.1.1.15	Main Condensers	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
1b.1.1.16	Auxiliary building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1.17	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,272	641	4,913	3,989	-	924	-	-	-	-	-	-	-	33,243
1b.1.2	Decon primary loop	572	-	-	-	-	-	-	286	859	859	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	572	-	-	-	-	-	4,272	927	5,772	4,848	-	924	-	-	-	-	-	-	1,067	33,243
Period 1b Additional Costs																					
1b.2.1	Site Characterization	-	-	-	-	-	-	3,520	1,056	4,576	4,576	-	-	-	-	-	-	-	-	21,020	8,332
1b.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
1b.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
1b.2	Subtotal Period 1b Additional Costs	-	2,526	356	244	178	1,369	3,520	2,129	10,321	10,321	-	-	6,132	12,843	-	-	-	518,936	44,275	8,332
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	25	-	16	29	-	66	-	35	172	172	-	-	-	152	-	-	-	9,127	30	-
1b.3.4	Process decommissioning chemical flush waste	2	-	61	199	-	3,889	-	1,009	5,159	5,159	-	-	-	-	588	-	-	62,689	110	-
1b.3.5	Small tool allowance	-	36	-	-	-	-	-	5	42	42	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	163	25	188	-	188	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	1,032	155	1,187	1,187	-	-	-	-	-	-	-	-	-	-
1b.3.10	Prairie Island Indian Community Payments	-	-	-	-	-	-	623	-	623	-	623	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,185	1,236	77	228	-	3,955	3,082	2,072	13,836	13,025	811	-	-	152	588	-	-	71,815	140	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	828	83	910	910	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,806	181	1,987	1,987	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	475	-	-	-	-	-	119	594	594	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	3	-	29	-	8	48	48	-	-	-	356	-	-	-	7,122	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,617	243	1,859	1,859	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	323	32	355	355	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,084	108	1,193	-	1,193	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	4,153	623	4,775	4,775	-	-	-	-	-	-	-	-	-	61,192
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,846	877	6,723	6,723	-	-	-	-	-	-	-	-	-	63,266
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	13,505	2,026	15,531	15,531	-	-	-	-	-	-	-	-	-	211,579
1b.4	Subtotal Period 1b Period-Dependent Costs	38	851	7	3	-	29	30,149	4,513	35,590	34,123	1,467	-	-	356	-	-	-	7,122	12	336,037
1b.0	TOTAL PERIOD 1b COST	3,795	4,613	440	475	178	5,354	41,023	9,641	65,519	62,317	2,278	924	6,132	13,351	588	-	-	597,873	45,493	377,612

Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1 TOTALS		3,795	5,980	452	480	178	5,404	118,348	20,903	155,540	147,480	6,468	1,592	6,132	13,961	588	-	-	610,063	45,513	1,000,729
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Reactor Coolant Piping	54	47	10	18	-	187	-	89	406	406	-	-	-	508	-	-	-	35,411	1,421	-
2a.1.1.2	Pressurizer Relief Tank	24	21	6	12	-	125	-	51	238	238	-	-	-	338	-	-	-	23,594	630	-
2a.1.1.3	Reactor Coolant Pumps & Motors	57	68	110	93	-	463	-	186	977	977	-	-	-	2,332	-	-	-	295,800	2,049	100
2a.1.1.4	Pressurizer	-	77	503	97	-	776	-	278	1,732	1,732	-	-	-	2,196	-	-	-	185,015	1,666	938
2a.1.1.5	Steam Generators	-	3,307	2,269	1,770	2,409	4,001	-	2,681	16,437	16,437	-	-	18,672	11,316	-	-	-	1,689,435	11,613	2,875
2a.1.1.6	CRDMs/ICIs/Service Structure Removal	302	281	218	66	-	938	-	488	2,294	2,294	-	-	-	4,797	-	-	-	177,400	8,104	-
2a.1.1.7	Reactor Vessel Internals	82	4,861	13,621	929	-	9,015	307	11,878	40,693	40,693	-	-	-	501	125	673	-	164,987	25,123	1,163
2a.1.1.8	Reactor Vessel	94	6,046	2,028	728	-	2,975	307	6,804	18,982	18,982	-	-	-	8,073	-	-	-	576,524	25,123	1,163
2a.1.1	Totals	613	14,709	18,764	3,714	2,409	18,480	614	22,455	81,759	81,759	-	-	18,672	30,062	125	673	-	3,148,166	75,729	6,240
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	331	172	64	527	377	-	283	1,752	1,752	-	-	2,131	1,187	-	-	-	203,265	4,667	-
2a.1.3	Main Condensers	-	2,801	109	62	705	533	-	960	5,170	5,170	-	-	3,800	1,587	-	-	-	271,824	39,151	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
2a.1.4	Totals	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
Disposal of Plant Systems																					
2a.1.5.1	Air Removal	-	31	-	-	-	-	-	5	36	-	-	36	-	-	-	-	-	-	452	-
2a.1.5.2	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	670	-
2a.1.5.3	Auxiliary Feedwater - RCA	-	47	0	2	36	-	-	17	102	102	-	-	215	-	-	-	-	8,722	601	-
2a.1.5.4	Bleed Steam	-	90	-	-	-	-	-	14	104	-	-	104	-	-	-	-	-	-	1,335	-
2a.1.5.5	Caustic Addition - RCA	-	38	0	2	39	-	-	16	95	95	-	-	233	-	-	-	-	9,453	444	-
2a.1.5.6	Chemical Feed	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	304	-
2a.1.5.7	Chemical Feed - RCA	-	1	0	0	1	-	-	0	3	3	-	-	6	-	-	-	-	243	12	-
2a.1.5.8	Circulating Water	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	619	-
2a.1.5.9	Condensate	-	474	-	-	-	-	-	71	545	-	-	545	-	-	-	-	-	-	6,837	-
2a.1.5.10	Condensate Polishing	-	235	-	-	-	-	-	35	271	-	-	271	-	-	-	-	-	-	3,420	-
2a.1.5.11	Condensate Polishing - RCA	-	183	4	15	348	-	-	101	651	651	-	-	2,078	-	-	-	-	84,395	2,329	-
2a.1.5.12	Electro-hydraulic	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	127	-
2a.1.5.13	Feedwater	-	153	-	-	-	-	-	23	175	-	-	175	-	-	-	-	-	-	2,215	-
2a.1.5.14	Feedwater - RCA	-	195	7	24	537	-	-	133	895	895	-	-	3,208	-	-	-	-	130,294	2,651	-
2a.1.5.15	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	505	-
2a.1.5.16	Heater Drain	-	400	-	-	-	-	-	60	460	-	-	460	-	-	-	-	-	-	5,881	-
2a.1.5.17	Internal Circ Water & CDSR	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	389	-
2a.1.5.18	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
2a.1.5.19	Main Steam	-	115	-	-	-	-	-	17	133	-	-	133	-	-	-	-	-	-	1,690	-
2a.1.5.20	Main Steam - RCA	-	366	10	37	844	-	-	225	1,482	1,482	-	-	5,044	-	-	-	-	204,825	4,956	-
2a.1.5.21	Steam Generator Blowdown	-	478	22	29	340	234	-	235	1,337	1,337	-	-	2,031	686	-	-	-	126,640	6,667	-
2a.1.5.22	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
2a.1.5.23	Turbine & Moisture Separators	-	386	-	-	-	-	-	58	444	-	-	444	-	-	-	-	-	-	5,609	-
2a.1.5.24	Turbine Oil Purification	-	70	-	-	-	-	-	11	81	-	-	81	-	-	-	-	-	-	1,003	-
2a.1.5	Totals	-	3,445	44	108	2,144	234	-	1,048	7,023	4,565	-	2,458	12,815	686	-	-	-	564,572	48,794	-
2a.1.6	Scaffolding in support of decommissioning	-	930	3	1	26	4	-	238	1,202	1,202	-	-	138	12	-	-	-	6,985	6,368	-
2a.1	Subtotal Period 2a Activity Costs	613	23,011	19,092	3,950	5,810	19,628	614	25,102	97,819	95,362	-	2,458	37,556	33,533	125	673	-	4,194,811	182,298	6,240
Period 2a Additional Costs																					
2a.2.1	Retired RPV Upper Internals Package	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
2a.2	Subtotal Period 2a Additional Costs	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	48	-	32	58	-	130	-	68	337	337	-	-	-	299	-	-	-	17,968	58	-
2a.3.2	Process decommissioning chemical flush waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a.3.3	Small tool allowance	-	239	-	-	-	-	-	36	274	247	-	27	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,639	246	1,885	-	1,885	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	12,780	1,917	14,697	14,697	-	-	-	-	-	-	-	-	-	-
2a.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,780	-	1,780	-	1,780	-	-	-	-	-	-	-	-	-
2a.3.7	On-site survey and release of 0.0 tons clean metallic waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Prairie Island DECON Unit 1
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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
2a.3	Subtotal Period 2a Collateral Costs	48	239	32	58	-	130	16,198	2,267	18,972	15,281	3,664	27	-	299	-	-	-	17,968	58	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	107	-	-	-	-	-	-	27	134	134	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	690	69	759	759	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	5,009	501	5,510	5,510	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	1,950	-	-	-	-	-	487	2,437	2,437	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,565	-	-	-	-	-	535	4,100	4,100	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	73	30	-	303	-	88	493	493	-	-	-	3,681	-	-	-	73,619	120	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,194	329	2,523	2,523	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	842	84	926	926	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,647	265	2,912	-	2,912	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	1,695	254	1,949	1,949	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	602	90	692	-	692	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	80	12	92	-	92	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	318	48	366	366	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,596	239	1,835	1,835	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	11,727	1,759	13,486	13,486	-	-	-	-	-	-	-	-	-	172,726
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	20,663	3,099	23,763	23,763	-	-	-	-	-	-	-	-	-	225,210
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	26,905	4,036	30,941	30,941	-	-	-	-	-	-	-	-	-	417,453
2a.4	Subtotal Period 2a Period-Dependent Costs	107	5,515	73	30	-	303	74,968	11,922	92,918	89,223	3,696	-	-	3,681	-	-	-	73,619	120	815,389
2a.0	TOTAL PERIOD 2a COST	768	29,021	19,584	4,254	5,810	21,456	91,780	40,333	213,006	203,161	7,360	2,485	37,556	37,889	237	673	-	4,336,562	185,810	821,762
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	Aux Bldg Normal Ventilation	-	2	0	0	1	-	-	1	3	3	-	-	3	-	-	-	-	140	29	-
2b.1.1.2	Battery Rm Special Ventilation	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	6	-
2b.1.1.3	Buildings Maintenance	-	5	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	65	-
2b.1.1.4	Chemical & Volume Control	1,120	1,389	89	90	753	973	-	1,286	5,700	5,700	-	-	4,498	2,846	-	-	-	366,565	34,533	-
2b.1.1.5	Component Cooling - RCA	-	858	25	91	2,079	-	-	543	3,597	3,597	-	-	12,427	-	-	-	-	504,675	11,242	-
2b.1.1.6	Containment Cooling	-	74	-	-	-	-	-	11	85	-	-	85	-	-	-	-	-	-	1,086	-
2b.1.1.7	Containment Cooling - RCA	-	304	7	25	569	-	-	166	1,070	1,070	-	-	3,400	-	-	-	-	138,090	3,971	-
2b.1.1.8	Containment Hydrogen Control - RCA	-	30	0	1	18	-	-	10	59	59	-	-	105	-	-	-	-	4,278	401	-
2b.1.1.9	Containment Spray - RCA	-	93	2	6	145	-	-	46	293	293	-	-	868	-	-	-	-	35,249	1,217	-
2b.1.1.10	Containment Ventilation	-	255	24	51	828	248	-	260	1,667	1,667	-	-	4,951	737	-	-	-	247,952	3,668	-
2b.1.1.11	Cooling Water	-	163	-	-	-	-	-	24	187	-	-	187	-	-	-	-	-	-	2,396	-
2b.1.1.12	Cooling Water - RCA	-	658	16	57	1,293	-	-	368	2,392	2,392	-	-	7,728	-	-	-	-	313,832	8,594	-
2b.1.1.13	D1 Emergency Diesel	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	730	-
2b.1.1.14	D2 Emergency Diesel	-	36	-	-	-	-	-	5	41	-	-	41	-	-	-	-	-	-	522	-
2b.1.1.15	Diesel Rooms Ventilation	-	9	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	135	-
2b.1.1.16	Electrical - Clean	-	1,905	-	-	-	-	-	286	2,191	-	-	2,191	-	-	-	-	-	-	26,981	-
2b.1.1.17	Electrical - Contaminated	-	611	7	20	423	32	-	228	1,321	1,321	-	-	2,527	95	-	-	-	108,690	8,377	-
2b.1.1.18	Electrical - Decontaminated	-	3,787	48	173	3,940	-	-	1,569	9,518	9,518	-	-	23,551	-	-	-	-	956,401	49,378	-
2b.1.1.19	Fuel Handling	-	121	6	11	152	73	-	74	436	436	-	-	908	218	-	-	-	50,723	1,784	-
2b.1.1.20	Fuel Oil	-	121	-	-	-	-	-	18	140	-	-	140	-	-	-	-	-	-	1,697	-
2b.1.1.21	HVAC - Clean	-	120	-	-	-	-	-	18	138	-	-	138	-	-	-	-	-	-	1,891	-
2b.1.1.22	HVAC - Contaminated	-	374	9	26	546	41	-	190	1,186	1,186	-	-	3,261	123	-	-	-	140,257	5,032	-
2b.1.1.23	Incore Instrumentation	0	28	1	2	10	19	-	14	74	74	-	-	60	57	-	-	-	6,058	425	-
2b.1.1.24	Misc Drains & Vents	-	233	15	13	65	176	-	115	618	618	-	-	390	514	-	-	-	49,062	3,091	-
2b.1.1.25	Reactor Coolant	153	311	21	18	58	265	-	234	1,060	1,060	-	-	344	777	-	-	-	64,085	6,470	-
2b.1.1.26	Reactor Hot Sampling	149	136	12	7	11	118	-	142	576	576	-	-	66	342	-	-	-	25,063	3,946	-
2b.1.1.27	Reactor Makeup	-	73	-	-	-	-	-	11	84	-	-	84	-	-	-	-	-	-	1,042	-
2b.1.1.28	Reactor Vessel	9	21	1	0	4	5	-	12	52	52	-	-	26	14	-	-	-	2,000	425	-
2b.1.1.29	Residual Heat Removal	357	419	85	86	484	1,105	-	654	3,190	3,190	-	-	2,895	3,252	-	-	-	326,425	7,621	-
2b.1.1.30	Safeguards Chilled Water	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	259	-
2b.1.1.31	Safety Injection	-	893	42	73	1,136	393	-	507	3,044	3,044	-	-	6,788	1,156	-	-	-	349,908	12,561	-
2b.1.1.32	Sampling	-	60	4	3	10	37	-	26	140	140	-	-	59	107	-	-	-	9,420	811	-
2b.1.1.33	Shield Bldg Ventilation	-	140	14	26	360	165	-	135	839	839	-	-	2,152	491	-	-	-	118,583	2,030	-
2b.1.1.34	Station & Instrument Air	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	300	-
2b.1.1.35	Station & Instrument Air - RCA	-	81	1	2	56	-	-	29	169	169	-	-	332	-	-	-	-	13,496	1,053	-
2b.1.1.36	Turbine Bldg Traps & Drains	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	767	-
2b.1.1.37	Unit Coolers	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	611	-
2b.1.1.38	Unit Coolers - RCA	-	55	0	2	39	-	-	20	115	115	-	-	230	-	-	-	-	9,348	683	-
2b.1.1	Totals	1,789	13,544	429	786	12,979	3,651	-	7,032	40,209	37,119	-	3,091	77,571	10,728	-	-	-	3,840,299	205,829	-

Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
2b.1.2	Scaffolding in support of decommissioning	-	1,163	4	2	32	5	-	297	1,503	1,503	-	-	173	15	-	-	-	8,731	7,960	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor	1,215	2,807	240	1,236	373	13,624	-	4,981	24,476	24,476	-	-	2,230	83,429	-	-	-	3,633,417	50,950	-
2b.1.3.2	Backwash Waste Receiving Tank	-	28	3	17	-	97	-	34	179	179	-	-	-	929	-	-	-	43,896	301	-
2b.1.3	Totals	1,215	2,835	243	1,253	373	13,721	-	5,015	24,655	24,655	-	-	2,230	84,358	-	-	-	3,677,313	51,251	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	3,004	17,542	675	2,041	13,384	17,377	526	12,423	66,973	63,882	-	3,091	79,974	95,101	-	-	-	7,526,343	265,040	4,096
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
2b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
2b.2.3	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,175	11	36	606	-	4,573	1,077	7,478	7,478	-	-	5,880	-	-	-	-	147,000	7,427	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	108	-	74	132	-	298	-	156	768	768	-	-	-	684	-	-	-	41,053	133	-
2b.3.2	Process decommissioning chemical flush waste	2	-	90	296	-	677	-	224	1,289	1,289	-	-	-	875	-	-	-	93,252	164	-
2b.3.3	Small tool allowance	-	315	-	-	-	-	-	47	362	362	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	6,924	1,039	7,963	-	7,963	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	6,141	921	7,063	7,063	-	-	-	-	-	-	-	-	-	-
2b.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,348	-	1,348	-	1,348	-	-	-	-	-	-	-	-	-
2b.3.7	On-site survey and release of 0.0 tons clean metallic waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	110	315	164	428	-	975	14,414	2,387	18,793	9,482	9,311	-	-	1,559	-	-	-	134,305	297	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	511	-	-	-	-	-	-	128	639	639	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	523	52	575	575	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	3,435	344	3,779	3,779	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,140	-	-	-	-	-	535	2,675	2,675	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,774	-	-	-	-	-	416	3,190	3,190	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	70	28	-	290	-	84	472	472	-	-	-	3,521	-	-	-	70,425	115	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,313	197	1,509	1,509	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	638	64	701	701	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,006	201	2,207	-	2,207	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	1,284	193	1,477	1,477	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	456	68	524	-	524	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	229	34	264	264	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	60	9	69	-	69	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	67	10	78	78	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,209	181	1,391	1,391	-	-	-	-	-	-	-	-	-	-
2b.4.16	Security Staff Cost	-	-	-	-	-	-	8,259	1,239	9,497	9,497	-	-	-	-	-	-	-	-	-	121,244
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	10,738	1,611	12,348	12,348	-	-	-	-	-	-	-	-	-	121,244
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	13,928	2,089	16,017	16,017	-	-	-	-	-	-	-	-	-	225,649
2b.4	Subtotal Period 2b Period-Dependent Costs	511	4,914	70	28	-	290	44,145	7,454	57,412	54,612	2,800	-	-	3,521	-	-	-	70,425	115	468,137
2b.0	TOTAL PERIOD 2b COST	3,626	23,946	920	2,533	13,990	18,642	63,658	23,341	150,657	135,455	12,111	3,091	85,854	100,182	-	-	-	7,878,073	272,879	472,233
PERIOD 2c - Spent fuel delay prior to SFP decon																					
Period 2c Direct Decommissioning Activities																					
Period 2c Collateral Costs																					
2c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	51,274	7,691	58,965	-	58,965	-	-	-	-	-	-	-	-	-
2c.3.2	Retention and Severance	-	-	-	-	-	-	3,512	527	4,039	4,039	-	-	-	-	-	-	-	-	-	-
2c.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,526	-	1,526	-	1,526	-	-	-	-	-	-	-	-	-
2c.3	Subtotal Period 2c Collateral Costs	-	-	-	-	-	-	56,312	8,218	64,530	4,039	60,491	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	592	59	651	651	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	3,512	351	3,863	3,863	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	263	-	-	-	-	-	66	328	328	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	9	4	-	38	-	11	61	61	-	-	-	457	-	-	-	9,141	15	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	1,486	223	1,709	1,709	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	687	69	756	756	-	-	-	-	-	-	-	-	-	-

Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2c Period-Dependent Costs (continued)																					
2c.4.7	Emergency Planning Fees	-	-	-	-	-	-	2,271	227	2,498	-	2,498	-	-	-	-	-	-	-	-	-
2c.4.8	Fixed Overhead	-	-	-	-	-	-	1,454	218	1,672	1,672	-	-	-	-	-	-	-	-	-	-
2c.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	516	77	593	-	593	-	-	-	-	-	-	-	-	-
2c.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	260	39	298	298	-	-	-	-	-	-	-	-	-	-
2c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	68	10	79	-	79	-	-	-	-	-	-	-	-	-
2c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	76	11	88	88	-	-	-	-	-	-	-	-	-	-
2c.4.13	Security Staff Cost	-	-	-	-	-	-	9,348	1,402	10,751	10,751	-	-	-	-	-	-	-	-	-	137,246
2c.4.14	Utility Staff Cost	-	-	-	-	-	-	1,195	179	1,375	1,375	-	-	-	-	-	-	-	-	-	19,062
2c.4	Subtotal Period 2c Period-Dependent Costs	-	263	9	4	-	38	21,465	2,943	24,721	21,552	3,170	-	-	457	-	-	-	9,141	15	156,308
2c.0	TOTAL PERIOD 2c COST	-	263	9	4	-	38	77,777	11,161	89,252	25,591	63,661	-	-	457	-	-	-	9,141	15	156,308
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	347	35	86	41	-	703	-	373	1,585	1,585	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
2d.1.2.1	Electrical - Contaminated - Fuel Pool	-	152	2	5	103	8	-	56	325	325	-	-	615	23	-	-	-	26,449	2,077	-
2d.1.2.2	Electrical - Decontaminated - Fuel Pool	-	947	12	43	986	-	-	392	2,380	2,380	-	-	5,893	-	-	-	-	239,327	12,340	-
2d.1.2.3	HVAC - Contaminated - Fuel Pool	-	160	4	11	234	18	-	82	508	508	-	-	1,398	53	-	-	-	60,110	2,157	-
2d.1.2.4	Safeguards Chilled Water - RCA	-	85	1	4	83	-	-	34	207	207	-	-	495	-	-	-	-	20,100	1,019	-
2d.1.2.5	Spent Fuel Pool Cooling	303	357	34	32	135	450	-	382	1,693	1,693	-	-	806	1,325	-	-	-	117,816	7,613	-
2d.1.2.6	Station & Instrument Air - RCA Fuel Pool	-	20	0	1	14	-	-	7	42	42	-	-	83	-	-	-	-	3,374	263	-
2d.1.2	Totals	303	1,721	52	96	1,554	476	-	954	5,157	5,157	-	-	9,290	1,401	-	-	-	467,176	25,468	-
2d.1.4	Scaffolding in support of decommissioning	-	233	1	0	6	1	-	59	301	301	-	-	35	3	-	-	-	1,746	1,592	-
2d.1	Subtotal Period 2d Activity Costs	650	1,989	139	138	1,561	1,180	-	1,386	7,042	7,042	-	-	9,325	3,496	-	-	-	601,841	27,637	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	30	-	21	38	-	86	-	44	220	220	-	-	-	197	-	-	-	11,793	38	-
2d.3.2	Process decommissioning chemical flush waste	1	-	34	110	-	251	-	83	478	478	-	-	-	324	-	-	-	34,576	61	-
2d.3.3	Small tool allowance	-	37	-	-	-	-	-	6	42	42	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	975	-	975	-	975	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	31	37	185	215	1,112	514	975	367	3,437	2,462	975	-	6,000	1,050	-	-	-	349,977	246	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	59	-	-	-	-	-	-	15	73	73	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	378	38	416	416	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	2,004	200	2,204	2,204	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	575	-	-	-	-	-	144	719	719	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	2,007	-	-	-	-	-	301	2,308	2,308	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	16	7	-	68	-	20	111	111	-	-	-	830	-	-	-	16,609	27	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	506	76	582	582	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	439	44	483	483	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	58	6	64	-	64	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	929	139	1,068	1,068	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	332	50	381	381	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	44	7	50	-	50	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	49	7	56	56	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	875	131	1,006	1,006	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	5,782	867	6,649	4,694	1,955	-	-	-	-	-	-	-	-	84,454
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	6,401	960	7,361	7,361	-	-	-	-	-	-	-	-	-	70,243
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	8,100	1,215	9,315	8,858	456	-	-	-	-	-	-	-	-	126,681
2d.4	Subtotal Period 2d Period-Dependent Costs	59	2,582	16	7	-	68	25,896	4,220	32,848	30,323	2,525	-	-	830	-	-	-	16,609	27	281,377
2d.0	TOTAL PERIOD 2d COST	740	4,608	340	360	2,673	1,763	27,908	6,284	44,675	41,175	3,501	-	15,325	5,377	-	-	-	968,427	27,910	287,617

Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	934	-	934	-	934	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	2,198	190	2,388	1,454	934	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	362	36	398	398	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,771	177	1,948	1,948	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	501	-	-	-	-	-	125	626	626	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	3	-	28	-	8	45	45	-	-	-	334	-	-	-	6,685	11	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	422	42	465	465	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	42	6	48	-	48	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	5,538	831	6,369	4,497	1,873	-	-	-	-	-	-	-	-	80,898
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	4,011	602	4,613	4,175	438	-	-	-	-	-	-	-	-	59,507
2f.4	Subtotal Period 2f Period-Dependent Costs	-	501	7	3	-	28	17,620	2,646	20,803	18,384	2,420	-	-	334	-	-	-	6,685	11	186,687
2f.0	TOTAL PERIOD 2f COST	-	501	7	3	-	28	23,183	3,845	27,566	24,212	3,354	-	-	334	-	-	-	6,685	40,542	189,807
PERIOD 2 TOTALS		5,134	58,338	20,860	7,153	22,473	41,926	284,307	84,964	525,155	429,593	89,987	5,576	138,734	144,239	237	673	-	13,198,890	527,156	1,927,726
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor	-	4,644	-	-	-	-	-	697	5,341	-	-	5,341	-	-	-	-	-	-	44,669	-
3b.1.1.2	Condensate Storage Tank Foundation	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	16	-
3b.1.1.3	Structures below 3' below grade	-	1,651	-	-	-	-	-	248	1,899	-	-	1,899	-	-	-	-	-	-	8,411	-
3b.1.1.4	Turbine	-	2,139	-	-	-	-	-	321	2,460	-	-	2,460	-	-	-	-	-	-	21,985	-
3b.1.1.5	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
3b.1.1	Totals	-	8,803	-	-	-	-	-	1,320	10,123	-	-	10,123	-	-	-	-	-	-	76,939	-
Site Closeout Activities																					
3b.1.2	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
3b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	9,251	-	-	-	-	200	1,418	10,869	231	-	10,639	-	-	-	-	-	-	77,859	1,560
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	2,242	-	-	-	-	5	337	2,583	-	-	2,583	-	-	-	-	-	-	8,386	-
3b.2.2	Intake Strucutre Cofferdam	-	623	-	-	-	-	-	93	716	-	-	716	-	-	-	-	-	-	5,168	-
3b.2.3	Construction Debris	-	-	-	-	-	-	10	2	12	-	-	12	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	3,011	-	-	-	-	-	452	3,462	-	-	3,462	-	-	-	-	-	-	2,904	-
3b.2	Subtotal Period 3b Additional Costs	-	5,875	-	-	-	-	15	883	6,773	-	-	6,773	-	-	-	-	-	-	16,458	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	120	-	-	-	-	-	18	138	-	-	138	-	-	-	-	-	-	-	-
3b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,649	-	2,649	-	2,649	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	120	-	-	-	-	2,649	18	2,787	-	2,649	138	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	513	51	565	565	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	4,167	417	4,583	-	4,583	-	-	-	-	-	-	-	-	-

Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3b Period-Dependent Costs (continued)																					
3b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	395	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	218	22	239	-	239	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	157	16	173	-	173	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	397	781	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	119	18	136	-	136	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	361	54	416	153	263	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	4,616	692	5,308	-	5,308	-	-	-	-	-	-	-	-	57,340
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,004	751	5,755	-	1,237	4,517	-	-	-	-	-	-	-	74,431
3b.4	Subtotal Period 3b Period-Dependent Costs	-	7,144	-	-	-	-	27,444	4,935	39,523	1,114	13,117	25,292	-	-	-	-	-	-	-	248,656
3b.0	TOTAL PERIOD 3b COST	-	22,390	-	-	-	-	30,308	7,255	59,952	1,345	15,766	42,842	-	-	-	-	-	-	94,317	250,216
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	18,191	2,729	20,919	-	20,919	-	-	-	-	-	-	-	-	-
3c.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	44,363	-	44,363	-	44,363	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	62,554	2,729	65,283	-	65,283	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	8,599	860	9,459	-	9,459	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	49,245	4,924	54,169	-	54,169	-	-	-	-	-	-	-	-	-
3c.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	5,140	514	5,653	-	5,653	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	2,633	263	2,896	-	2,896	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	5,787	868	6,655	-	6,655	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	1,988	298	2,286	-	2,286	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	2,220	333	2,554	-	2,554	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	77,306	11,596	88,902	-	88,902	-	-	-	-	-	-	-	-	960,328
3c.4.10	Utility Staff Cost	-	-	-	-	-	-	18,035	2,705	20,740	-	20,740	-	-	-	-	-	-	-	-	249,316
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	170,952	22,362	193,314	-	193,314	-	-	-	-	-	-	-	-	1,209,643
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	233,506	25,091	258,597	-	258,597	-	-	-	-	-	-	-	-	1,209,643
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1.1	Totals	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3d.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	76	4	80	-	80	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	9	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	53	5	58	58	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	4	0	4	-	4	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	3	0	3	-	3	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	2	0	3	3	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	83	13	96	96	-	-	-	-	-	-	-	-	-	1,037
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	269
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	181	24	204	197	7	-	-	-	-	-	-	-	-	1,306
3d.0	TOTAL PERIOD 3d COST	-	-	1,444	-	-	8,680	256	1,691	12,071	11,984	87	-	-	-	-	-	1,773	344,823	-	1,306

Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	24	81	435	-	2,532	839	978	4,890	4,890	-	-	-	9,355	-	-	-	1,123,457	3,762	1,065
3e.2	Subtotal Period 3e Additional Costs	-	24	81	435	-	2,532	839	978	4,890	4,890	-	-	-	9,355	-	-	-	1,123,457	3,762	1,065
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	93	23	116	116	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	56	14	69	69	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	11	3	13	13	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	54	14	68	68	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	21	5	26	26	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	174	43	217	217	-	-	-	-	-	-	-	-	-	2,500
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	129	32	161	161	-	-	-	-	-	-	-	-	-	1,896
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	536	134	670	670	-	-	-	-	-	-	-	-	-	4,396
3e.0	TOTAL PERIOD 3e COST	-	24	81	435	-	2,532	1,375	1,112	5,560	5,560	-	-	-	9,355	-	-	-	1,123,457	3,762	5,460
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	515	-	-	-	-	68	87	670	-	-	670	-	-	-	-	-	-	2,219	80
3f.2	Subtotal Period 3f Additional Costs	-	515	-	-	-	-	68	87	670	-	-	670	-	-	-	-	-	-	2,219	80
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	28	3	31	-	-	31	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	59	-	-	-	-	-	9	68	-	-	68	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	6	-	-	6	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	28	4	32	-	-	32	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	11	2	12	-	-	12	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	89	13	102	-	-	102	-	-	-	-	-	-	-	1,281
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	55	8	63	-	-	63	-	-	-	-	-	-	-	795
3f.4	Subtotal Period 3f Period-Dependent Costs	-	59	-	-	-	-	216	40	315	-	-	315	-	-	-	-	-	-	-	2,076
3f.0	TOTAL PERIOD 3f COST	-	577	-	-	-	-	284	128	989	-	-	989	-	-	-	-	-	-	2,219	2,156
PERIOD 3 TOTALS		-	22,992	1,525	435	-	11,212	265,729	35,276	337,169	18,889	274,449	43,831	-	9,355	-	-	1,773	1,468,280	100,298	1,468,781
TOTAL COST TO DECOMMISSION		8,929	87,309	22,838	8,068	22,651	58,542	668,385	141,143	1,017,865	595,962	370,904	50,998	144,866	167,555	826	673	1,773	15,277,230	672,967	4,397,236

Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
TOTAL COST TO DECOMMISSION WITH 16.1% CONTINGENCY:					**$1,017,865**	**thousands of 2020 dollars**															
TOTAL NRC LICENSE TERMINATION COST IS 58.55% OR:					**$595,962**	**thousands of 2020 dollars**															
SPENT FUEL MANAGEMENT COST IS 36.44% OR:					**$370,904**	**thousands of 2020 dollars**															
NON-NUCLEAR DEMOLITION COST IS 5.01% OR:					**$50,998**	**thousands of 2020 dollars**															
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):					**169,054**	**Cubic Feet**															
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:					**1,773**	**Cubic Feet**															
TOTAL SCRAP METAL REMOVED:					**32,925**	**Tons**															
TOTAL CRAFT LABOR REQUIREMENTS:					**672,967**	**Man-hours**															

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.10	End product description	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.12	Define major work sequence	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
1a.1.13	Perform SER and EA	-	-	-	-	-	-	170	26	196	196	-	-	-	-	-	-	-	-	-	1,326
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	275	41	316	316	-	-	-	-	-	-	-	-	-	2,138
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	270	41	311	280	-	31	-	-	-	-	-	-	-	2,104
1a.1.17.2	Plant systems	-	-	-	-	-	-	229	34	263	237	-	26	-	-	-	-	-	-	-	1,782
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	27	4	32	32	-	-	-	-	-	-	-	-	-	214
1a.1.17.4	Reactor internals	-	-	-	-	-	-	390	59	449	449	-	-	-	-	-	-	-	-	-	3,036
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	357	54	411	411	-	-	-	-	-	-	-	-	-	2,779
1a.1.17.6	Biological shield	-	-	-	-	-	-	27	4	32	32	-	-	-	-	-	-	-	-	-	214
1a.1.17.7	Steam generators	-	-	-	-	-	-	171	26	197	197	-	-	-	-	-	-	-	-	-	1,334
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	88	13	101	51	-	51	-	-	-	-	-	-	-	684
1a.1.17.9	Main Turbine	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
1a.1.17.10	Main Condensers	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
1a.1.17.11	Plant structures & buildings	-	-	-	-	-	-	171	26	197	99	-	99	-	-	-	-	-	-	-	1,334
1a.1.17.12	Waste management	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
1a.1.17.13	Facility & site closeout	-	-	-	-	-	-	49	7	57	28	-	28	-	-	-	-	-	-	-	385
1a.1.17	Total	-	-	-	-	-	-	2,079	312	2,391	2,105	-	286	-	-	-	-	-	-	-	16,175
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	132	20	152	152	-	-	-	-	-	-	-	-	-	1,026
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	77	12	88	88	-	-	-	-	-	-	-	-	-	599
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	68	10	78	78	-	-	-	-	-	-	-	-	-	526
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	10,195	1,529	11,724	11,439	-	286	-	-	-	-	-	-	-	33,420
Period 1a Additional Costs																					
1a.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
1a.2	Subtotal Period 1a Additional Costs	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,330	199	1,529	-	1,529	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	8,394	1,259	9,653	9,653	-	-	-	-	-	-	-	-	-	-
1a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	10,973	1,459	12,432	9,653	2,779	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	578	-	-	-	-	-	144	722	722	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	11	5	-	47	-	13	76	76	-	-	-	565	-	-	-	11,299	18	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	638	64	702	702	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-

Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1a Period-Dependent Costs (continued)																					
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	21,681	3,252	24,933	24,933	-	-	-	-	-	-	-	-	-	345,280
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,331	11	5	-	47	41,706	6,122	49,221	46,279	2,942	-	-	565	-	-	-	11,299	18	468,000
1a.0	TOTAL PERIOD 1a COST	-	1,331	11	5	-	47	71,324	10,377	83,095	77,089	5,720	286	-	565	-	-	-	11,299	18	501,420
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	260	39	299	269	-	30	-	-	-	-	-	-	-	2,024
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.3	Reactor internals	-	-	-	-	-	-	137	21	158	158	-	-	-	-	-	-	-	-	-	1,069
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	74	11	85	21	-	64	-	-	-	-	-	-	-	577
1b.1.1.5	CRD cooling assembly	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.6	CRD housings & ICI tubes	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.7	Incore instrumentation	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	199	30	229	229	-	-	-	-	-	-	-	-	-	1,552
1b.1.1.9	Facility closeout	-	-	-	-	-	-	66	10	76	38	-	38	-	-	-	-	-	-	-	513
1b.1.1.10	Missile shields	-	-	-	-	-	-	25	4	28	28	-	-	-	-	-	-	-	-	-	192
1b.1.1.11	Biological shield	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	513
1b.1.1.12	Steam generators	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
1b.1.1.13	Reinforced concrete	-	-	-	-	-	-	55	8	63	32	-	32	-	-	-	-	-	-	-	428
1b.1.1.14	Main Turbine	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
1b.1.1.15	Main Condensers	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
1b.1.1.16	Auxiliary building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
1b.1.1.17	Reactor building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
1b.1.1	Total	-	-	-	-	-	-	1,827	274	2,101	1,706	-	395	-	-	-	-	-	-	-	14,215
1b.1.2	Decon primary loop	572	-	-	-	-	-	-	286	859	859	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	572	-	-	-	-	-	1,827	560	2,959	2,564	-	395	-	-	-	-	-	-	1,067	14,215
Period 1b Additional Costs																					
1b.2.1	Site Characterization	-	-	-	-	-	-	1,505	451	1,956	1,956	-	-	-	-	-	-	-	-	8,988	3,563
1b.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
1b.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
1b.2	Subtotal Period 1b Additional Costs	-	2,526	356	244	178	1,369	1,505	1,524	7,702	7,702	-	-	6,132	12,843	-	-	-	518,936	32,243	3,563
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	25	-	16	29	-	66	-	35	172	172	-	-	-	152	-	-	-	9,127	30	-
1b.3.4	Process decommissioning chemical flush waste	2	-	61	199	-	3,889	-	1,009	5,159	5,159	-	-	-	-	588	-	-	62,689	110	-
1b.3.5	Small tool allowance	-	36	-	-	-	-	-	5	42	42	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	399	60	459	-	459	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	4,017	603	4,620	4,620	-	-	-	-	-	-	-	-	-	-
1b.3.10	Prairie Island Indian Community Payments	-	-	-	-	-	-	623	-	623	-	623	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,185	1,236	77	228	-	3,955	6,303	2,555	17,540	16,458	1,082	-	-	152	588	-	-	71,815	140	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	828	83	910	910	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,713	171	1,884	1,884	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	449	-	-	-	-	-	112	561	561	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	6	3	-	27	-	8	43	43	-	-	-	324	-	-	-	6,473	11	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,617	243	1,859	1,859	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	196	20	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,084	108	1,193	-	1,193	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-

Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1b Period-Dependent Costs (continued)																					
1b.4.14	Security Staff Cost	-	-	-	-	-	-	4,153	623	4,775	4,775	-	-	-	-	-	-	-	-	-	61,192
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	4,182	627	4,810	4,810	-	-	-	-	-	-	-	-	-	46,672
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	10,811	1,622	12,432	12,432	-	-	-	-	-	-	-	-	-	172,167
1b.4	Subtotal Period 1b Period-Dependent Costs	38	825	6	3	-	27	25,571	3,830	30,299	28,832	1,467	-	-	324	-	-	-	6,473	11	280,031
1b.0	TOTAL PERIOD 1b COST	3,795	4,586	440	475	178	5,351	35,206	8,470	58,501	55,557	2,549	395	6,132	13,319	588	-	-	597,225	33,460	297,808
PERIOD 1 TOTALS		3,795	5,917	451	479	178	5,398	106,531	18,847	141,595	132,646	8,269	681	6,132	13,884	588	-	-	608,524	33,478	799,228
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Reactor Coolant Piping	54	47	10	18	-	187	-	89	406	406	-	-	-	508	-	-	-	35,411	1,421	-
2a.1.1.2	Pressurizer Relief Tank	24	21	6	12	-	125	-	51	238	238	-	-	-	338	-	-	-	23,594	630	-
2a.1.1.3	Reactor Coolant Pumps & Motors	57	68	110	93	-	463	-	186	977	977	-	-	-	2,332	-	-	-	295,800	2,049	100
2a.1.1.4	Pressurizer	-	77	503	97	-	776	-	278	1,732	1,732	-	-	-	2,196	-	-	-	185,015	1,666	938
2a.1.1.5	Steam Generators	-	3,307	2,269	1,770	2,409	4,001	-	2,681	16,437	16,437	-	-	18,672	11,316	-	-	-	1,689,435	11,613	2,875
2a.1.1.6	CRDMs/ICIs/Service Structure Removal	302	281	218	66	-	938	-	488	2,294	2,294	-	-	-	4,797	-	-	-	177,400	8,104	-
2a.1.1.7	Reactor Vessel Internals	82	4,861	13,621	929	-	9,015	307	11,878	40,693	40,693	-	-	-	501	125	673	-	164,987	25,123	1,163
2a.1.1.8	Reactor Vessel	94	6,046	2,028	728	-	2,975	307	6,804	18,982	18,982	-	-	-	8,073	-	-	-	576,524	25,123	1,163
2a.1.1	Totals	613	14,709	18,764	3,714	2,409	18,480	614	22,455	81,759	81,759	-	-	18,672	30,062	125	673	-	3,148,166	75,729	6,240
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	331	172	64	527	377	-	283	1,752	1,752	-	-	2,131	1,187	-	-	-	203,265	4,667	-
2a.1.3	Main Condensers	-	2,801	109	62	705	533	-	960	5,170	5,170	-	-	3,800	1,587	-	-	-	271,824	39,151	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
2a.1.4.2	Auxiliary	-	221	-	-	-	-	-	33	254	254	-	-	-	-	-	-	-	-	1,309	-
2a.1.4.3	Radwaste	-	9	-	-	-	-	-	1	10	10	-	-	-	-	-	-	-	-	65	-
2a.1.4	Totals	-	1,023	-	-	-	-	-	154	1,177	1,177	-	-	-	-	-	-	-	-	8,963	-
Disposal of Plant Systems																					
2a.1.5.1	Admin Bldg Ventilation	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	90	-
2a.1.5.2	Air Removal	-	29	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	422	-
2a.1.5.3	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	676	-
2a.1.5.4	Auxiliary Feedwater - RCA	-	38	0	1	30	-	-	14	84	84	-	-	178	-	-	-	-	7,214	486	-
2a.1.5.5	Bleed Steam	-	90	-	-	-	-	-	13	103	-	-	103	-	-	-	-	-	-	1,331	-
2a.1.5.6	Caustic Addition - RCA	-	40	0	2	40	-	-	16	99	99	-	-	240	-	-	-	-	9,761	468	-
2a.1.5.7	Chemical Feed	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	261	-
2a.1.5.8	Chemical Feed - RCA	-	3	0	0	3	-	-	1	7	7	-	-	16	-	-	-	-	634	31	-
2a.1.5.9	Circulating Water	-	27	-	-	-	-	-	4	32	-	-	32	-	-	-	-	-	-	401	-
2a.1.5.10	Condensate	-	525	-	-	-	-	-	79	603	-	-	603	-	-	-	-	-	-	7,537	-
2a.1.5.11	Condensate Polishing	-	208	-	-	-	-	-	31	239	-	-	239	-	-	-	-	-	-	2,987	-
2a.1.5.12	Condensate Polishing - RCA	-	38	1	4	81	-	-	22	145	145	-	-	483	-	-	-	-	19,616	493	-
2a.1.5.13	Electro-Hydraulic	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	143	-
2a.1.5.14	External Circulating Water	-	26	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	385	-
2a.1.5.15	External Circulating Water - RCA	-	72	1	5	121	-	-	37	237	237	-	-	721	-	-	-	-	29,284	938	-
2a.1.5.16	Feedwater	-	127	-	-	-	-	-	19	146	-	-	146	-	-	-	-	-	-	1,840	-
2a.1.5.17	Feedwater - RCA	-	248	8	31	694	-	-	171	1,152	1,152	-	-	4,147	-	-	-	-	168,414	3,377	-
2a.1.5.18	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	504	-
2a.1.5.19	Heater Drain	-	384	-	-	-	-	-	58	441	-	-	441	-	-	-	-	-	-	5,638	-
2a.1.5.20	Hypobromous Acid Feed	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	86	-
2a.1.5.21	Hypobromous Acid Feed - RCA	-	1	0	0	0	-	-	0	2	2	-	-	2	-	-	-	-	100	12	-
2a.1.5.22	Internal Circ Water & CDSR	-	25	-	-	-	-	-	4	29	-	-	29	-	-	-	-	-	-	366	-
2a.1.5.23	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
2a.1.5.24	Main Steam	-	101	-	-	-	-	-	15	116	-	-	116	-	-	-	-	-	-	1,482	-
2a.1.5.25	Main Steam - RCA	-	380	11	38	864	-	-	231	1,525	1,525	-	-	5,166	-	-	-	-	209,799	5,146	-
2a.1.5.26	Repairable Spare Snubbers	-	6	0	0	2	-	-	2	10	10	-	-	12	-	-	-	-	490	82	-
2a.1.5.27	Steam Exclusion	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	32	-
2a.1.5.28	Steam Exclusion - RCA	-	4	0	0	4	-	-	2	10	10	-	-	24	-	-	-	-	966	47	-
2a.1.5.29	Steam Generator Blowdown	-	416	21	27	319	215	-	212	1,210	1,210	-	-	1,906	631	-	-	-	118,130	5,778	-
2a.1.5.30	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-

Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2a.1.5.31	Turbine & Moisture Separators	-	377	-	-	-	-	-	57	434	-	-	434	-	-	-	-	-	-	5,472	-
2a.1.5.32	Turbine Oil Purification	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	757	-
2a.1.5.33	Water Treatment	-	453	-	-	-	-	-	68	521	-	-	521	-	-	-	-	-	-	6,677	-
2a.1.5.34	Water Treatment - RCA	-	20	0	1	19	-	-	8	49	49	-	-	115	-	-	-	-	4,652	252	-
2a.1.5	Totals	-	3,817	43	108	2,177	215	-	1,100	7,461	4,528	-	2,933	13,010	631	-	-	-	569,060	54,280	-
2a.1.6	Scaffolding in support of decommissioning	-	3,020	22	10	188	30	-	794	4,064	4,064	-	-	1,012	89	-	-	-	51,216	26,270	-
2a.1	Subtotal Period 2a Activity Costs	613	25,702	19,110	3,959	6,005	19,635	614	25,745	101,384	98,450	-	2,933	38,625	33,556	125	673	-	4,243,531	209,060	6,240
Period 2a Additional Costs																					
2a.2.1	Retired RPV Upper Internals Package	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
2a.2	Subtotal Period 2a Additional Costs	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	49	-	33	60	-	134	-	70	347	347	-	-	-	308	-	-	-	18,487	60	-
2a.3.2	Process decommissioning chemical flush waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a.3.3	Small tool allowance	-	269	-	-	-	-	-	40	309	278	-	31	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	8,593	1,289	9,882	-	9,882	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	8,215	1,232	9,447	9,447	-	-	-	-	-	-	-	-	-	-
2a.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,780	-	1,780	-	1,780	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	49	269	33	60	-	134	18,588	2,632	21,765	10,072	11,662	31	-	308	-	-	-	18,487	60	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	107	-	-	-	-	-	-	27	134	134	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	690	69	759	759	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	4,548	455	5,002	5,002	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,103	-	-	-	-	-	526	2,629	2,629	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,565	-	-	-	-	-	535	4,100	4,100	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	86	35	-	358	-	103	582	582	-	-	-	4,345	-	-	-	86,891	142	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,194	329	2,523	2,523	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	526	53	578	578	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,647	265	2,912	-	2,912	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	1,695	254	1,949	1,949	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	602	90	692	-	692	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	80	12	92	-	92	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	318	48	366	366	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,596	239	1,835	1,835	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	10,900	1,635	12,534	12,534	-	-	-	-	-	-	-	-	-	160,018
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	20,663	3,099	23,763	23,763	-	-	-	-	-	-	-	-	-	225,210
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	27,056	4,058	31,115	31,115	-	-	-	-	-	-	-	-	-	419,049
2a.4	Subtotal Period 2a Period-Dependent Costs	107	5,668	86	35	-	358	73,514	11,797	91,565	87,870	3,696	-	-	4,345	-	-	-	86,891	142	804,276
2a.0	TOTAL PERIOD 2a COST	770	31,895	19,616	4,270	6,005	21,522	92,716	41,215	218,009	199,687	15,358	2,964	38,625	38,584	237	673	-	4,399,073	212,595	810,649
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	ADT & Misc Ventilation	-	25	1	1	26	3	-	11	66	66	-	-	153	9	-	-	-	6,803	363	-
2b.1.1.2	Aux Bldg Normal Ventilation	-	69	2	6	116	13	-	39	246	246	-	-	692	39	-	-	-	30,595	1,013	-
2b.1.1.3	Aux Bldg Special Ventilation	-	14	0	1	12	2	-	6	34	34	-	-	70	6	-	-	-	3,234	197	-
2b.1.1.4	Battery Rm Special Ventilation	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	24	-
2b.1.1.5	Boron Recycle	0	4	0	0	0	3	-	2	10	10	-	-	3	9	-	-	-	700	50	-
2b.1.1.6	Chemical & Volume Control	749	942	62	57	394	677	-	853	3,736	3,736	-	-	2,356	1,977	-	-	-	223,753	23,197	-
2b.1.1.7	Cold Chemical Lab Ventilation	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
2b.1.1.8	Component Cooling - RCA	-	647	25	88	2,007	-	-	479	3,246	3,246	-	-	11,996	-	-	-	-	487,169	8,583	-
2b.1.1.9	Containment Cooling	-	35	-	-	-	-	-	5	40	-	-	40	-	-	-	-	-	-	502	-
2b.1.1.10	Containment Cooling - RCA	-	302	6	20	459	-	-	148	934	934	-	-	2,743	-	-	-	-	111,390	3,949	-
2b.1.1.11	Containment Hydrogen Control - RCA	-	36	0	1	24	-	-	13	74	74	-	-	141	-	-	-	-	5,742	494	-
2b.1.1.12	Containment Spray - RCA	-	194	3	11	243	-	-	87	538	538	-	-	1,453	-	-	-	-	59,019	2,617	-
2b.1.1.13	Containment Ventilation	-	235	23	49	790	243	-	248	1,587	1,587	-	-	4,721	722	-	-	-	237,643	3,375	-
2b.1.1.14	Control/Relay/Cmptr Rm Vent	-	31	1	2	44	7	-	17	102	102	-	-	260	20	-	-	-	11,878	454	-
2b.1.1.15	Cooling Water	-	159	-	-	-	-	-	24	183	-	-	183	-	-	-	-	-	-	2,344	-
2b.1.1.16	Cooling Water - RCA	-	476	17	62	1,412	-	-	342	2,310	2,310	-	-	8,442	-	-	-	-	342,822	6,311	-
2b.1.1.17	Cranes/Hoists/Elevators - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-

Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2b.1.1.18	D3 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-
2b.1.1.19	D4 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-
2b.1.1.20	D5 Emergency Diesel	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
2b.1.1.21	Electrical - Clean	-	1,714	-	-	-	-	-	257	1,972	-	-	1,972	-	-	-	-	-	-	24,276	-
2b.1.1.22	Electrical - Contaminated	-	475	5	16	334	25	-	178	1,034	1,034	-	-	1,997	75	-	-	-	85,887	6,503	-
2b.1.1.23	Electrical - Decontaminated	-	2,955	38	138	3,138	-	-	1,234	7,503	7,503	-	-	18,753	-	-	-	-	761,569	38,423	-
2b.1.1.24	Filter Rm Ventilation	-	5	0	0	4	0	-	2	11	11	-	-	24	1	-	-	-	1,017	69	-
2b.1.1.25	Fire Protection & Detection	-	204	-	-	-	-	-	31	235	-	-	235	-	-	-	-	-	-	3,009	-
2b.1.1.26	Fire Protection & Detection - RCA	-	246	4	13	306	-	-	110	679	679	-	-	1,828	-	-	-	-	74,245	3,134	-
2b.1.1.27	Fuel Handling	-	74	1	2	34	17	-	28	156	156	-	-	200	49	-	-	-	11,273	1,101	-
2b.1.1.28	Fuel Oil	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
2b.1.1.29	HVAC - Clean	-	151	-	-	-	-	-	23	174	-	-	174	-	-	-	-	-	-	2,373	-
2b.1.1.30	HVAC - Contaminated	-	1,231	29	87	1,798	136	-	627	3,908	3,908	-	-	10,745	405	-	-	-	462,103	16,579	-
2b.1.1.31	Heating	-	322	-	-	-	-	-	48	370	-	-	370	-	-	-	-	-	-	4,804	-
2b.1.1.32	Heating - RCA	-	337	4	14	319	-	-	135	809	809	-	-	1,907	-	-	-	-	77,458	4,086	-
2b.1.1.33	Hot Lab & Sample Rm Ventilation	-	20	0	1	18	1	-	8	48	48	-	-	107	4	-	-	-	4,622	285	-
2b.1.1.34	Incore Instrumentation	0	30	1	2	10	20	-	14	77	77	-	-	60	58	-	-	-	6,143	458	-
2b.1.1.35	Misc Drains & Vents	-	234	12	12	77	145	-	109	590	590	-	-	458	426	-	-	-	46,079	3,180	-
2b.1.1.36	Misc Lab & Service Areas Vent	-	129	8	8	62	84	-	65	356	356	-	-	370	244	-	-	-	30,899	1,713	-
2b.1.1.37	Miscellaneous Gas	-	72	-	-	-	-	-	11	83	-	-	83	-	-	-	-	-	-	1,073	-
2b.1.1.38	Miscellaneous Gas - RCA	-	134	1	4	100	-	-	49	289	289	-	-	600	-	-	-	-	24,378	1,636	-
2b.1.1.39	Radiation Monitoring	-	7	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	111	-
2b.1.1.40	Radiation Monitoring - RCA	-	65	1	2	53	-	-	25	145	145	-	-	316	-	-	-	-	12,826	782	-
2b.1.1.41	Reactor Coolant	163	236	20	16	38	249	-	213	937	937	-	-	229	730	-	-	-	56,440	5,517	-
2b.1.1.42	Reactor Hot Sampling	140	126	11	7	9	108	-	132	533	533	-	-	54	312	-	-	-	22,678	3,686	-
2b.1.1.43	Reactor Makeup	-	41	-	-	-	-	-	6	47	-	-	47	-	-	-	-	-	-	583	-
2b.1.1.44	Reactor Makeup - RCA	-	4	0	0	5	-	-	2	11	11	-	-	28	-	-	-	-	1,148	47	-
2b.1.1.45	Reactor Vessel	9	18	1	0	4	5	-	11	47	47	-	-	22	14	-	-	-	1,816	385	-
2b.1.1.46	Residual Heat Removal	348	393	84	86	477	1,102	-	641	3,132	3,132	-	-	2,853	3,244	-	-	-	324,232	7,112	-
2b.1.1.47	Safeguards Chilled Water	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
2b.1.1.48	Safety Injection	-	874	42	72	1,117	395	-	500	3,000	3,000	-	-	6,676	1,161	-	-	-	345,708	12,284	-
2b.1.1.49	Sampling	-	52	3	2	6	32	-	23	119	119	-	-	37	93	-	-	-	7,628	714	-
2b.1.1.50	Service Bldg & New Cmptr Vent	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	6	-
2b.1.1.51	Shield Bldg Ventilation	-	120	13	25	339	163	-	127	787	787	-	-	2,028	484	-	-	-	113,139	1,743	-
2b.1.1.52	Station & Instrument Air	-	161	-	-	-	-	-	24	185	-	-	185	-	-	-	-	-	-	2,424	-
2b.1.1.53	Station & Instrument Air - RCA	-	299	3	12	272	-	-	118	704	704	-	-	1,625	-	-	-	-	65,986	3,638	-
2b.1.1.54	Turbine Bldg Traps & Drains	-	30	-	-	-	-	-	5	35	-	-	35	-	-	-	-	-	-	462	-
2b.1.1.55	Turbine Bldg Traps & Drains - RCA	-	30	0	1	30	-	-	12	73	73	-	-	180	-	-	-	-	7,321	344	-
2b.1.1.56	Turbine Bldg Ventilation	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	655	-
2b.1.1.57	Unit Coolers	-	23	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	332	-
2b.1.1.58	Unit Coolers - RCA	-	56	0	2	39	-	-	20	117	117	-	-	232	-	-	-	-	9,413	690	-
2b.1.1.59	Waste Gas Disposal	553	479	43	45	410	464	-	585	2,581	2,581	-	-	2,453	1,358	-	-	-	187,339	14,308	-
2b.1.1.60	Waste Liquid Disposal	1,436	1,800	116	100	612	1,234	-	1,595	6,893	6,893	-	-	3,655	3,594	-	-	-	381,754	44,485	-
2b.1.1.61	Waste Solid Disposal	115	145	12	11	65	134	-	140	622	622	-	-	389	393	-	-	-	41,177	3,481	-
2b.1.1	Totals	3,515	16,542	596	980	15,220	5,264	-	9,399	51,516	48,072	-	3,444	90,963	15,429	-	-	-	4,689,210	270,390	-
2b.1.2	Scaffolding in support of decommissioning	-	3,775	27	13	235	37	-	993	5,081	5,081	-	-	1,265	112	-	-	-	64,020	32,837	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor	1,215	2,808	240	1,236	373	13,625	-	4,981	24,479	24,479	-	-	2,230	83,434	-	-	-	3,633,771	50,962	-
2b.1.3.2	Auxiliary	1,292	422	23	117	177	648	-	960	3,639	3,639	-	-	1,060	6,118	-	-	-	332,495	23,821	-
2b.1.3.3	Backwash Waste Receiving Tank	-	28	3	17	-	97	-	34	179	179	-	-	-	929	-	-	-	43,896	301	-
2b.1.3.4	Drum Transfer & Truck Loading Enclosure	18	9	1	3	3	14	-	16	63	63	-	-	19	135	-	-	-	7,118	369	-
2b.1.3.5	LLRW Storage Enclosure	123	54	3	17	6	96	-	103	403	403	-	-	38	920	-	-	-	44,971	2,426	-
2b.1.3.6	Radwaste	55	24	1	8	7	43	-	47	185	185	-	-	42	412	-	-	-	21,136	1,083	-
2b.1.3.7	Resin Disposal	16	12	1	3	14	14	-	17	76	76	-	-	83	124	-	-	-	9,271	383	-
2b.1.3	Totals	2,720	3,357	271	1,400	581	14,537	-	6,158	29,024	29,024	-	-	3,471	92,071	-	-	-	4,092,658	79,343	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	225	34	259	259	-	-	-	-	-	-	-	-	-	1,751
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	6,235	23,674	895	2,393	16,035	19,839	225	16,584	85,879	82,435	-	3,444	95,700	107,611	-	-	-	8,845,887	382,570	1,751

Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
2b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
2b.2.3	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,175	11	36	606	-	4,573	1,077	7,478	7,478	-	-	5,880	-	-	-	-	147,000	7,427	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	166	-	113	203	-	456	-	239	1,176	1,176	-	-	-	1,047	-	-	-	62,844	204	-
2b.3.2	Process decommissioning chemical flush waste	3	-	119	390	-	893	-	295	1,699	1,699	-	-	-	1,154	-	-	-	122,948	216	-
2b.3.3	Small tool allowance	-	446	-	-	-	-	-	67	513	513	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	49,678	7,452	57,129	-	57,129	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	2,839	426	3,265	3,265	-	-	-	-	-	-	-	-	-	-
2b.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,348	-	1,348	-	1,348	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	169	446	232	592	-	1,349	53,866	8,478	65,132	6,654	58,478	-	-	2,201	-	-	-	185,792	420	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,219	-	-	-	-	-	-	305	1,524	1,524	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	523	52	575	575	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	3,075	308	3,383	3,383	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,866	-	-	-	-	-	716	3,582	3,582	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,774	-	-	-	-	-	416	3,190	3,190	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	103	42	-	429	-	124	698	698	-	-	-	5,209	-	-	-	104,172	170	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,313	197	1,509	1,509	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	398	40	438	438	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,006	201	2,207	-	2,207	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	1,284	193	1,477	1,477	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	456	68	524	-	524	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	229	34	264	264	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	60	9	69	-	69	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	67	10	78	78	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,209	181	1,391	1,391	-	-	-	-	-	-	-	-	-	-
2b.4.16	Security Staff Cost	-	-	-	-	-	-	8,259	1,239	9,497	9,497	-	-	-	-	-	-	-	-	-	121,244
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	15,117	2,268	17,385	17,385	-	-	-	-	-	-	-	-	-	163,904
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	19,642	2,946	22,588	22,588	-	-	-	-	-	-	-	-	-	304,233
2b.4	Subtotal Period 2b Period-Dependent Costs	1,219	5,640	103	42	-	429	53,639	9,307	70,380	67,579	2,800	-	-	5,209	-	-	-	104,172	170	589,381
2b.0	TOTAL PERIOD 2b COST	7,623	30,935	1,242	3,063	16,641	21,617	112,303	35,446	228,869	164,147	61,278	3,444	101,580	115,021	-	-	-	9,282,851	390,587	591,132
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	347	35	86	41	-	703	-	373	1,585	1,585	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
2d.1.2.1	Electrical - Contaminated - Fuel Pool	-	203	2	7	145	11	-	77	445	445	-	-	864	33	-	-	-	37,167	2,783	-
2d.1.2.2	Electrical - Decontaminated - Fuel Pool	-	1,269	17	59	1,350	-	-	530	3,225	3,225	-	-	8,069	-	-	-	-	327,668	16,495	-
2d.1.2.3	Fire Protection & Detection - RCA Fuel P	-	37	1	2	48	-	-	17	105	105	-	-	286	-	-	-	-	11,622	476	-
2d.1.2.4	HVAC - Contaminated - Fuel Pool	-	553	13	39	808	61	-	282	1,756	1,756	-	-	4,828	182	-	-	-	207,612	7,448	-
2d.1.2.5	Safeguards Chilled Water - RCA	-	5	0	0	4	-	-	2	11	11	-	-	26	-	-	-	-	1,045	51	-
2d.1.2.6	Spent Fuel Pool Cooling	32	36	3	2	6	37	-	36	152	152	-	-	39	107	-	-	-	8,481	882	-
2d.1.2.7	Spent Fuel Pool Normal Ventilation	-	27	1	2	44	4	-	15	93	93	-	-	265	12	-	-	-	11,505	394	-
2d.1.2	Totals	32	2,130	36	112	2,405	113	-	958	5,786	5,786	-	-	14,376	333	-	-	-	605,100	28,530	-
Decontamination of Site Buildings																					
2d.1.3.1	Fuel Handling of Aux Building	1,029	1,138	13	45	404	195	-	916	3,741	3,741	-	-	2,417	1,652	-	-	-	177,755	30,404	-
2d.1.3	Totals	1,029	1,138	13	45	404	195	-	916	3,741	3,741	-	-	2,417	1,652	-	-	-	177,755	30,404	-
2d.1.4	Scaffolding in support of decommissioning	-	755	5	3	47	7	-	199	1,016	1,016	-	-	253	22	-	-	-	12,804	6,567	-
2d.1	Subtotal Period 2d Activity Costs	1,408	4,058	141	202	2,857	1,018	-	2,445	12,128	12,128	-	-	17,046	4,099	-	-	-	928,579	66,078	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240

Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	45	-	31	56	-	126	-	65	323	323	-	-	-	288	-	-	-	17,293	56	-
2d.3.2	Process decommissioning chemical flush waste	0	-	1	5	-	10	-	3	20	20	-	-	-	13	-	-	-	1,422	2	-
2d.3.3	Small tool allowance	-	83	-	-	-	-	-	12	95	95	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	975	-	975	-	975	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	45	83	162	128	1,112	314	975	316	3,135	2,160	975	-	6,000	831	-	-	-	322,324	206	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	236	-	-	-	-	-	-	59	295	295	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	378	38	416	416	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	2,004	200	2,204	2,204	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	794	-	-	-	-	-	198	992	992	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	2,007	-	-	-	-	-	301	2,308	2,308	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	40	16	-	165	-	48	268	268	-	-	-	2,002	-	-	-	40,031	65	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	506	76	582	582	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	277	28	305	305	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	58	6	64	-	64	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	929	139	1,068	1,068	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	332	50	381	381	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	44	7	50	-	50	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	49	7	56	56	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	875	131	1,006	1,006	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	5,782	867	6,649	4,694	1,955	-	-	-	-	-	-	-	-	84,454
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	6,401	960	7,361	7,361	-	-	-	-	-	-	-	-	-	70,243
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	8,100	1,215	9,315	8,858	456	-	-	-	-	-	-	-	-	126,681
2d.4	Subtotal Period 2d Period-Dependent Costs	236	2,801	40	16	-	165	25,734	4,330	33,321	30,796	2,525	-	-	2,002	-	-	-	40,031	65	281,377
2d.0	TOTAL PERIOD 2d COST	1,689	6,941	343	346	3,969	1,496	27,746	7,403	49,932	46,432	3,501	-	23,046	6,931	-	-	-	1,290,933	66,348	287,617
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	934	-	934	-	934	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	2,198	190	2,388	1,454	934	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	362	36	398	398	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,771	177	1,948	1,948	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	710	-	-	-	-	-	178	888	888	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	3	-	28	-	8	45	45	-	-	-	334	-	-	-	6,685	11	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	263	26	290	290	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	42	6	48	-	48	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	5,538	831	6,369	4,497	1,873	-	-	-	-	-	-	-	-	80,898
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	4,011	602	4,613	4,175	438	-	-	-	-	-	-	-	-	59,507
2f.4	Subtotal Period 2f Period-Dependent Costs	-	710	7	3	-	28	17,461	2,682	20,890	18,470	2,420	-	-	334	-	-	-	6,685	11	186,687
2f.0	TOTAL PERIOD 2f COST	-	710	7	3	-	28	26,867	5,034	32,648	29,294	3,354	-	-	334	-	-	-	6,685	100,906	189,807
PERIOD 2 TOTALS		10,081	70,482	21,208	7,682	26,615	44,663	259,631	89,097	529,458	439,560	83,490	6,408	163,252	160,871	237	673	-	14,979,540	770,436	1,879,206

Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor	-	4,645	-	-	-	-	-	697	5,342	-	-	5,342	-	-	-	-	-	-	44,679	-
3b.1.1.2	Auxiliary	-	1,993	-	-	-	-	-	299	2,291	-	-	2,291	-	-	-	-	-	-	11,902	-
3b.1.1.3	Condensate Storage Tank Foundation	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	33	-
3b.1.1.4	Construction Warehouse & Fab Shop	-	130	-	-	-	-	-	19	149	-	-	149	-	-	-	-	-	-	1,405	-
3b.1.1.5	D3/D4 Emergency Generator	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	84	-
3b.1.1.6	Drum Transfer & Truck Loading Enclosure	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	221	-
3b.1.1.7	Hydrogen House	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	47	-
3b.1.1.8	LLRW Storage Enclosure	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	853	-
3b.1.1.9	Misc Structures 2017	-	2,617	-	-	-	-	-	393	3,009	-	-	3,009	-	-	-	-	-	-	22,582	-
3b.1.1.10	Radwaste	-	176	-	-	-	-	-	26	202	-	-	202	-	-	-	-	-	-	1,400	-
3b.1.1.11	Resin Disposal	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	120	-
3b.1.1.12	Structures below 3' below grade	-	1,785	-	-	-	-	-	268	2,052	-	-	2,052	-	-	-	-	-	-	9,238	-
3b.1.1.13	Sulfuric Acid Tank Enclosure	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	35	-
3b.1.1.14	Turbine	-	2,140	-	-	-	-	-	321	2,461	-	-	2,461	-	-	-	-	-	-	21,997	-
3b.1.1.15	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
3b.1.1.16	Warehouse #2	-	24	-	-	-	-	-	4	27	-	-	27	-	-	-	-	-	-	213	-
3b.1.1.17	Waste Neutralizing Tank House	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	56	-
3b.1.1.18	Waste Oil Storage	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	70	-
3b.1.1.19	Water Treatment	-	324	-	-	-	-	-	49	373	-	-	373	-	-	-	-	-	-	2,690	-
3b.1.1.20	Fuel Handling of Aux Building	-	1,095	-	-	-	-	-	164	1,259	-	-	1,259	-	-	-	-	-	-	8,240	-
3b.1.1	Totals	-	15,501	-	-	-	-	-	2,325	17,826	-	-	17,826	-	-	-	-	-	-	127,723	-
Site Closeout Activities																					
3b.1.2	Remove Rubble	-	1,330	-	-	-	-	-	200	1,530	-	-	1,530	-	-	-	-	-	-	6,495	-
3b.1.3	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
3b.1.4	Final report to NRC	-	-	-	-	-	-	86	13	99	99	-	-	-	-	-	-	-	-	-	667
3b.1	Subtotal Period 3b Activity Costs	-	17,279	-	-	-	-	86	2,605	19,969	99	-	19,871	-	-	-	-	-	-	135,138	667
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	4,912	-	-	-	-	10	738	5,660	-	-	5,660	-	-	-	-	-	-	18,372	-
3b.2.2	Intake Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
3b.2.3	Construction Debris	-	-	-	-	-	-	2,150	323	2,473	-	-	2,473	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	9,257	-	-	-	-	-	1,388	10,645	-	-	10,645	-	-	-	-	-	-	9,327	-
3b.2	Subtotal Period 3b Additional Costs	-	14,610	-	-	-	-	2,160	2,516	19,286	-	-	19,286	-	-	-	-	-	-	31,251	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	212	-	-	-	-	-	32	244	-	-	244	-	-	-	-	-	-	-	-
3b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,649	-	2,649	-	2,649	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	212	-	-	-	-	2,649	32	2,892	-	2,649	244	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	513	51	565	565	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	4,167	417	4,583	-	4,583	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	395	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	218	22	239	-	239	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	157	16	173	-	173	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	397	781	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	119	18	136	-	136	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	361	54	416	153	263	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	4,616	692	5,308	-	5,308	-	-	-	-	-	-	-	-	57,340
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,004	751	5,755	-	1,237	4,517	-	-	-	-	-	-	-	74,431
3b.4	Subtotal Period 3b Period-Dependent Costs	-	7,144	-	-	-	-	27,444	4,935	39,523	1,114	13,117	25,292	-	-	-	-	-	-	-	248,656
3b.0	TOTAL PERIOD 3b COST	-	39,245	-	-	-	-	32,338	10,087	81,671	1,213	15,766	64,692	-	-	-	-	-	-	166,388	249,323

Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	18,191	2,729	20,919	-	20,919	-	-	-	-	-	-	-	-	-
3c.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	44,363	-	44,363	-	44,363	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	62,554	2,729	65,283	-	65,283	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	8,599	860	9,459	-	9,459	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	49,245	4,924	54,169	-	54,169	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	5,140	514	5,653	-	5,653	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	2,633	263	2,896	-	2,896	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	5,787	868	6,655	-	6,655	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	1,988	298	2,286	-	2,286	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	2,220	333	2,554	-	2,554	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	77,306	11,596	88,902	-	88,902	-	-	-	-	-	-	-	-	960,328
3c.4.10	Utility Staff Cost	-	-	-	-	-	-	18,035	2,705	20,740	-	20,740	-	-	-	-	-	-	-	-	249,316
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	170,952	22,362	193,314	-	193,314	-	-	-	-	-	-	-	-	1,209,643
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	233,506	25,091	258,597	-	258,597	-	-	-	-	-	-	-	-	1,209,643
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1.1	Totals	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3d.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	76	4	80	-	80	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	9	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	53	5	58	58	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	4	0	4	-	4	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	3	0	3	-	3	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	2	0	3	3	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	83	13	96	96	-	-	-	-	-	-	-	-	-	1,037
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	269
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	181	24	204	197	7	-	-	-	-	-	-	-	-	1,306
3d.0	TOTAL PERIOD 3d COST	-	-	1,444	-	-	8,680	256	1,691	12,071	11,984	87	-	-	-	-	-	1,773	344,823	-	1,306
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	24	81	435	-	2,532	839	978	4,890	4,890	-	-	-	9,355	-	-	-	1,123,457	3,762	1,065
3e.2	Subtotal Period 3e Additional Costs	-	24	81	435	-	2,532	839	978	4,890	4,890	-	-	-	9,355	-	-	-	1,123,457	3,762	1,065
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	93	23	116	116	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	56	14	69	69	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	11	3	13	13	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	54	14	68	68	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	21	5	26	26	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	174	43	217	217	-	-	-	-	-	-	-	-	-	2,500
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	129	32	161	161	-	-	-	-	-	-	-	-	-	1,896
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	536	134	670	670	-	-	-	-	-	-	-	-	-	4,396

Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
3e.0	TOTAL PERIOD 3e COST	-	24	81	435	-	2,532	1,375	1,112	5,560	5,560	-	-	-	9,355	-	-	-	1,123,457	3,762	5,460
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	515	-	-	-	-	68	87	670	-	-	670	-	-	-	-	-	-	2,219	80
3f.2	Subtotal Period 3f Additional Costs	-	515	-	-	-	-	68	87	670	-	-	670	-	-	-	-	-	-	2,219	80
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	28	3	31	-	-	31	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	59	-	-	-	-	-	9	68	-	-	68	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	6	-	-	6	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	28	4	32	-	-	32	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	11	2	12	-	-	12	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	89	13	102	-	-	102	-	-	-	-	-	-	-	1,281
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	55	8	63	-	-	63	-	-	-	-	-	-	-	795
3f.4	Subtotal Period 3f Period-Dependent Costs	-	59	-	-	-	-	216	40	315	-	-	315	-	-	-	-	-	-	-	2,076
3f.0	TOTAL PERIOD 3f COST	-	577	-	-	-	-	284	128	989	-	-	989	-	-	-	-	-	-	2,219	2,156
PERIOD 3 TOTALS		-	39,847	1,525	435	-	11,212	267,760	38,109	358,887	18,757	274,449	65,681	-	9,355	-	-	1,773	1,468,280	172,370	1,467,888
TOTAL COST TO DECOMMISSION		13,876	116,246	23,184	8,596	26,793	61,273	633,922	146,053	1,029,941	590,962	366,208	72,770	169,384	184,110	826	673	1,773	17,056,350	976,284	4,146,322

TOTAL COST TO DECOMMISSION WITH 16.52% CONTINGENCY:	**$1,029,941**	**thousands of 2020 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 57.38% OR:	**$590,962**	**thousands of 2020 dollars**
SPENT FUEL MANAGEMENT COST IS 35.56% OR:	**$366,208**	**thousands of 2020 dollars**
NON-NUCLEAR DEMOLITION COST IS 7.07% OR:	**$72,770**	**thousands of 2020 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**185,608**	**Cubic Feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**
TOTAL SCRAP METAL REMOVED:	**42,328**	**Tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**976,284**	**Man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX E

DETAILED COST ANALYSIS

SCENARIO 3: DECON with 100 Year DFS

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Prairie Island Nuclear Generating Plant, Unit 2 ..... E-11

Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	632	95	727	654	-	73	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Biological shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Steam generators	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
1a.1.17.10	Main Condensers	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
1a.1.17.11	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
1a.1.17.12	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.13	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	4,861	729	5,591	4,923	-	668	-	-	-	-	-	-	-	37,827
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	15,945	2,392	18,336	17,669	-	668	-	-	-	-	-	-	-	78,157
Period 1a Additional Costs																					
1a.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1a.2	Subtotal Period 1a Additional Costs	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
Period 1a Collateral Costs																					
1a.3.1	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	50	-	14	82	82	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,137	114	1,251	1,251	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	26,931	4,040	30,971	30,971	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	5	-	50	47,456	6,970	55,860	52,918	2,942	-	-	610	-	-	-	12,190	20	544,960

Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	5	-	50	77,325	11,263	90,022	85,163	4,191	668	-	610	-	-	-	12,190	20	623,117
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	321	48	369	369	-	-	-	-	-	-	-	-	-	2,500
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD cooling assembly	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	CRD housings & ICI tubes	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
1b.1.1.10	Missile shields	-	-	-	-	-	-	58	9	67	67	-	-	-	-	-	-	-	-	-	450
1b.1.1.11	Biological shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.12	Steam generators	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1b.1.1.13	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
1b.1.1.14	Main Turbine	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
1b.1.1.15	Main Condensers	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
1b.1.1.16	Auxiliary building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1.17	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,272	641	4,913	3,989	-	924	-	-	-	-	-	-	-	33,243
1b.1.2	Decon primary loop	572	-	-	-	-	-	-	286	859	859	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	572	-	-	-	-	-	4,272	927	5,772	4,848	-	924	-	-	-	-	-	-	1,067	33,243
Period 1b Additional Costs																					
1b.2.1	Site Characterization	-	-	-	-	-	-	3,520	1,056	4,576	4,576	-	-	-	-	-	-	-	-	21,020	8,332
1b.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
1b.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
1b.2	Subtotal Period 1b Additional Costs	-	2,526	356	244	178	1,369	3,520	2,129	10,321	10,321	-	-	6,132	12,843	-	-	-	518,936	44,275	8,332
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	25	-	16	29	-	66	-	35	172	172	-	-	-	152	-	-	-	9,127	30	-
1b.3.4	Process decommissioning chemical flush waste	2	-	61	199	-	3,889	-	1,009	5,159	5,159	-	-	-	-	588	-	-	62,689	110	-
1b.3.5	Small tool allowance	-	36	-	-	-	-	-	5	42	42	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	163	25	188	-	188	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	1,032	155	1,187	1,187	-	-	-	-	-	-	-	-	-	-
1b.3.10	Prairie Island Indian Community Payments	-	-	-	-	-	-	623	-	623	-	623	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,185	1,236	77	228	-	3,955	3,082	2,072	13,836	13,025	811	-	-	152	588	-	-	71,815	140	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	828	83	910	910	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,806	181	1,987	1,987	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	475	-	-	-	-	-	119	594	594	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	3	-	29	-	8	48	48	-	-	-	356	-	-	-	7,122	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,617	243	1,859	1,859	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	323	32	355	355	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,084	108	1,193	-	1,193	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	4,153	623	4,775	4,775	-	-	-	-	-	-	-	-	-	61,192
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,846	877	6,723	6,723	-	-	-	-	-	-	-	-	-	63,266
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	13,505	2,026	15,531	15,531	-	-	-	-	-	-	-	-	-	211,579
1b.4	Subtotal Period 1b Period-Dependent Costs	38	851	7	3	-	29	30,149	4,513	35,590	34,123	1,467	-	-	356	-	-	-	7,122	12	336,037
1b.0	TOTAL PERIOD 1b COST	3,795	4,613	440	475	178	5,354	41,023	9,641	65,519	62,317	2,278	924	6,132	13,351	588	-	-	597,873	45,493	377,612

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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 1 TOTALS		3,795	5,980	452	480	178	5,404	118,348	20,903	155,540	147,480	6,468	1,592	6,132	13,961	588	-	-	610,063	45,513	1,000,729
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Reactor Coolant Piping	54	47	10	18	-	187	-	89	406	406	-	-	-	508	-	-	-	35,411	1,421	-
2a.1.1.2	Pressurizer Relief Tank	24	21	6	12	-	125	-	51	238	238	-	-	-	338	-	-	-	23,594	630	-
2a.1.1.3	Reactor Coolant Pumps & Motors	57	68	110	93	-	463	-	186	977	977	-	-	-	2,332	-	-	-	295,800	2,049	100
2a.1.1.4	Pressurizer	-	77	503	97	-	776	-	278	1,732	1,732	-	-	-	2,196	-	-	-	185,015	1,666	938
2a.1.1.5	Steam Generators	-	3,307	2,269	1,770	2,409	4,001	-	2,681	16,437	16,437	-	-	18,672	11,316	-	-	-	1,689,435	11,613	2,875
2a.1.1.6	CRDMs/ICIs/Service Structure Removal	302	281	218	66	-	938	-	488	2,294	2,294	-	-	-	4,797	-	-	-	177,400	8,104	-
2a.1.1.7	Reactor Vessel Internals	82	4,861	13,621	929	-	9,015	307	11,878	40,693	40,693	-	-	-	501	125	673	-	164,987	25,123	1,163
2a.1.1.8	Reactor Vessel	94	6,046	2,028	728	-	2,975	307	6,804	18,982	18,982	-	-	-	8,073	-	-	-	576,524	25,123	1,163
2a.1.1	Totals	613	14,709	18,764	3,714	2,409	18,480	614	22,455	81,759	81,759	-	-	18,672	30,062	125	673	-	3,148,166	75,729	6,240
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	331	172	64	527	377	-	283	1,752	1,752	-	-	2,131	1,187	-	-	-	203,265	4,667	-
2a.1.3	Main Condensers	-	2,801	109	62	705	533	-	960	5,170	5,170	-	-	3,800	1,587	-	-	-	271,824	39,151	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
2a.1.4	Totals	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
Disposal of Plant Systems																					
2a.1.5.1	Air Removal	-	31	-	-	-	-	-	5	36	-	-	36	-	-	-	-	-	-	452	-
2a.1.5.2	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	670	-
2a.1.5.3	Auxiliary Feedwater - RCA	-	47	0	2	36	-	-	17	102	102	-	-	215	-	-	-	-	8,722	601	-
2a.1.5.4	Bleed Steam	-	90	-	-	-	-	-	14	104	-	-	104	-	-	-	-	-	-	1,335	-
2a.1.5.5	Caustic Addition - RCA	-	38	0	2	39	-	-	16	95	95	-	-	233	-	-	-	-	9,453	444	-
2a.1.5.6	Chemical Feed	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	304	-
2a.1.5.7	Chemical Feed - RCA	-	1	0	0	1	-	-	0	3	3	-	-	6	-	-	-	-	243	12	-
2a.1.5.8	Circulating Water	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	619	-
2a.1.5.9	Condensate	-	474	-	-	-	-	-	71	545	-	-	545	-	-	-	-	-	-	6,837	-
2a.1.5.10	Condensate Polishing	-	235	-	-	-	-	-	35	271	-	-	271	-	-	-	-	-	-	3,420	-
2a.1.5.11	Condensate Polishing - RCA	-	183	4	15	348	-	-	101	651	651	-	-	2,078	-	-	-	-	84,395	2,329	-
2a.1.5.12	Electro-hydraulic	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	127	-
2a.1.5.13	Feedwater	-	153	-	-	-	-	-	23	175	-	-	175	-	-	-	-	-	-	2,215	-
2a.1.5.14	Feedwater - RCA	-	195	7	24	537	-	-	133	895	895	-	-	3,208	-	-	-	-	130,294	2,651	-
2a.1.5.15	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	505	-
2a.1.5.16	Heater Drain	-	400	-	-	-	-	-	60	460	-	-	460	-	-	-	-	-	-	5,881	-
2a.1.5.17	Internal Circ Water & CDSR	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	389	-
2a.1.5.18	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
2a.1.5.19	Main Steam	-	115	-	-	-	-	-	17	133	-	-	133	-	-	-	-	-	-	1,690	-
2a.1.5.20	Main Steam - RCA	-	366	10	37	844	-	-	225	1,482	1,482	-	-	5,044	-	-	-	-	204,825	4,956	-
2a.1.5.21	Steam Generator Blowdown	-	478	22	29	340	234	-	235	1,337	1,337	-	-	2,031	686	-	-	-	126,640	6,667	-
2a.1.5.22	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
2a.1.5.23	Turbine & Moisture Separators	-	386	-	-	-	-	-	58	444	-	-	444	-	-	-	-	-	-	5,609	-
2a.1.5.24	Turbine Oil Purification	-	70	-	-	-	-	-	11	81	-	-	81	-	-	-	-	-	-	1,003	-
2a.1.5	Totals	-	3,445	44	108	2,144	234	-	1,048	7,023	4,565	-	2,458	12,815	686	-	-	-	564,572	48,794	-
2a.1.6	Scaffolding in support of decommissioning	-	930	3	1	26	4	-	238	1,202	1,202	-	-	138	12	-	-	-	6,985	6,368	-
2a.1	Subtotal Period 2a Activity Costs	613	23,011	19,092	3,950	5,810	19,628	614	25,102	97,819	95,362	-	2,458	37,556	33,533	125	673	-	4,194,811	182,298	6,240
Period 2a Additional Costs																					
2a.2.1	Retired RPV Upper Internals Package	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
2a.2	Subtotal Period 2a Additional Costs	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	48	-	32	58	-	130	-	68	337	337	-	-	-	299	-	-	-	17,968	58	-
2a.3.3	Small tool allowance	-	239	-	-	-	-	-	36	274	247	-	27	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,639	246	1,885	-	1,885	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	12,780	1,917	14,697	14,697	-	-	-	-	-	-	-	-	-	-
2a.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,780	-	1,780	-	1,780	-	-	-	-	-	-	-	-	-
2a.3.7	On-site survey and release of 0.0 tons clean metallic waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	48	239	32	58	-	130	16,198	2,267	18,972	15,281	3,664	27	-	299	-	-	-	17,968	58	-

Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	107	-	-	-	-	-	-	27	134	134	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	690	69	759	759	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	5,009	501	5,510	5,510	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	1,950	-	-	-	-	-	487	2,437	2,437	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,565	-	-	-	-	-	535	4,100	4,100	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	73	30	-	303	-	88	493	493	-	-	-	3,681	-	-	-	73,619	120	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,194	329	2,523	2,523	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	842	84	926	926	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,647	265	2,912	-	2,912	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	1,695	254	1,949	1,949	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	602	90	692	-	692	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	80	12	92	-	92	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	318	48	366	366	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,596	239	1,835	1,835	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	11,727	1,759	13,486	13,486	-	-	-	-	-	-	-	-	-	172,726
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	20,663	3,099	23,763	23,763	-	-	-	-	-	-	-	-	-	225,210
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	26,905	4,036	30,941	30,941	-	-	-	-	-	-	-	-	-	417,453
2a.4	Subtotal Period 2a Period-Dependent Costs	107	5,515	73	30	-	303	74,968	11,922	92,918	89,223	3,696	-	-	3,681	-	-	-	73,619	120	815,389
2a.0	TOTAL PERIOD 2a COST	768	29,021	19,584	4,254	5,810	21,456	91,780	40,333	213,006	203,161	7,360	2,485	37,556	37,889	237	673	-	4,336,562	185,810	821,762
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	Aux Bldg Normal Ventilation	-	2	0	0	1	-	-	1	3	3	-	-	3	-	-	-	-	140	29	-
2b.1.1.2	Battery Rm Special Ventilation	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	6	-
2b.1.1.3	Buildings Maintenance	-	5	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	65	-
2b.1.1.4	Chemical & Volume Control	1,120	1,389	89	90	753	973	-	1,286	5,700	5,700	-	-	4,498	2,846	-	-	-	366,565	34,533	-
2b.1.1.5	Component Cooling - RCA	-	858	25	91	2,079	-	-	543	3,597	3,597	-	-	12,427	-	-	-	-	504,675	11,242	-
2b.1.1.6	Containment Cooling	-	74	-	-	-	-	-	11	85	-	-	85	-	-	-	-	-	-	1,086	-
2b.1.1.7	Containment Cooling - RCA	-	304	7	25	569	-	-	166	1,070	1,070	-	-	3,400	-	-	-	-	138,090	3,971	-
2b.1.1.8	Containment Hydrogen Control - RCA	-	30	0	1	18	-	-	10	59	59	-	-	105	-	-	-	-	4,278	401	-
2b.1.1.9	Containment Spray - RCA	-	93	2	6	145	-	-	46	293	293	-	-	868	-	-	-	-	35,249	1,217	-
2b.1.1.10	Containment Ventilation	-	255	24	51	828	248	-	260	1,667	1,667	-	-	4,951	737	-	-	-	247,952	3,668	-
2b.1.1.11	Cooling Water	-	163	-	-	-	-	-	24	187	-	-	187	-	-	-	-	-	-	2,396	-
2b.1.1.12	Cooling Water - RCA	-	658	16	57	1,293	-	-	368	2,392	2,392	-	-	7,728	-	-	-	-	313,832	8,594	-
2b.1.1.13	D1 Emergency Diesel	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	730	-
2b.1.1.14	D2 Emergency Diesel	-	36	-	-	-	-	-	5	41	-	-	41	-	-	-	-	-	-	522	-
2b.1.1.15	Diesel Rooms Ventilation	-	9	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	135	-
2b.1.1.16	Electrical - Clean	-	1,905	-	-	-	-	-	286	2,191	-	-	2,191	-	-	-	-	-	-	26,981	-
2b.1.1.17	Electrical - Contaminated	-	611	7	20	423	32	-	228	1,321	1,321	-	-	2,527	95	-	-	-	108,690	8,377	-
2b.1.1.18	Electrical - Decontaminated	-	3,787	48	173	3,940	-	-	1,569	9,518	9,518	-	-	23,551	-	-	-	-	956,401	49,378	-
2b.1.1.19	Fuel Handling	-	121	6	11	152	73	-	74	436	436	-	-	908	218	-	-	-	50,723	1,784	-
2b.1.1.20	Fuel Oil	-	121	-	-	-	-	-	18	140	-	-	140	-	-	-	-	-	-	1,697	-
2b.1.1.21	HVAC - Clean	-	120	-	-	-	-	-	18	138	-	-	138	-	-	-	-	-	-	1,891	-
2b.1.1.22	HVAC - Contaminated	-	374	9	26	546	41	-	190	1,186	1,186	-	-	3,261	123	-	-	-	140,257	5,032	-
2b.1.1.23	Incore Instrumentation	0	28	1	2	10	19	-	14	74	74	-	-	60	57	-	-	-	6,058	425	-
2b.1.1.24	Misc Drains & Vents	-	233	15	13	65	176	-	115	618	618	-	-	390	514	-	-	-	49,062	3,091	-
2b.1.1.25	Reactor Coolant	153	311	21	18	58	265	-	234	1,060	1,060	-	-	344	777	-	-	-	64,085	6,470	-
2b.1.1.26	Reactor Hot Sampling	149	136	12	7	11	118	-	142	576	576	-	-	66	342	-	-	-	25,063	3,946	-
2b.1.1.27	Reactor Makeup	-	73	-	-	-	-	-	11	84	-	-	84	-	-	-	-	-	-	1,042	-
2b.1.1.28	Reactor Vessel	9	21	1	0	4	5	-	12	52	52	-	-	26	14	-	-	-	2,000	425	-
2b.1.1.29	Residual Heat Removal	357	419	85	86	484	1,105	-	654	3,190	3,190	-	-	2,895	3,252	-	-	-	326,425	7,621	-
2b.1.1.30	Safeguards Chilled Water	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	259	-
2b.1.1.31	Safety Injection	-	893	42	73	1,136	393	-	507	3,044	3,044	-	-	6,788	1,156	-	-	-	349,908	12,561	-
2b.1.1.32	Sampling	-	60	4	3	10	37	-	26	140	140	-	-	59	107	-	-	-	9,420	811	-
2b.1.1.33	Shield Bldg Ventilation	-	140	14	26	360	165	-	135	839	839	-	-	2,152	491	-	-	-	118,583	2,030	-
2b.1.1.34	Station & Instrument Air	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	300	-
2b.1.1.35	Station & Instrument Air - RCA	-	81	1	2	56	-	-	29	169	169	-	-	332	-	-	-	-	13,496	1,053	-
2b.1.1.36	Turbine Bldg Traps & Drains	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	767	-
2b.1.1.37	Unit Coolers	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	611	-
2b.1.1.38	Unit Coolers - RCA	-	55	0	2	39	-	-	20	115	115	-	-	230	-	-	-	-	9,348	683	-
2b.1.1	Totals	1,789	13,544	429	786	12,979	3,651	-	7,032	40,209	37,119	-	3,091	77,571	10,728	-	-	-	3,840,299	205,829	-
2b.1.2	Scaffolding in support of decommissioning	-	1,163	4	2	32	5	-	297	1,503	1,503	-	-	173	15	-	-	-	8,731	7,960	-

Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Decontamination of Site Buildings																					
2b.1.3.1	Reactor	1,215	2,807	240	1,236	373	13,624	-	4,981	24,476	24,476	-	-	2,230	83,429	-	-	-	3,633,417	50,950	-
2b.1.3.2	Backwash Waste Receiving Tank	-	28	3	17	-	97	-	34	179	179	-	-	-	929	-	-	-	43,896	301	-
2b.1.3	Totals	1,215	2,835	243	1,253	373	13,721	-	5,015	24,655	24,655	-	-	2,230	84,358	-	-	-	3,677,313	51,251	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	3,004	17,542	675	2,041	13,384	17,377	526	12,423	66,973	63,882	-	3,091	79,974	95,101	-	-	-	7,526,343	265,040	4,096
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
2b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
2b.2.3	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,175	11	36	606	-	4,573	1,077	7,478	7,478	-	-	5,880	-	-	-	-	147,000	7,427	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	108	-	74	132	-	298	-	156	768	768	-	-	-	684	-	-	-	41,053	133	-
2b.3.2	Process decommissioning chemical flush waste	2	-	90	296	-	677	-	224	1,289	1,289	-	-	-	875	-	-	-	93,252	164	-
2b.3.3	Small tool allowance	-	315	-	-	-	-	-	47	362	362	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	10,782	1,617	12,400	-	12,400	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	6,141	921	7,063	7,063	-	-	-	-	-	-	-	-	-	-
2b.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,348	-	1,348	-	1,348	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	110	315	164	428	-	975	18,272	2,965	23,230	9,482	13,748	-	-	1,559	-	-	-	134,305	297	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	511	-	-	-	-	-	-	128	639	639	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	523	52	575	575	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	3,435	344	3,779	3,779	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,140	-	-	-	-	-	535	2,675	2,675	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,774	-	-	-	-	-	416	3,190	3,190	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	70	28	-	290	-	84	472	472	-	-	-	3,521	-	-	-	70,425	115	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,313	197	1,509	1,509	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	638	64	701	701	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,006	201	2,207	-	2,207	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	1,284	193	1,477	1,477	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	456	68	524	-	524	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	229	34	264	264	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	60	9	69	-	69	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	67	10	78	78	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,209	181	1,391	1,391	-	-	-	-	-	-	-	-	-	-
2b.4.16	Security Staff Cost	-	-	-	-	-	-	8,259	1,239	9,497	9,497	-	-	-	-	-	-	-	-	-	121,244
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	10,738	1,611	12,348	12,348	-	-	-	-	-	-	-	-	-	121,244
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	13,928	2,089	16,017	16,017	-	-	-	-	-	-	-	-	-	225,649
2b.4	Subtotal Period 2b Period-Dependent Costs	511	4,914	70	28	-	290	44,145	7,454	57,412	54,612	2,800	-	-	3,521	-	-	-	70,425	115	468,137
2b.0	TOTAL PERIOD 2b COST	3,626	23,946	920	2,533	13,990	18,642	67,516	23,920	155,093	135,455	16,548	3,091	85,854	100,182	-	-	-	7,878,073	272,879	472,233
PERIOD 2c - Spent fuel delay prior to SFP decon																					
Period 2c Direct Decommissioning Activities																					
Period 2c Collateral Costs																					
2c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	53,816	8,072	61,889	-	61,889	-	-	-	-	-	-	-	-	-
2c.3.2	Retention and Severance	-	-	-	-	-	-	3,512	527	4,039	4,039	-	-	-	-	-	-	-	-	-	-
2c.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,526	-	1,526	-	1,526	-	-	-	-	-	-	-	-	-
2c.3	Subtotal Period 2c Collateral Costs	-	-	-	-	-	-	58,855	8,599	67,455	4,039	63,415	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	592	59	651	651	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	3,512	351	3,863	3,863	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	263	-	-	-	-	-	66	328	328	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	9	4	-	38	-	11	61	61	-	-	-	457	-	-	-	9,141	15	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	1,486	223	1,709	1,709	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	687	69	756	756	-	-	-	-	-	-	-	-	-	-
2c.4.7	Emergency Planning Fees	-	-	-	-	-	-	2,271	227	2,498	-	2,498	-	-	-	-	-	-	-	-	-
2c.4.8	Fixed Overhead	-	-	-	-	-	-	1,454	218	1,672	1,672	-	-	-	-	-	-	-	-	-	-
2c.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	516	77	593	-	593	-	-	-	-	-	-	-	-	-

Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2c Period-Dependent Costs (continued)																					
2c.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	260	39	298	298	-	-	-	-	-	-	-	-	-	-
2c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	68	10	79	-	79	-	-	-	-	-	-	-	-	-
2c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	76	11	88	88	-	-	-	-	-	-	-	-	-	-
2c.4.13	Security Staff Cost	-	-	-	-	-	-	9,348	1,402	10,751	10,751	-	-	-	-	-	-	-	-	-	137,246
2c.4.14	Utility Staff Cost	-	-	-	-	-	-	1,195	179	1,375	1,375	-	-	-	-	-	-	-	-	-	19,062
2c.4	Subtotal Period 2c Period-Dependent Costs	-	263	9	4	-	38	21,465	2,943	24,721	21,552	3,170	-	-	457	-	-	-	9,141	15	156,308
2c.0	TOTAL PERIOD 2c COST	-	263	9	4	-	38	80,320	11,543	92,176	25,591	66,585	-	-	457	-	-	-	9,141	15	156,308
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	347	35	86	41	-	703	-	373	1,585	1,585	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
2d.1.2.1	Electrical - Contaminated - Fuel Pool	-	152	2	5	103	8	-	56	325	325	-	-	615	23	-	-	-	26,449	2,077	-
2d.1.2.2	Electrical - Decontaminated - Fuel Pool	-	947	12	43	986	-	-	392	2,380	2,380	-	-	5,893	-	-	-	-	239,327	12,340	-
2d.1.2.3	HVAC - Contaminated - Fuel Pool	-	160	4	11	234	18	-	82	508	508	-	-	1,398	53	-	-	-	60,110	2,157	-
2d.1.2.4	Safeguards Chilled Water - RCA	-	85	1	4	83	-	-	34	207	207	-	-	495	-	-	-	-	20,100	1,019	-
2d.1.2.5	Spent Fuel Pool Cooling	303	357	34	32	135	450	-	382	1,693	1,693	-	-	806	1,325	-	-	-	117,816	7,613	-
2d.1.2.6	Station & Instrument Air - RCA Fuel Pool	-	20	0	1	14	-	-	7	42	42	-	-	83	-	-	-	-	3,374	263	-
2d.1.2	Totals	303	1,721	52	96	1,554	476	-	954	5,157	5,157	-	-	9,290	1,401	-	-	-	467,176	25,468	-
2d.1.4	Scaffolding in support of decommissioning	-	233	1	0	6	1	-	59	301	301	-	-	35	3	-	-	-	1,746	1,592	-
2d.1	Subtotal Period 2d Activity Costs	650	1,989	139	138	1,561	1,180	-	1,386	7,042	7,042	-	-	9,325	3,496	-	-	-	601,841	27,637	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	30	-	21	38	-	86	-	44	220	220	-	-	-	197	-	-	-	11,793	38	-
2d.3.2	Process decommissioning chemical flush waste	1	-	34	110	-	251	-	83	478	478	-	-	-	324	-	-	-	34,576	61	-
2d.3.3	Small tool allowance	-	37	-	-	-	-	-	6	42	42	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	975	-	975	-	975	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	31	37	185	215	1,112	514	975	367	3,437	2,462	975	-	6,000	1,050	-	-	-	349,977	246	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	59	-	-	-	-	-	-	15	73	73	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	378	38	416	416	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	2,004	200	2,204	2,204	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	575	-	-	-	-	-	144	719	719	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	2,007	-	-	-	-	-	301	2,308	2,308	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	16	7	-	68	-	20	111	111	-	-	-	830	-	-	-	16,609	27	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	506	76	582	582	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	439	44	483	483	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	58	6	64	-	64	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	929	139	1,068	1,068	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	332	50	381	381	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	44	7	50	-	50	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	49	7	56	56	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	875	131	1,006	1,006	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	5,782	867	6,649	4,694	1,955	-	-	-	-	-	-	-	-	84,454
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	6,401	960	7,361	7,361	-	-	-	-	-	-	-	-	-	70,243
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	8,100	1,215	9,315	8,858	456	-	-	-	-	-	-	-	-	126,681
2d.4	Subtotal Period 2d Period-Dependent Costs	59	2,582	16	7	-	68	25,896	4,220	32,848	30,323	2,525	-	-	830	-	-	-	16,609	27	281,377
2d.0	TOTAL PERIOD 2d COST	740	4,608	340	360	2,673	1,763	27,908	6,284	44,675	41,175	3,501	-	15,325	5,377	-	-	-	968,427	27,910	287,617
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-

Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	934	-	934	-	934	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	2,198	190	2,388	1,454	934	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	362	36	398	398	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,771	177	1,948	1,948	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	501	-	-	-	-	-	125	626	626	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	3	-	28	-	8	45	45	-	-	-	334	-	-	-	6,685	11	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	422	42	465	465	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	42	6	48	-	48	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	5,538	831	6,369	4,497	1,873	-	-	-	-	-	-	-	-	80,898
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	4,011	602	4,613	4,175	438	-	-	-	-	-	-	-	-	59,507
2f.4	Subtotal Period 2f Period-Dependent Costs	-	501	7	3	-	28	17,620	2,646	20,803	18,384	2,420	-	-	334	-	-	-	6,685	11	186,687
2f.0	TOTAL PERIOD 2f COST	-	501	7	3	-	28	23,183	3,845	27,566	24,212	3,354	-	-	334	-	-	-	6,685	40,542	189,807
PERIOD 2 TOTALS		5,134	58,338	20,860	7,153	22,473	41,926	290,708	85,924	532,517	429,593	97,348	5,576	138,734	144,239	237	673	-	13,198,890	527,156	1,927,726
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor	-	4,644	-	-	-	-	-	697	5,341	-	-	5,341	-	-	-	-	-	-	44,669	-
3b.1.1.2	Condensate Storage Tank Foundation	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	16	-
3b.1.1.3	Structures below 3' below grade	-	1,651	-	-	-	-	-	248	1,899	-	-	1,899	-	-	-	-	-	-	8,411	-
3b.1.1.4	Turbine	-	2,139	-	-	-	-	-	321	2,460	-	-	2,460	-	-	-	-	-	-	21,985	-
3b.1.1.5	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
3b.1.1	Totals	-	8,803	-	-	-	-	-	1,320	10,123	-	-	10,123	-	-	-	-	-	-	76,939	-
Site Closeout Activities																					
3b.1.2	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
3b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	9,251	-	-	-	-	200	1,418	10,869	231	-	10,639	-	-	-	-	-	-	77,859	1,560
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	2,242	-	-	-	-	5	337	2,583	-	-	2,583	-	-	-	-	-	-	8,386	-
3b.2.2	Intake Structure cofferdam	-	623	-	-	-	-	-	93	716	-	-	716	-	-	-	-	-	-	5,168	-
3b.2.3	Construction Debris	-	-	-	-	-	-	10	2	12	-	-	12	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	3,011	-	-	-	-	-	452	3,462	-	-	3,462	-	-	-	-	-	-	2,904	-
3b.2.5	Disposition of Original Casks	-	24	80	418	-	2,390	-	728	3,640	3,640	-	-	-	8,929	-	-	-	1,059,612	146	-
3b.2	Subtotal Period 3b Additional Costs	-	5,899	80	418	-	2,390	15	1,611	10,413	3,640	-	6,773	-	8,929	-	-	-	1,059,612	16,604	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	121	-	-	-	-	-	18	139	-	-	139	-	-	-	-	-	-	-	-
3b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,649	-	2,649	-	2,649	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	121	-	-	-	-	2,649	18	2,787	-	2,649	139	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	513	51	565	565	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	4,167	417	4,583	-	4,583	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	395	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	218	22	239	-	239	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	157	16	173	-	173	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	397	781	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	119	18	136	-	136	-	-	-	-	-	-	-	-	-

Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3b Period-Dependent Costs (continued)																					
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	361	54	416	153	263	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	4,616	692	5,308	-	5,308	-	-	-	-	-	-	-	-	57,340
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,170	776	5,946	-	1,278	4,668	-	-	-	-	-	-	-	76,637
3b.4	Subtotal Period 3b Period-Dependent Costs	-	7,144	-	-	-	-	27,610	4,960	39,714	1,114	13,158	25,442	-	-	-	-	-	-	-	250,861
3b.0	TOTAL PERIOD 3b COST	-	22,414	80	418	-	2,390	30,474	8,008	63,784	4,985	15,807	42,993	-	8,929	-	-	-	1,059,612	94,463	252,421
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	270,755	40,613	311,368	-	311,368	-	-	-	-	-	-	-	-	-
3c.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	94,360	-	94,360	-	94,360	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	365,115	40,613	405,728	-	405,728	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	18,290	1,829	20,119	-	20,119	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	104,580	10,458	115,038	-	115,038	-	-	-	-	-	-	-	-	-
3c.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	9,306	931	10,237	-	10,237	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	5,600	560	6,160	-	6,160	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	12,308	1,846	14,155	-	14,155	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	4,228	634	4,862	-	4,862	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	4,723	708	5,431	-	5,431	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	164,428	24,664	189,092	-	189,092	-	-	-	-	-	-	-	-	2,042,594
3c.4.10	DOC Staff Cost	-	-	-	-	-	-	11,579	1,737	13,316	-	13,316	-	-	-	-	-	-	-	-	78,561
3c.4.11	Utility Staff Cost	-	-	-	-	-	-	71,292	10,694	81,986	-	81,986	-	-	-	-	-	-	-	-	1,040,937
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	406,334	54,061	460,395	-	460,395	-	-	-	-	-	-	-	-	3,162,093
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	771,448	94,674	866,123	-	866,123	-	-	-	-	-	-	-	-	3,162,093
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1.1	Totals	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3d.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	76	4	80	-	80	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	9	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	53	5	58	58	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	4	0	4	-	4	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	3	0	3	-	3	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	2	0	3	3	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	83	13	96	96	-	-	-	-	-	-	-	-	-	1,037
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	269
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	181	24	204	197	7	-	-	-	-	-	-	-	-	1,306
3d.0	TOTAL PERIOD 3d COST	-	-	1,444	-	-	8,680	256	1,691	12,071	11,984	87	-	-	-	-	-	1,773	344,823	-	1,306
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161
3e.2	Subtotal Period 3e Additional Costs	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161

Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	93	23	116	116	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	56	14	69	69	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	11	3	13	13	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	54	14	68	68	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	21	5	26	26	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	174	43	217	217	-	-	-	-	-	-	-	-	-	2,500
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	129	32	161	161	-	-	-	-	-	-	-	-	-	1,896
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	536	134	670	670	-	-	-	-	-	-	-	-	-	4,396
3e.0	TOTAL PERIOD 3e COST	-	0	2	17	-	142	1,733	473	2,367	2,367	-	-	-	424	-	-	-	65,754	5,882	5,556
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
3f.2	Subtotal Period 3f Additional Costs	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	28	3	31	-	-	31	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	59	-	-	-	-	-	9	68	-	-	68	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	6	-	-	6	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	28	4	32	-	-	32	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	11	2	12	-	-	12	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	89	13	102	-	-	102	-	-	-	-	-	-	-	1,281
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	55	8	63	-	-	63	-	-	-	-	-	-	-	795
3f.4	Subtotal Period 3f Period-Dependent Costs	-	59	-	-	-	-	216	40	315	-	-	315	-	-	-	-	-	-	-	2,076
3f.0	TOTAL PERIOD 3f COST	-	1,187	-	-	-	-	377	233	1,798	-	-	1,798	-	-	-	-	-	-	4,846	2,156
PERIOD 3 TOTALS		-	23,601	1,525	435	-	11,212	804,289	105,079	946,142	19,335	882,017	44,790	-	9,353	-	-	1,773	1,470,189	105,190	3,423,532
TOTAL COST TO DECOMMISSION		8,929	87,919	22,838	8,068	22,651	58,542	1,213,346	211,907	1,634,199	596,408	985,833	51,958	144,866	167,553	826	673	1,773	15,279,140	677,859	6,351,987

TOTAL COST TO DECOMMISSION WITH 14.9% CONTINGENCY:	**$1,634,199**	**thousands of 2020 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 36.5% OR:	**$596,408**	**thousands of 2020 dollars**
SPENT FUEL MANAGEMENT COST IS 60.33% OR:	**$985,833**	**thousands of 2020 dollars**
NON-NUCLEAR DEMOLITION COST IS 3.18% OR:	**$51,958**	**thousands of 2020 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**169,051**	**Cubic Feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**
TOTAL SCRAP METAL REMOVED:	**32,925**	**Tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**677,859**	**Man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.10	End product description	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.12	Define major work sequence	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
1a.1.13	Perform SER and EA	-	-	-	-	-	-	170	26	196	196	-	-	-	-	-	-	-	-	-	1,326
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	275	41	316	316	-	-	-	-	-	-	-	-	-	2,138
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	270	41	311	280	-	31	-	-	-	-	-	-	-	2,104
1a.1.17.2	Plant systems	-	-	-	-	-	-	229	34	263	237	-	26	-	-	-	-	-	-	-	1,782
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	27	4	32	32	-	-	-	-	-	-	-	-	-	214
1a.1.17.4	Reactor internals	-	-	-	-	-	-	390	59	449	449	-	-	-	-	-	-	-	-	-	3,036
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	357	54	411	411	-	-	-	-	-	-	-	-	-	2,779
1a.1.17.6	Biological shield	-	-	-	-	-	-	27	4	32	32	-	-	-	-	-	-	-	-	-	214
1a.1.17.7	Steam generators	-	-	-	-	-	-	171	26	197	197	-	-	-	-	-	-	-	-	-	1,334
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	88	13	101	51	-	51	-	-	-	-	-	-	-	684
1a.1.17.9	Main Turbine	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
1a.1.17.10	Main Condensers	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
1a.1.17.11	Plant structures & buildings	-	-	-	-	-	-	171	26	197	99	-	99	-	-	-	-	-	-	-	1,334
1a.1.17.12	Waste management	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
1a.1.17.13	Facility & site closeout	-	-	-	-	-	-	49	7	57	28	-	28	-	-	-	-	-	-	-	385
1a.1.17	Total	-	-	-	-	-	-	2,079	312	2,391	2,105	-	286	-	-	-	-	-	-	-	16,175
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	132	20	152	152	-	-	-	-	-	-	-	-	-	1,026
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	77	12	88	88	-	-	-	-	-	-	-	-	-	599
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	68	10	78	78	-	-	-	-	-	-	-	-	-	526
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	10,195	1,529	11,724	11,439	-	286	-	-	-	-	-	-	-	33,420
Period 1a Additional Costs																					
1a.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
1a.2	Subtotal Period 1a Additional Costs	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,330	199	1,529	-	1,529	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	8,394	1,259	9,653	9,653	-	-	-	-	-	-	-	-	-	-
1a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	10,973	1,459	12,432	9,653	2,779	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	578	-	-	-	-	-	144	722	722	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	11	5	-	47	-	13	76	76	-	-	-	565	-	-	-	11,299	18	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	638	64	702	702	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-

Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1a Period-Dependent Costs (continued)																					
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	21,681	3,252	24,933	24,933	-	-	-	-	-	-	-	-	-	345,280
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,331	11	5	-	47	41,706	6,122	49,221	46,279	2,942	-	-	565	-	-	-	11,299	18	468,000
1a.0	TOTAL PERIOD 1a COST	-	1,331	11	5	-	47	71,324	10,377	83,095	77,089	5,720	286	-	565	-	-	-	11,299	18	501,420
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	260	39	299	269	-	30	-	-	-	-	-	-	-	2,024
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.3	Reactor internals	-	-	-	-	-	-	137	21	158	158	-	-	-	-	-	-	-	-	-	1,069
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	74	11	85	21	-	64	-	-	-	-	-	-	-	577
1b.1.1.5	CRD cooling assembly	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.6	CRD housings & ICI tubes	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.7	Incore instrumentation	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	199	30	229	229	-	-	-	-	-	-	-	-	-	1,552
1b.1.1.9	Facility closeout	-	-	-	-	-	-	66	10	76	38	-	38	-	-	-	-	-	-	-	513
1b.1.1.10	Missile shields	-	-	-	-	-	-	25	4	28	28	-	-	-	-	-	-	-	-	-	192
1b.1.1.11	Biological shield	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	513
1b.1.1.12	Steam generators	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
1b.1.1.13	Reinforced concrete	-	-	-	-	-	-	55	8	63	32	-	32	-	-	-	-	-	-	-	428
1b.1.1.14	Main Turbine	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
1b.1.1.15	Main Condensers	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
1b.1.1.16	Auxiliary building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
1b.1.1.17	Reactor building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
1b.1.1	Total	-	-	-	-	-	-	1,827	274	2,101	1,706	-	395	-	-	-	-	-	-	-	14,215
1b.1.2	Decon primary loop	572	-	-	-	-	-	-	286	859	859	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	572	-	-	-	-	-	1,827	560	2,959	2,564	-	395	-	-	-	-	-	-	1,067	14,215
Period 1b Additional Costs																					
1b.2.1	Site Characterization	-	-	-	-	-	-	1,505	451	1,956	1,956	-	-	-	-	-	-	-	-	8,988	3,563
1b.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
1b.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
1b.2	Subtotal Period 1b Additional Costs	-	2,526	356	244	178	1,369	1,505	1,524	7,702	7,702	-	-	6,132	12,843	-	-	-	518,936	32,243	3,563
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	25	-	16	29	-	66	-	35	172	172	-	-	-	152	-	-	-	9,127	30	-
1b.3.4	Process decommissioning chemical flush waste	2	-	61	199	-	3,889	-	1,009	5,159	5,159	-	-	-	-	588	-	-	62,689	110	-
1b.3.5	Small tool allowance	-	36	-	-	-	-	-	5	42	42	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	399	60	459	-	459	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	4,017	603	4,620	4,620	-	-	-	-	-	-	-	-	-	-
1b.3.10	Prairie Island Indian Community Payments	-	-	-	-	-	-	623	-	623	-	623	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,185	1,236	77	228	-	3,955	6,303	2,555	17,540	16,458	1,082	-	-	152	588	-	-	71,815	140	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	828	83	910	910	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,713	171	1,884	1,884	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	449	-	-	-	-	-	112	561	561	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	6	3	-	27	-	8	43	43	-	-	-	324	-	-	-	6,473	11	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,617	243	1,859	1,859	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	196	20	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,084	108	1,193	-	1,193	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-

Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 1b Period-Dependent Costs (continued)																					
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	4,153	623	4,775	4,775	-	-	-	-	-	-	-	-	-	61,192
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	4,182	627	4,810	4,810	-	-	-	-	-	-	-	-	-	46,672
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	10,811	1,622	12,432	12,432	-	-	-	-	-	-	-	-	-	172,167
1b.4	Subtotal Period 1b Period-Dependent Costs	38	825	6	3	-	27	25,571	3,830	30,299	28,832	1,467	-	-	324	-	-	-	6,473	11	280,031
1b.0	TOTAL PERIOD 1b COST	3,795	4,586	440	475	178	5,351	35,206	8,470	58,501	55,557	2,549	395	6,132	13,319	588	-	-	597,225	33,460	297,808
PERIOD 1 TOTALS		3,795	5,917	451	479	178	5,398	106,531	18,847	141,595	132,646	8,269	681	6,132	13,884	588	-	-	608,524	33,478	799,228
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Reactor Coolant Piping	54	47	10	18	-	187	-	89	406	406	-	-	-	508	-	-	-	35,411	1,421	-
2a.1.1.2	Pressurizer Relief Tank	24	21	6	12	-	125	-	51	238	238	-	-	-	338	-	-	-	23,594	630	-
2a.1.1.3	Reactor Coolant Pumps & Motors	57	68	110	93	-	463	-	186	977	977	-	-	-	2,332	-	-	-	295,800	2,049	100
2a.1.1.4	Pressurizer	-	77	503	97	-	776	-	278	1,732	1,732	-	-	-	2,196	-	-	-	185,015	1,666	938
2a.1.1.5	Steam Generators	-	3,307	2,269	1,770	2,409	4,001	-	2,681	16,437	16,437	-	-	18,672	11,316	-	-	-	1,689,435	11,613	2,875
2a.1.1.6	CRDMs/ICIs/Service Structure Removal	302	281	218	66	-	938	-	488	2,294	2,294	-	-	-	4,797	-	-	-	177,400	8,104	-
2a.1.1.7	Reactor Vessel Internals	82	4,861	13,621	929	-	9,015	307	11,878	40,693	40,693	-	-	-	501	125	673	-	164,987	25,123	1,163
2a.1.1.8	Reactor Vessel	94	6,046	2,028	728	-	2,975	307	6,804	18,982	18,982	-	-	-	8,073	-	-	-	576,524	25,123	1,163
2a.1.1	Totals	613	14,709	18,764	3,714	2,409	18,480	614	22,455	81,759	81,759	-	-	18,672	30,062	125	673	-	3,148,166	75,729	6,240
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	331	172	64	527	377	-	283	1,752	1,752	-	-	2,131	1,187	-	-	-	203,265	4,667	-
2a.1.3	Main Condensers	-	2,801	109	62	705	533	-	960	5,170	5,170	-	-	3,800	1,587	-	-	-	271,824	39,151	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
2a.1.4.2	Auxiliary	-	221	-	-	-	-	-	33	254	254	-	-	-	-	-	-	-	-	1,309	-
2a.1.4.3	Radwaste	-	9	-	-	-	-	-	1	10	10	-	-	-	-	-	-	-	-	65	-
2a.1.4	Totals	-	1,023	-	-	-	-	-	154	1,177	1,177	-	-	-	-	-	-	-	-	8,963	-
Disposal of Plant Systems																					
2a.1.5.1	Admin Bldg Ventilation	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	90	-
2a.1.5.2	Air Removal	-	29	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	422	-
2a.1.5.3	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	676	-
2a.1.5.4	Auxiliary Feedwater - RCA	-	38	0	1	30	-	-	14	84	84	-	-	178	-	-	-	-	7,214	486	-
2a.1.5.5	Bleed Steam	-	90	-	-	-	-	-	13	103	-	-	103	-	-	-	-	-	-	1,331	-
2a.1.5.6	Caustic Addition - RCA	-	40	0	2	40	-	-	16	99	99	-	-	240	-	-	-	-	9,761	468	-
2a.1.5.7	Chemical Feed	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	261	-
2a.1.5.8	Chemical Feed - RCA	-	3	0	0	3	-	-	1	7	7	-	-	16	-	-	-	-	634	31	-
2a.1.5.9	Circulating Water	-	27	-	-	-	-	-	4	32	-	-	32	-	-	-	-	-	-	401	-
2a.1.5.10	Condensate	-	525	-	-	-	-	-	79	603	-	-	603	-	-	-	-	-	-	7,537	-
2a.1.5.11	Condensate Polishing	-	208	-	-	-	-	-	31	239	-	-	239	-	-	-	-	-	-	2,987	-
2a.1.5.12	Condensate Polishing - RCA	-	38	1	4	81	-	-	22	145	145	-	-	483	-	-	-	-	19,616	493	-
2a.1.5.13	Electro-Hydraulic	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	143	-
2a.1.5.14	External Circulating Water	-	26	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	385	-
2a.1.5.15	External Circulating Water - RCA	-	72	1	5	121	-	-	37	237	237	-	-	721	-	-	-	-	29,284	938	-
2a.1.5.16	Feedwater	-	127	-	-	-	-	-	19	146	-	-	146	-	-	-	-	-	-	1,840	-
2a.1.5.17	Feedwater - RCA	-	248	8	31	694	-	-	171	1,152	1,152	-	-	4,147	-	-	-	-	168,414	3,377	-
2a.1.5.18	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	504	-
2a.1.5.19	Heater Drain	-	384	-	-	-	-	-	58	441	-	-	441	-	-	-	-	-	-	5,638	-
2a.1.5.20	Hypobromous Acid Feed	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	86	-
2a.1.5.21	Hypobromous Acid Feed - RCA	-	1	0	0	0	-	-	0	2	2	-	-	2	-	-	-	-	100	12	-
2a.1.5.22	Internal Circ Water & CDSR	-	25	-	-	-	-	-	4	29	-	-	29	-	-	-	-	-	-	366	-
2a.1.5.23	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
2a.1.5.24	Main Steam	-	101	-	-	-	-	-	15	116	-	-	116	-	-	-	-	-	-	1,482	-
2a.1.5.25	Main Steam - RCA	-	380	11	38	864	-	-	231	1,525	1,525	-	-	5,166	-	-	-	-	209,799	5,146	-
2a.1.5.26	Repairable Spare Snubbers	-	6	0	0	2	-	-	2	10	10	-	-	12	-	-	-	-	490	82	-
2a.1.5.27	Steam Exclusion	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	32	-
2a.1.5.28	Steam Exclusion - RCA	-	4	0	0	4	-	-	2	10	10	-	-	24	-	-	-	-	966	47	-
2a.1.5.29	Steam Generator Blowdown	-	416	21	27	319	215	-	212	1,210	1,210	-	-	1,906	631	-	-	-	118,130	5,778	-
2a.1.5.30	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-

Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2a.1.5.31	Turbine & Moisture Separators	-	377	-	-	-	-	-	57	434	-	-	434	-	-	-	-	-	-	5,472	-
2a.1.5.32	Turbine Oil Purification	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	757	-
2a.1.5.33	Water Treatment	-	453	-	-	-	-	-	68	521	-	-	521	-	-	-	-	-	-	6,677	-
2a.1.5.34	Water Treatment - RCA	-	20	0	1	19	-	-	8	49	49	-	-	115	-	-	-	-	4,652	252	-
2a.1.5	Totals	-	3,817	43	108	2,177	215	-	1,100	7,461	4,528	-	2,933	13,010	631	-	-	-	569,060	54,280	-
2a.1.6	Scaffolding in support of decommissioning	-	3,020	22	10	188	30	-	794	4,064	4,064	-	-	1,012	89	-	-	-	51,216	26,270	-
2a.1	Subtotal Period 2a Activity Costs	613	25,702	19,110	3,959	6,005	19,635	614	25,745	101,384	98,450	-	2,933	38,625	33,556	125	673	-	4,243,531	209,060	6,240
Period 2a Additional Costs																					
2a.2.1	Retired RPV upper internals package	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
2a.2	Subtotal Period 2a Additional Costs	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	49	-	33	60	-	134	-	70	347	347	-	-	-	308	-	-	-	18,487	60	-
2a.3.3	Small tool allowance	-	269	-	-	-	-	-	40	309	278	-	31	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	13,363	2,004	15,368	-	15,368	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	8,215	1,232	9,447	9,447	-	-	-	-	-	-	-	-	-	-
2a.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,780	-	1,780	-	1,780	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	49	269	33	60	-	134	23,358	3,347	27,250	10,072	17,147	31	-	308	-	-	-	18,487	60	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	107	-	-	-	-	-	-	27	134	134	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	690	69	759	759	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	4,548	455	5,002	5,002	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,103	-	-	-	-	-	526	2,629	2,629	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,565	-	-	-	-	-	535	4,100	4,100	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	86	35	-	358	-	103	582	582	-	-	-	4,345	-	-	-	86,891	142	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,194	329	2,523	2,523	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	526	53	578	578	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,647	265	2,912	-	2,912	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	1,695	254	1,949	1,949	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	602	90	692	-	692	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	80	12	92	-	92	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	318	48	366	366	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,596	239	1,835	1,835	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	10,900	1,635	12,534	12,534	-	-	-	-	-	-	-	-	-	160,018
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	20,663	3,099	23,763	23,763	-	-	-	-	-	-	-	-	-	225,210
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	27,056	4,058	31,115	31,115	-	-	-	-	-	-	-	-	-	419,049
2a.4	Subtotal Period 2a Period-Dependent Costs	107	5,668	86	35	-	358	73,514	11,797	91,565	87,870	3,696	-	-	4,345	-	-	-	86,891	142	804,276
2a.0	TOTAL PERIOD 2a COST	770	31,895	19,616	4,270	6,005	21,522	97,486	41,931	223,495	199,687	20,843	2,964	38,625	38,584	237	673	-	4,399,073	212,595	810,649
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	ADT & Misc Ventilation	-	25	1	1	26	3	-	11	66	66	-	-	153	9	-	-	-	6,803	363	-
2b.1.1.2	Aux Bldg Normal Ventilation	-	69	2	6	116	13	-	39	246	246	-	-	692	39	-	-	-	30,595	1,013	-
2b.1.1.3	Aux Bldg Special Ventilation	-	14	0	1	12	2	-	6	34	34	-	-	70	6	-	-	-	3,234	197	-
2b.1.1.4	Battery Rm Special Ventilation	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	24	-
2b.1.1.5	Boron Recycle	0	4	0	0	0	3	-	2	10	10	-	-	3	9	-	-	-	700	50	-
2b.1.1.6	Chemical & Volume Control	749	942	62	57	394	677	-	853	3,736	3,736	-	-	2,356	1,977	-	-	-	223,753	23,197	-
2b.1.1.7	Cold Chemical Lab Ventilation	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
2b.1.1.8	Component Cooling - RCA	-	647	25	88	2,007	-	-	479	3,246	3,246	-	-	11,996	-	-	-	-	487,169	8,583	-
2b.1.1.9	Containment Cooling	-	35	-	-	-	-	-	5	40	-	-	40	-	-	-	-	-	-	502	-
2b.1.1.10	Containment Cooling - RCA	-	302	6	20	459	-	-	148	934	934	-	-	2,743	-	-	-	-	111,390	3,949	-
2b.1.1.11	Containment Hydrogen Control - RCA	-	36	0	1	24	-	-	13	74	74	-	-	141	-	-	-	-	5,742	494	-
2b.1.1.12	Containment Spray - RCA	-	194	3	11	243	-	-	87	538	538	-	-	1,453	-	-	-	-	59,019	2,617	-
2b.1.1.13	Containment Ventilation	-	235	23	49	790	243	-	248	1,587	1,587	-	-	4,721	722	-	-	-	237,643	3,375	-
2b.1.1.14	Control/Relay/Cmptr Rm Vent	-	31	1	2	44	7	-	17	102	102	-	-	260	20	-	-	-	11,878	454	-
2b.1.1.15	Cooling Water	-	159	-	-	-	-	-	24	183	-	-	183	-	-	-	-	-	-	2,344	-
2b.1.1.16	Cooling Water - RCA	-	476	17	62	1,412	-	-	342	2,310	2,310	-	-	8,442	-	-	-	-	342,822	6,311	-
2b.1.1.17	Cranes/Hoists/Elevators - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2b.1.1.18	D3 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-
2b.1.1.19	D4 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-

Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2b.1.1.20	D5 Emergency Diesel	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
2b.1.1.21	Electrical - Clean	-	1,714	-	-	-	-	-	257	1,972	-	-	1,972	-	-	-	-	-	-	24,276	-
2b.1.1.22	Electrical - Contaminated	-	475	5	16	334	25	-	178	1,034	1,034	-	-	1,997	75	-	-	-	85,887	6,503	-
2b.1.1.23	Electrical - Decontaminated	-	2,955	38	138	3,138	-	-	1,234	7,503	7,503	-	-	18,753	-	-	-	-	761,569	38,423	-
2b.1.1.24	Filter Rm Ventilation	-	5	0	0	4	0	-	2	11	11	-	-	24	1	-	-	-	1,017	69	-
2b.1.1.25	Fire Protection & Detection	-	204	-	-	-	-	-	31	235	-	-	235	-	-	-	-	-	-	3,009	-
2b.1.1.26	Fire Protection & Detection - RCA	-	246	4	13	306	-	-	110	679	679	-	-	1,828	-	-	-	-	74,245	3,134	-
2b.1.1.27	Fuel Handling	-	74	1	2	34	17	-	28	156	156	-	-	200	49	-	-	-	11,273	1,101	-
2b.1.1.28	Fuel Oil	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
2b.1.1.29	HVAC - Clean	-	151	-	-	-	-	-	23	174	-	-	174	-	-	-	-	-	-	2,373	-
2b.1.1.30	HVAC - Contaminated	-	1,231	29	87	1,798	136	-	627	3,908	3,908	-	-	10,745	405	-	-	-	462,103	16,579	-
2b.1.1.31	Heating	-	322	-	-	-	-	-	48	370	-	-	370	-	-	-	-	-	-	4,804	-
2b.1.1.32	Heating - RCA	-	337	4	14	319	-	-	135	809	809	-	-	1,907	-	-	-	-	77,458	4,086	-
2b.1.1.33	Hot Lab & Sample Rm Ventilation	-	20	0	1	18	1	-	8	48	48	-	-	107	4	-	-	-	4,622	285	-
2b.1.1.34	Incore Instrumentation	0	30	1	2	10	20	-	14	77	77	-	-	60	58	-	-	-	6,143	458	-
2b.1.1.35	Misc Drains & Vents	-	234	12	12	77	145	-	109	590	590	-	-	458	426	-	-	-	46,079	3,180	-
2b.1.1.36	Misc Lab & Service Areas Vent	-	129	8	8	62	84	-	65	356	356	-	-	370	244	-	-	-	30,899	1,713	-
2b.1.1.37	Miscellaneous Gas	-	72	-	-	-	-	-	11	83	-	-	83	-	-	-	-	-	-	1,073	-
2b.1.1.38	Miscellaneous Gas - RCA	-	134	1	4	100	-	-	49	289	289	-	-	600	-	-	-	-	24,378	1,636	-
2b.1.1.39	Radiation Monitoring	-	7	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	111	-
2b.1.1.40	Radiation Monitoring - RCA	-	65	1	2	53	-	-	25	145	145	-	-	316	-	-	-	-	12,826	782	-
2b.1.1.41	Reactor Coolant	163	236	20	16	38	249	-	213	937	937	-	-	229	730	-	-	-	56,440	5,517	-
2b.1.1.42	Reactor Hot Sampling	140	126	11	7	9	108	-	132	533	533	-	-	54	312	-	-	-	22,678	3,686	-
2b.1.1.43	Reactor Makeup	-	41	-	-	-	-	-	6	47	-	-	47	-	-	-	-	-	-	583	-
2b.1.1.44	Reactor Makeup - RCA	-	4	0	0	5	-	-	2	11	11	-	-	28	-	-	-	-	1,148	47	-
2b.1.1.45	Reactor Vessel	9	18	1	0	4	5	-	11	47	47	-	-	22	14	-	-	-	1,816	385	-
2b.1.1.46	Residual Heat Removal	348	393	84	86	477	1,102	-	641	3,132	3,132	-	-	2,853	3,244	-	-	-	324,232	7,112	-
2b.1.1.47	Safeguards Chilled Water	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
2b.1.1.48	Safety Injection	-	874	42	72	1,117	395	-	500	3,000	3,000	-	-	6,676	1,161	-	-	-	345,708	12,284	-
2b.1.1.49	Sampling	-	52	3	2	6	32	-	23	119	119	-	-	37	93	-	-	-	7,628	714	-
2b.1.1.50	Service Bldg & New Cmptr Vent	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	6	-
2b.1.1.51	Shield Bldg Ventilation	-	120	13	25	339	163	-	127	787	787	-	-	2,028	484	-	-	-	113,139	1,743	-
2b.1.1.52	Station & Instrument Air	-	161	-	-	-	-	-	24	185	-	-	185	-	-	-	-	-	-	2,424	-
2b.1.1.53	Station & Instrument Air - RCA	-	299	3	12	272	-	-	118	704	704	-	-	1,625	-	-	-	-	65,986	3,638	-
2b.1.1.54	Turbine Bldg Traps & Drains	-	30	-	-	-	-	-	5	35	-	-	35	-	-	-	-	-	-	462	-
2b.1.1.55	Turbine Bldg Traps & Drains - RCA	-	30	0	1	30	-	-	12	73	73	-	-	180	-	-	-	-	7,321	344	-
2b.1.1.56	Turbine Bldg Ventilation	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	655	-
2b.1.1.57	Unit Coolers	-	23	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	332	-
2b.1.1.58	Unit Coolers - RCA	-	56	0	2	39	-	-	20	117	117	-	-	232	-	-	-	-	9,413	690	-
2b.1.1.59	Waste Gas Disposal	553	479	43	45	410	464	-	585	2,581	2,581	-	-	2,453	1,358	-	-	-	187,339	14,308	-
2b.1.1.60	Waste Liquid Disposal	1,436	1,800	116	100	612	1,234	-	1,595	6,893	6,893	-	-	3,655	3,594	-	-	-	381,754	44,485	-
2b.1.1.61	Waste Solid Disposal	115	145	12	11	65	134	-	140	622	622	-	-	389	393	-	-	-	41,177	3,481	-
2b.1.1	Totals	3,515	16,542	596	980	15,220	5,264	-	9,399	51,516	48,072	-	3,444	90,963	15,429	-	-	-	4,689,210	270,390	-
2b.1.2	Scaffolding in support of decommissioning	-	3,775	27	13	235	37	-	993	5,081	5,081	-	-	1,265	112	-	-	-	64,020	32,837	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor	1,215	2,808	240	1,236	373	13,625	-	4,981	24,479	24,479	-	-	2,230	83,434	-	-	-	3,633,771	50,962	-
2b.1.3.2	Auxiliary	1,292	422	23	117	177	648	-	960	3,639	3,639	-	-	1,060	6,118	-	-	-	332,495	23,821	-
2b.1.3.3	Backwash Waste Receiving Tank	-	28	3	17	-	97	-	34	179	179	-	-	-	929	-	-	-	43,896	301	-
2b.1.3.4	Drum Transfer & Truck Loading Enclosure	18	9	1	3	3	14	-	16	63	63	-	-	19	135	-	-	-	7,118	369	-
2b.1.3.5	LLRW Storage Enclosure	123	54	3	17	6	96	-	103	403	403	-	-	38	920	-	-	-	44,971	2,426	-
2b.1.3.6	Radwaste	55	24	1	8	7	43	-	47	185	185	-	-	42	412	-	-	-	21,136	1,083	-
2b.1.3.7	Resin Disposal	16	12	1	3	14	14	-	17	76	76	-	-	83	124	-	-	-	9,271	383	-
2b.1.3	Totals	2,720	3,357	271	1,400	581	14,537	-	6,158	29,024	29,024	-	-	3,471	92,071	-	-	-	4,092,658	79,343	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	225	34	259	259	-	-	-	-	-	-	-	-	-	1,751
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	6,235	23,674	895	2,393	16,035	19,839	225	16,584	85,879	82,435	-	3,444	95,700	107,611	-	-	-	8,845,887	382,570	1,751
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
2b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
2b.2.3	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,175	11	36	606	-	4,573	1,077	7,478	7,478	-	-	5,880	-	-	-	-	147,000	7,427	-

Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	166	-	113	203	-	456	-	239	1,176	1,176	-	-	-	1,047	-	-	-	62,844	204	-
2b.3.2	Process decommissioning chemical flush waste	3	-	119	390	-	893	-	295	1,699	1,699	-	-	-	1,154	-	-	-	122,948	216	-
2b.3.3	Small tool allowance	-	446	-	-	-	-	-	67	513	513	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	51,308	7,696	59,005	-	59,005	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	2,839	426	3,265	3,265	-	-	-	-	-	-	-	-	-	-
2b.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,348	-	1,348	-	1,348	-	-	-	-	-	-	-	-	-
2b.3.7	On-site survey and release of 0.437 tons clean metallic waste	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	169	446	232	592	-	1,349	55,497	8,723	67,007	6,654	60,353	-	-	2,201	-	-	-	185,792	420	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,219	-	-	-	-	-	-	305	1,524	1,524	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	523	52	575	575	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	3,075	308	3,383	3,383	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,866	-	-	-	-	-	716	3,582	3,582	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,774	-	-	-	-	-	416	3,190	3,190	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	103	42	-	429	-	124	698	698	-	-	-	5,209	-	-	-	104,172	170	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,313	197	1,509	1,509	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	398	40	438	438	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,006	201	2,207	-	2,207	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	1,284	193	1,477	1,477	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	456	68	524	-	524	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	229	34	264	264	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	60	9	69	-	69	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	67	10	78	78	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,209	181	1,391	1,391	-	-	-	-	-	-	-	-	-	-
2b.4.16	Security Staff Cost	-	-	-	-	-	-	8,259	1,239	9,497	9,497	-	-	-	-	-	-	-	-	-	121,244
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	15,117	2,268	17,385	17,385	-	-	-	-	-	-	-	-	-	163,904
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	19,642	2,946	22,588	22,588	-	-	-	-	-	-	-	-	-	304,233
2b.4	Subtotal Period 2b Period-Dependent Costs	1,219	5,640	103	42	-	429	53,639	9,307	70,380	67,579	2,800	-	-	5,209	-	-	-	104,172	170	589,381
2b.0	TOTAL PERIOD 2b COST	7,623	30,935	1,242	3,063	16,641	21,617	113,934	35,690	230,744	164,147	63,153	3,444	101,580	115,021	-	-	-	9,282,851	390,587	591,132
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	347	35	86	41	-	703	-	373	1,585	1,585	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
2d.1.2.1	Electrical - Contaminated - Fuel Pool	-	203	2	7	145	11	-	77	445	445	-	-	864	33	-	-	-	37,167	2,783	-
2d.1.2.2	Electrical - Decontaminated - Fuel Pool	-	1,269	17	59	1,350	-	-	530	3,225	3,225	-	-	8,069	-	-	-	-	327,668	16,495	-
2d.1.2.3	Fire Protection & Detection - RCA Fuel P	-	37	1	2	48	-	-	17	105	105	-	-	286	-	-	-	-	11,622	476	-
2d.1.2.4	HVAC - Contaminated - Fuel Pool	-	553	13	39	808	61	-	282	1,756	1,756	-	-	4,828	182	-	-	-	207,612	7,448	-
2d.1.2.5	Safeguards Chilled Water - RCA	-	5	0	0	4	-	-	2	11	11	-	-	26	-	-	-	-	1,045	51	-
2d.1.2.6	Spent Fuel Pool Cooling	32	36	3	2	6	37	-	36	152	152	-	-	39	107	-	-	-	8,481	882	-
2d.1.2.7	Spent Fuel Pool Normal Ventilation	-	27	1	2	44	4	-	15	93	93	-	-	265	12	-	-	-	11,505	394	-
2d.1.2	Totals	32	2,130	36	112	2,405	113	-	958	5,786	5,786	-	-	14,376	333	-	-	-	605,100	28,530	-
Decontamination of Site Buildings																					
2d.1.3.1	Fuel Handling of Aux Building	1,029	1,138	13	45	404	195	-	916	3,741	3,741	-	-	2,417	1,652	-	-	-	177,755	30,404	-
2d.1.3	Totals	1,029	1,138	13	45	404	195	-	916	3,741	3,741	-	-	2,417	1,652	-	-	-	177,755	30,404	-
2d.1.4	Scaffolding in support of decommissioning	-	755	5	3	47	7	-	199	1,016	1,016	-	-	253	22	-	-	-	12,804	6,567	-
2d.1	Subtotal Period 2d Activity Costs	1,408	4,058	141	202	2,857	1,018	-	2,445	12,128	12,128	-	-	17,046	4,099	-	-	-	928,579	66,078	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	45	-	31	56	-	126	-	65	323	323	-	-	-	288	-	-	-	17,293	56	-
2d.3.2	Process decommissioning chemical flush waste	0	-	1	5	-	10	-	3	20	20	-	-	-	13	-	-	-	1,422	2	-
2d.3.3	Small tool allowance	-	83	-	-	-	-	-	12	95	95	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	975	-	975	-	975	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	45	83	162	128	1,112	314	975	316	3,135	2,160	975	-	6,000	831	-	-	-	322,324	206	-

Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	236	-	-	-	-	-	-	59	295	295	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	378	38	416	416	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	2,004	200	2,204	2,204	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	794	-	-	-	-	-	198	992	992	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	2,007	-	-	-	-	-	301	2,308	2,308	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	40	16	-	165	-	48	268	268	-	-	-	2,002	-	-	-	40,031	65	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	506	76	582	582	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	277	28	305	305	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	58	6	64	-	64	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	929	139	1,068	1,068	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	332	50	381	381	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	44	7	50	-	50	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	49	7	56	56	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	875	131	1,006	1,006	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	5,782	867	6,649	4,694	1,955	-	-	-	-	-	-	-	-	84,454
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	6,401	960	7,361	7,361	-	-	-	-	-	-	-	-	-	70,243
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	8,100	1,215	9,315	8,858	456	-	-	-	-	-	-	-	-	126,681
2d.4	Subtotal Period 2d Period-Dependent Costs	236	2,801	40	16	-	165	25,734	4,330	33,321	30,796	2,525	-	-	2,002	-	-	-	40,031	65	281,377
2d.0	TOTAL PERIOD 2d COST	1,689	6,941	343	346	3,969	1,496	27,746	7,403	49,932	46,432	3,501	-	23,046	6,931	-	-	-	1,290,933	66,348	287,617
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	934	-	934	-	934	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	2,198	190	2,388	1,454	934	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	362	36	398	398	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,771	177	1,948	1,948	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	710	-	-	-	-	-	178	888	888	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	3	-	28	-	8	45	45	-	-	-	334	-	-	-	6,685	11	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	263	26	290	290	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	42	6	48	-	48	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	5,538	831	6,369	4,497	1,873	-	-	-	-	-	-	-	-	80,898
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	4,011	602	4,613	4,175	438	-	-	-	-	-	-	-	-	59,507
2f.4	Subtotal Period 2f Period-Dependent Costs	-	710	7	3	-	28	17,461	2,682	20,890	18,470	2,420	-	-	334	-	-	-	6,685	11	186,687
2f.0	TOTAL PERIOD 2f COST	-	710	7	3	-	28	26,867	5,034	32,648	29,294	3,354	-	-	334	-	-	-	6,685	100,906	189,807
PERIOD 2 TOTALS		10,081	70,482	21,208	7,682	26,615	44,663	266,032	90,058	536,819	439,560	90,851	6,408	163,252	160,871	237	673	-	14,979,540	770,436	1,879,206
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor	-	4,645	-	-	-	-	-	697	5,342	-	-	5,342	-	-	-	-	-	-	44,679	-
3b.1.1.2	Auxiliary	-	1,993	-	-	-	-	-	299	2,291	-	-	2,291	-	-	-	-	-	-	11,902	-
3b.1.1.3	Condensate Storage Tank Foundation	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	33	-
3b.1.1.4	Construction Warehouse & Fab Shop	-	130	-	-	-	-	-	19	149	-	-	149	-	-	-	-	-	-	1,405	-
3b.1.1.5	D3/D4 Emergency Generator	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	84	-

Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Demolition of Remaining Site Buildings (continued)																					
3b.1.1.6	Drum Transfer & Truck Loading Enclosure	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	221	-
3b.1.1.7	Hydrogen House	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	47	-
3b.1.1.8	LLRW Storage Enclosure	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	853	-
3b.1.1.9	Misc Structures 2017	-	2,617	-	-	-	-	-	393	3,009	-	-	3,009	-	-	-	-	-	-	22,582	-
3b.1.1.10	Radwaste	-	176	-	-	-	-	-	26	202	-	-	202	-	-	-	-	-	-	1,400	-
3b.1.1.11	Resin Disposal	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	120	-
3b.1.1.12	Structures below 3' below grade	-	1,785	-	-	-	-	-	268	2,052	-	-	2,052	-	-	-	-	-	-	9,238	-
3b.1.1.13	Sulfuric Acid Tank Enclosure	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	35	-
3b.1.1.14	Turbine	-	2,140	-	-	-	-	-	321	2,461	-	-	2,461	-	-	-	-	-	-	21,997	-
3b.1.1.15	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
3b.1.1.16	Warehouse #2	-	24	-	-	-	-	-	4	27	-	-	27	-	-	-	-	-	-	213	-
3b.1.1.17	Waste Neutralizing Tank House	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	56	-
3b.1.1.18	Waste Oil Storage	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	70	-
3b.1.1.19	Water Treatment	-	324	-	-	-	-	-	49	373	-	-	373	-	-	-	-	-	-	2,690	-
3b.1.1.20	Fuel Handling of Aux Building	-	1,095	-	-	-	-	-	164	1,259	-	-	1,259	-	-	-	-	-	-	8,240	-
3b.1.1	Totals	-	15,501	-	-	-	-	-	2,325	17,826	-	-	17,826	-	-	-	-	-	-	127,723	-
Site Closeout Activities																					
3b.1.2	Remove Rubble	-	1,330	-	-	-	-	-	200	1,530	-	-	1,530	-	-	-	-	-	-	6,495	-
3b.1.3	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
3b.1.4	Final report to NRC	-	-	-	-	-	-	86	13	99	99	-	-	-	-	-	-	-	-	-	667
3b.1	Subtotal Period 3b Activity Costs	-	17,279	-	-	-	-	86	2,605	19,969	99	-	19,871	-	-	-	-	-	-	135,138	667
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	4,912	-	-	-	-	10	738	5,660	-	-	5,660	-	-	-	-	-	-	18,372	-
3b.2.2	Intake Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
3b.2.3	Construction Debris	-	-	-	-	-	-	2,150	323	2,473	-	-	2,473	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	9,257	-	-	-	-	-	1,388	10,645	-	-	10,645	-	-	-	-	-	-	9,327	-
3b.2.5	Disposition of Original Casks	-	24	80	418	-	2,390	-	728	3,640	3,640	-	-	-	8,929	-	-	-	1,059,612	146	-
3b.2	Subtotal Period 3b Additional Costs	-	14,634	80	418	-	2,390	2,160	3,244	22,926	3,640	-	19,286	-	8,929	-	-	-	1,059,612	31,397	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	212	-	-	-	-	-	32	244	-	-	244	-	-	-	-	-	-	-	-
3b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,649	-	2,649	-	2,649	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	212	-	-	-	-	2,649	32	2,893	-	2,649	244	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	513	51	565	565	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	4,167	417	4,583	-	4,583	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	395	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	218	22	239	-	239	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	157	16	173	-	173	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	397	781	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	119	18	136	-	136	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	361	54	416	153	263	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	4,616	692	5,308	-	5,308	-	-	-	-	-	-	-	-	57,340
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,170	776	5,946	-	1,278	4,668	-	-	-	-	-	-	-	76,637
3b.4	Subtotal Period 3b Period-Dependent Costs	-	7,144	-	-	-	-	27,610	4,960	39,714	1,114	13,158	25,442	-	-	-	-	-	-	-	250,861
3b.0	TOTAL PERIOD 3b COST	-	39,269	80	418	-	2,390	32,505	10,840	85,502	4,853	15,807	64,843	-	8,929	-	-	-	1,059,612	166,534	251,528
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	270,755	40,613	311,368	-	311,368	-	-	-	-	-	-	-	-	-
3c.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	94,360	-	94,360	-	94,360	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	365,115	40,613	405,728	-	405,728	-	-	-	-	-	-	-	-	-

Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	18,290	1,829	20,119	-	20,119	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	104,580	10,458	115,038	-	115,038	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	9,306	931	10,237	-	10,237	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	5,600	560	6,160	-	6,160	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	12,308	1,846	14,155	-	14,155	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	4,228	634	4,862	-	4,862	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	4,723	708	5,431	-	5,431	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	164,428	24,664	189,092	-	189,092	-	-	-	-	-	-	-	-	2,042,594
3c.4.10	DOC Staff Cost	-	-	-	-	-	-	11,579	1,737	13,316	-	13,316	-	-	-	-	-	-	-	-	78,561
3c.4.11	Utility Staff Cost	-	-	-	-	-	-	71,292	10,694	81,986	-	81,986	-	-	-	-	-	-	-	-	1,040,937
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	406,334	54,061	460,395	-	460,395	-	-	-	-	-	-	-	-	3,162,093
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	771,448	94,674	866,123	-	866,123	-	-	-	-	-	-	-	-	3,162,093
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1.1	Totals	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3d.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	76	4	80	-	80	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	9	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	53	5	58	58	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	4	0	4	-	4	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	3	0	3	-	3	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	2	0	3	3	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	83	13	96	96	-	-	-	-	-	-	-	-	-	1,037
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	269
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	181	24	204	197	7	-	-	-	-	-	-	-	-	1,306
3d.0	TOTAL PERIOD 3d COST	-	-	1,444	-	-	8,680	256	1,691	12,071	11,984	87	-	-	-	-	-	1,773	344,823	-	1,306
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161
3e.2	Subtotal Period 3e Additional Costs	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	93	23	116	116	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	56	14	69	69	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	11	3	13	13	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	54	14	68	68	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	21	5	26	26	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	174	43	217	217	-	-	-	-	-	-	-	-	-	2,500
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	129	32	161	161	-	-	-	-	-	-	-	-	-	1,896
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	536	134	670	670	-	-	-	-	-	-	-	-	-	4,396
3e.0	TOTAL PERIOD 3e COST	-	0	2	17	-	142	1,733	473	2,367	2,367	-	-	-	424	-	-	-	65,754	5,882	5,556

Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
3f.2	Subtotal Period 3f Additional Costs	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	28	3	31	-	-	31	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	59	-	-	-	-	-	9	68	-	-	68	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	6	-	-	6	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	28	4	32	-	-	32	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	11	2	12	-	-	12	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	89	13	102	-	-	102	-	-	-	-	-	-	-	1,281
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	55	8	63	-	-	63	-	-	-	-	-	-	-	795
3f.4	Subtotal Period 3f Period-Dependent Costs	-	59	-	-	-	-	216	40	315	-	-	315	-	-	-	-	-	-	-	2,076
3f.0	TOTAL PERIOD 3f COST	-	1,187	-	-	-	-	377	233	1,798	-	-	1,798	-	-	-	-	-	-	4,846	2,156
PERIOD 3 TOTALS		-	40,456	1,525	435	-	11,212	806,320	107,912	967,861	19,203	882,017	66,641	-	9,353	-	-	1,773	1,470,189	177,262	3,422,639
TOTAL COST TO DECOMMISSION		13,876	116,855	23,184	8,596	26,793	61,273	1,178,883	216,817	1,646,275	591,409	981,137	73,730	169,384	184,108	826	673	1,773	17,058,250	981,176	6,101,073

TOTAL COST TO DECOMMISSION WITH 15.17% CONTINGENCY:	**$1,646,275**	**thousands of 2020 dollars**	
TOTAL NRC LICENSE TERMINATION COST IS 35.92% OR:	**$591,409**	**thousands of 2020 dollars**	
SPENT FUEL MANAGEMENT COST IS 59.6% OR:	**$981,137**	**thousands of 2020 dollars**	
NON-NUCLEAR DEMOLITION COST IS 4.48% OR:	**$73,730**	**thousands of 2020 dollars**	
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**185,606**	**Cubic Feet**	
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**	
TOTAL SCRAP METAL REMOVED:	**42,328**	**Tons**	
TOTAL CRAFT LABOR REQUIREMENTS:	**981,176**	**Man-hours**	

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX F

DETAILED COST ANALYSIS

SCENARIO 4: DECON with 200 Year DFS

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Prairie Island Nuclear Generating Plant, Unit 1 ..... F-2

Prairie Island Nuclear Generating Plant, Unit 2 ..... F-11

Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.10	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.12	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.13	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	632	95	727	654	-	73	-	-	-	-	-	-	-	4,920
1a.1.17.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.4	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
1a.1.17.6	Biological shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
1a.1.17.7	Steam generators	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
1a.1.17.9	Main Turbine	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
1a.1.17.10	Main Condensers	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
1a.1.17.11	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
1a.1.17.12	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1a.1.17.13	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
1a.1.17	Total	-	-	-	-	-	-	4,861	729	5,591	4,923	-	668	-	-	-	-	-	-	-	37,827
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	15,945	2,392	18,336	17,669	-	668	-	-	-	-	-	-	-	78,157
Period 1a Additional Costs																					
1a.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1a.2	Subtotal Period 1a Additional Costs	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
Period 1a Collateral Costs																					
1a.3.1	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	50	-	14	82	82	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	1,137	114	1,251	1,251	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	26,931	4,040	30,971	30,971	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	5	-	50	47,456	6,970	55,860	52,918	2,942	-	-	610	-	-	-	12,190	20	544,960

Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	5	-	50	77,325	11,263	90,022	85,163	4,191	668	-	610	-	-	-	12,190	20	623,117
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.3	Reactor internals	-	-	-	-	-	-	321	48	369	369	-	-	-	-	-	-	-	-	-	2,500
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
1b.1.1.5	CRD cooling assembly	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.6	CRD housings & ICI tubes	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.7	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
1b.1.1.9	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
1b.1.1.10	Missile shields	-	-	-	-	-	-	58	9	67	67	-	-	-	-	-	-	-	-	-	450
1b.1.1.11	Biological shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1b.1.1.12	Steam generators	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
1b.1.1.13	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
1b.1.1.14	Main Turbine	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
1b.1.1.15	Main Condensers	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
1b.1.1.16	Auxiliary building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1.17	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
1b.1.1	Total	-	-	-	-	-	-	4,272	641	4,913	3,989	-	924	-	-	-	-	-	-	-	33,243
1b.1.2	Decon primary loop	572	-	-	-	-	-	-	286	859	859	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	572	-	-	-	-	-	4,272	927	5,772	4,848	-	924	-	-	-	-	-	-	1,067	33,243
Period 1b Additional Costs																					
1b.2.1	Site Characterization	-	-	-	-	-	-	3,520	1,056	4,576	4,576	-	-	-	-	-	-	-	-	21,020	8,332
1b.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
1b.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
1b.2	Subtotal Period 1b Additional Costs	-	2,526	356	244	178	1,369	3,520	2,129	10,321	10,321	-	-	6,132	12,843	-	-	-	518,936	44,275	8,332
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	25	-	16	29	-	66	-	35	172	172	-	-	-	152	-	-	-	9,127	30	-
1b.3.4	Process decommissioning chemical flush waste	2	-	61	199	-	3,889	-	1,009	5,159	5,159	-	-	-	-	588	-	-	62,689	110	-
1b.3.5	Small tool allowance	-	36	-	-	-	-	-	5	42	42	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	163	25	188	-	188	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	1,032	155	1,187	1,187	-	-	-	-	-	-	-	-	-	-
1b.3.10	Prairie Island Indian Community Payments	-	-	-	-	-	-	623	-	623	-	623	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,185	1,236	77	228	-	3,955	3,082	2,072	13,836	13,025	811	-	-	152	588	-	-	71,815	140	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	828	83	910	910	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,806	181	1,987	1,987	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	475	-	-	-	-	-	119	594	594	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	7	3	-	29	-	8	48	48	-	-	-	356	-	-	-	7,122	12	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,617	243	1,859	1,859	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	323	32	355	355	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,084	108	1,193	-	1,193	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	4,153	623	4,775	4,775	-	-	-	-	-	-	-	-	-	61,192
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,846	877	6,723	6,723	-	-	-	-	-	-	-	-	-	63,266
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	13,505	2,026	15,531	15,531	-	-	-	-	-	-	-	-	-	211,579
1b.4	Subtotal Period 1b Period-Dependent Costs	38	851	7	3	-	29	30,149	4,513	35,590	34,123	1,467	-	-	356	-	-	-	7,122	12	336,037
1b.0	TOTAL PERIOD 1b COST	3,795	4,613	440	475	178	5,354	41,023	9,641	65,519	62,317	2,278	924	6,132	13,351	588	-	-	597,873	45,493	377,612

Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 1 TOTALS		3,795	5,980	452	480	178	5,404	118,348	20,903	155,540	147,480	6,468	1,592	6,132	13,961	588	-	-	610,063	45,513	1,000,729
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Reactor Coolant Piping	54	47	10	18	-	187	-	89	406	406	-	-	-	508	-	-	-	35,411	1,421	-
2a.1.1.2	Pressurizer Relief Tank	24	21	6	12	-	125	-	51	238	238	-	-	-	338	-	-	-	23,594	630	-
2a.1.1.3	Reactor Coolant Pumps & Motors	57	68	110	93	-	463	-	186	977	977	-	-	-	2,332	-	-	-	295,800	2,049	100
2a.1.1.4	Pressurizer	-	77	503	97	-	776	-	278	1,732	1,732	-	-	-	2,196	-	-	-	185,015	1,666	938
2a.1.1.5	Steam Generators	-	3,307	2,269	1,770	2,409	4,001	-	2,681	16,437	16,437	-	-	18,672	11,316	-	-	-	1,689,435	11,613	2,875
2a.1.1.6	CRDMs/ICIs/Service Structure Removal	302	281	218	66	-	938	-	488	2,294	2,294	-	-	-	4,797	-	-	-	177,400	8,104	-
2a.1.1.7	Reactor Vessel Internals	82	4,861	13,621	929	-	9,015	307	11,878	40,693	40,693	-	-	-	501	125	673	-	164,987	25,123	1,163
2a.1.1.8	Reactor Vessel	94	6,046	2,028	728	-	2,975	307	6,804	18,982	18,982	-	-	-	8,073	-	-	-	576,524	25,123	1,163
2a.1.1	Totals	613	14,709	18,764	3,714	2,409	18,480	614	22,455	81,759	81,759	-	-	18,672	30,062	125	673	-	3,148,166	75,729	6,240
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	331	172	64	527	377	-	283	1,752	1,752	-	-	2,131	1,187	-	-	-	203,265	4,667	-
2a.1.3	Main Condensers	-	2,801	109	62	705	533	-	960	5,170	5,170	-	-	3,800	1,587	-	-	-	271,824	39,151	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
2a.1.4	Totals	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
Disposal of Plant Systems																					
2a.1.5.1	Air Removal	-	31	-	-	-	-	-	5	36	-	-	36	-	-	-	-	-	-	452	-
2a.1.5.2	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	670	-
2a.1.5.3	Auxiliary Feedwater - RCA	-	47	0	2	36	-	-	17	102	102	-	-	215	-	-	-	-	8,722	601	-
2a.1.5.4	Bleed Steam	-	90	-	-	-	-	-	14	104	-	-	104	-	-	-	-	-	-	1,335	-
2a.1.5.5	Caustic Addition - RCA	-	38	0	2	39	-	-	16	95	95	-	-	233	-	-	-	-	9,453	444	-
2a.1.5.6	Chemical Feed	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	304	-
2a.1.5.7	Chemical Feed - RCA	-	1	0	0	1	-	-	0	3	3	-	-	6	-	-	-	-	243	12	-
2a.1.5.8	Circulating Water	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	619	-
2a.1.5.9	Condensate	-	474	-	-	-	-	-	71	545	-	-	545	-	-	-	-	-	-	6,837	-
2a.1.5.10	Condensate Polishing	-	235	-	-	-	-	-	35	271	-	-	271	-	-	-	-	-	-	3,420	-
2a.1.5.11	Condensate Polishing - RCA	-	183	4	15	348	-	-	101	651	651	-	-	2,078	-	-	-	-	84,395	2,329	-
2a.1.5.12	Electro-hydraulic	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	127	-
2a.1.5.13	Feedwater	-	153	-	-	-	-	-	23	175	-	-	175	-	-	-	-	-	-	2,215	-
2a.1.5.14	Feedwater - RCA	-	195	7	24	537	-	-	133	895	895	-	-	3,208	-	-	-	-	130,294	2,651	-
2a.1.5.15	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	505	-
2a.1.5.16	Heater Drain	-	400	-	-	-	-	-	60	460	-	-	460	-	-	-	-	-	-	5,881	-
2a.1.5.17	Internal Circ Water & CDSR	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	389	-
2a.1.5.18	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
2a.1.5.19	Main Steam	-	115	-	-	-	-	-	17	133	-	-	133	-	-	-	-	-	-	1,690	-
2a.1.5.20	Main Steam - RCA	-	366	10	37	844	-	-	225	1,482	1,482	-	-	5,044	-	-	-	-	204,825	4,956	-
2a.1.5.21	Steam Generator Blowdown	-	478	22	29	340	234	-	235	1,337	1,337	-	-	2,031	686	-	-	-	126,640	6,667	-
2a.1.5.22	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
2a.1.5.23	Turbine & Moisture Separators	-	386	-	-	-	-	-	58	444	-	-	444	-	-	-	-	-	-	5,609	-
2a.1.5.24	Turbine Oil Purification	-	70	-	-	-	-	-	11	81	-	-	81	-	-	-	-	-	-	1,003	-
2a.1.5	Totals	-	3,445	44	108	2,144	234	-	1,048	7,023	4,565	-	2,458	12,815	686	-	-	-	564,572	48,794	-
2a.1.6	Scaffolding in support of decommissioning	-	930	3	1	26	4	-	238	1,202	1,202	-	-	138	12	-	-	-	6,985	6,368	-
2a.1	Subtotal Period 2a Activity Costs	613	23,011	19,092	3,950	5,810	19,628	614	25,102	97,819	95,362	-	2,458	37,556	33,533	125	673	-	4,194,811	182,298	6,240
Period 2a Additional Costs																					
2a.2.1	Retired RPV Upper Internals Package	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
2a.2	Subtotal Period 2a Additional Costs	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	48	-	32	58	-	130	-	68	337	337	-	-	-	299	-	-	-	17,968	58	-
2a.3.2	Process decommissioning chemical flush waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a.3.3	Small tool allowance	-	239	-	-	-	-	-	36	274	247	-	27	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,639	246	1,885	-	1,885	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	12,780	1,917	14,697	14,697	-	-	-	-	-	-	-	-	-	-
2a.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,780	-	1,780	-	1,780	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	48	239	32	58	-	130	16,198	2,267	18,972	15,281	3,664	27	-	299	-	-	-	17,968	58	-

Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	107	-	-	-	-	-	-	27	134	134	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	690	69	759	759	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	5,009	501	5,510	5,510	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	1,950	-	-	-	-	-	487	2,437	2,437	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,565	-	-	-	-	-	535	4,100	4,100	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	73	30	-	303	-	88	493	493	-	-	-	3,681	-	-	-	73,619	120	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,194	329	2,523	2,523	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	842	84	926	926	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,647	265	2,912	-	2,912	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	1,695	254	1,949	1,949	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	602	90	692	-	692	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	80	12	92	-	92	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	318	48	366	366	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,596	239	1,835	1,835	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	11,727	1,759	13,486	13,486	-	-	-	-	-	-	-	-	-	172,726
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	20,663	3,099	23,763	23,763	-	-	-	-	-	-	-	-	-	225,210
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	26,905	4,036	30,941	30,941	-	-	-	-	-	-	-	-	-	417,453
2a.4	Subtotal Period 2a Period-Dependent Costs	107	5,515	73	30	-	303	74,968	11,922	92,918	89,223	3,696	-	-	3,681	-	-	-	73,619	120	815,389
2a.0	TOTAL PERIOD 2a COST	768	29,021	19,584	4,254	5,810	21,456	91,780	40,333	213,006	203,161	7,360	2,485	37,556	37,889	237	673	-	4,336,562	185,810	821,762
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	Aux Bldg Normal Ventilation	-	2	0	0	1	-	-	1	3	3	-	-	3	-	-	-	-	140	29	-
2b.1.1.3	Buildings Maintenance	-	5	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	65	-
2b.1.1.4	Chemical & Volume Control	1,120	1,389	89	90	753	973	-	1,286	5,700	5,700	-	-	4,498	2,846	-	-	-	366,565	34,533	-
2b.1.1.5	Component Cooling - RCA	-	858	25	91	2,079	-	-	543	3,597	3,597	-	-	12,427	-	-	-	-	504,675	11,242	-
2b.1.1.6	Containment Cooling	-	74	-	-	-	-	-	11	85	-	-	85	-	-	-	-	-	-	1,086	-
2b.1.1.7	Containment Cooling - RCA	-	304	7	25	569	-	-	166	1,070	1,070	-	-	3,400	-	-	-	-	138,090	3,971	-
2b.1.1.8	Containment Hydrogen Control - RCA	-	30	0	1	18	-	-	10	59	59	-	-	105	-	-	-	-	4,278	401	-
2b.1.1.9	Containment Spray - RCA	-	93	2	6	145	-	-	46	293	293	-	-	868	-	-	-	-	35,249	1,217	-
2b.1.1.10	Containment Ventilation	-	255	24	51	828	248	-	260	1,667	1,667	-	-	4,951	737	-	-	-	247,952	3,668	-
2b.1.1.11	Cooling Water	-	163	-	-	-	-	-	24	187	-	-	187	-	-	-	-	-	-	2,396	-
2b.1.1.12	Cooling Water - RCA	-	658	16	57	1,293	-	-	368	2,392	2,392	-	-	7,728	-	-	-	-	313,832	8,594	-
2b.1.1.13	D1 Emergency Diesel	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	730	-
2b.1.1.14	D2 Emergency Diesel	-	36	-	-	-	-	-	5	41	-	-	41	-	-	-	-	-	-	522	-
2b.1.1.15	Diesel Rooms Ventilation	-	9	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	135	-
2b.1.1.16	Electrical - Clean	-	1,905	-	-	-	-	-	286	2,191	-	-	2,191	-	-	-	-	-	-	26,981	-
2b.1.1.17	Electrical - Contaminated	-	611	7	20	423	32	-	228	1,321	1,321	-	-	2,527	95	-	-	-	108,690	8,377	-
2b.1.1.18	Electrical - Decontaminated	-	3,787	48	173	3,940	-	-	1,569	9,518	9,518	-	-	23,551	-	-	-	-	956,401	49,378	-
2b.1.1.19	Fuel Handling	-	121	6	11	152	73	-	74	436	436	-	-	908	218	-	-	-	50,723	1,784	-
2b.1.1.20	Fuel Oil	-	121	-	-	-	-	-	18	140	-	-	140	-	-	-	-	-	-	1,697	-
2b.1.1.21	HVAC - Clean	-	120	-	-	-	-	-	18	138	-	-	138	-	-	-	-	-	-	1,891	-
2b.1.1.22	HVAC - Contaminated	-	374	9	26	546	41	-	190	1,186	1,186	-	-	3,261	123	-	-	-	140,257	5,032	-
2b.1.1.23	Incore Instrumentation	0	28	1	2	10	19	-	14	74	74	-	-	60	57	-	-	-	6,058	425	-
2b.1.1.24	Misc Drains & Vents	-	233	15	13	65	176	-	115	618	618	-	-	390	514	-	-	-	49,062	3,091	-
2b.1.1.25	Reactor Coolant	153	311	21	18	58	265	-	234	1,060	1,060	-	-	344	777	-	-	-	64,085	6,470	-
2b.1.1.26	Reactor Hot Sampling	149	136	12	7	11	118	-	142	576	576	-	-	66	342	-	-	-	25,063	3,946	-
2b.1.1.27	Reactor Makeup	-	73	-	-	-	-	-	11	84	-	-	84	-	-	-	-	-	-	1,042	-
2b.1.1.28	Reactor Vessel	9	21	1	0	4	5	-	12	52	52	-	-	26	14	-	-	-	2,000	425	-
2b.1.1.29	Residual Heat Removal	357	419	85	86	484	1,105	-	654	3,190	3,190	-	-	2,895	3,252	-	-	-	326,425	7,621	-
2b.1.1.30	Safeguards Chilled Water	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	259	-
2b.1.1.31	Safety Injection	-	893	42	73	1,136	393	-	507	3,044	3,044	-	-	6,788	1,156	-	-	-	349,908	12,561	-
2b.1.1.32	Sampling	-	60	4	3	10	37	-	26	140	140	-	-	59	107	-	-	-	9,420	811	-
2b.1.1.33	Shield Bldg Ventilation	-	140	14	26	360	165	-	135	839	839	-	-	2,152	491	-	-	-	118,583	2,030	-
2b.1.1.34	Station & Instrument Air	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	300	-
2b.1.1.35	Station & Instrument Air - RCA	-	81	1	2	56	-	-	29	169	169	-	-	332	-	-	-	-	13,496	1,053	-
2b.1.1.36	Turbine Bldg Traps & Drains	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	767	-
2b.1.1.37	Unit Coolers	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	611	-
2b.1.1.38	Unit Coolers - RCA	-	55	0	2	39	-	-	20	115	115	-	-	230	-	-	-	-	9,348	683	-
2b.1.1	Totals	1,789	13,544	429	786	12,979	3,651	-	7,032	40,209	37,119	-	3,091	77,571	10,728	-	-	-	3,840,299	205,829	-
2b.1.2	Scaffolding in support of decommissioning	-	1,163	4	2	32	5	-	297	1,503	1,503	-	-	173	15	-	-	-	8,731	7,960	-

Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Decontamination of Site Buildings																					
2b.1.3.1	Reactor	1,215	2,807	240	1,236	373	13,624	-	4,981	24,476	24,476	-	-	2,230	83,429	-	-	-	3,633,417	50,950	-
2b.1.3.2	Backwash Waste Receiving Tank	-	28	3	17	-	97	-	34	179	179	-	-	-	929	-	-	-	43,896	301	-
2b.1.3	Totals	1,215	2,835	243	1,253	373	13,721	-	5,015	24,655	24,655	-	-	2,230	84,358	-	-	-	3,677,313	51,251	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	3,004	17,542	675	2,041	13,384	17,377	526	12,423	66,973	63,882	-	3,091	79,974	95,101	-	-	-	7,526,343	265,040	4,096
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
2b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
2b.2.3	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,175	11	36	606	-	4,573	1,077	7,478	7,478	-	-	5,880	-	-	-	-	147,000	7,427	-
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	108	-	74	132	-	298	-	156	768	768	-	-	-	684	-	-	-	41,053	133	-
2b.3.2	Process decommissioning chemical flush waste	2	-	90	296	-	677	-	224	1,289	1,289	-	-	-	875	-	-	-	93,252	164	-
2b.3.3	Small tool allowance	-	315	-	-	-	-	-	47	362	362	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	10,782	1,617	12,400	-	12,400	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	6,141	921	7,063	7,063	-	-	-	-	-	-	-	-	-	-
2b.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,348	-	1,348	-	1,348	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	110	315	164	428	-	975	18,272	2,965	23,230	9,482	13,748	-	-	1,559	-	-	-	134,305	297	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	511	-	-	-	-	-	-	128	639	639	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	523	52	575	575	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	3,435	344	3,779	3,779	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,140	-	-	-	-	-	535	2,675	2,675	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,774	-	-	-	-	-	416	3,190	3,190	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	70	28	-	290	-	84	472	472	-	-	-	3,521	-	-	-	70,425	115	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,313	197	1,509	1,509	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	638	64	701	701	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,006	201	2,207	-	2,207	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	1,284	193	1,477	1,477	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	456	68	524	-	524	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	229	34	264	264	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	60	9	69	-	69	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	67	10	78	78	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,209	181	1,391	1,391	-	-	-	-	-	-	-	-	-	-
2b.4.16	Security Staff Cost	-	-	-	-	-	-	8,259	1,239	9,497	9,497	-	-	-	-	-	-	-	-	-	121,244
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	10,738	1,611	12,348	12,348	-	-	-	-	-	-	-	-	-	121,244
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	13,928	2,089	16,017	16,017	-	-	-	-	-	-	-	-	-	225,649
2b.4	Subtotal Period 2b Period-Dependent Costs	511	4,914	70	28	-	290	44,145	7,454	57,412	54,612	2,800	-	-	3,521	-	-	-	70,425	115	468,137
2b.0	TOTAL PERIOD 2b COST	3,626	23,946	920	2,533	13,990	18,642	67,516	23,920	155,093	135,455	16,548	3,091	85,854	100,182	-	-	-	7,878,073	272,879	472,233
PERIOD 2c - Spent fuel delay prior to SFP decon																					
Period 2c Direct Decommissioning Activities																					
Period 2c Collateral Costs																					
2c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	53,816	8,072	61,889	-	61,889	-	-	-	-	-	-	-	-	-
2c.3.2	Retention and Severance	-	-	-	-	-	-	3,512	527	4,039	4,039	-	-	-	-	-	-	-	-	-	-
2c.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,526	-	1,526	-	1,526	-	-	-	-	-	-	-	-	-
2c.3	Subtotal Period 2c Collateral Costs	-	-	-	-	-	-	58,855	8,599	67,455	4,039	63,415	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	592	59	651	651	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	3,512	351	3,863	3,863	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	263	-	-	-	-	-	66	328	328	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	9	4	-	38	-	11	61	61	-	-	-	457	-	-	-	9,141	15	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	1,486	223	1,709	1,709	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	687	69	756	756	-	-	-	-	-	-	-	-	-	-
2c.4.7	Emergency Planning Fees	-	-	-	-	-	-	2,271	227	2,498	-	2,498	-	-	-	-	-	-	-	-	-
2c.4.8	Fixed Overhead	-	-	-	-	-	-	1,454	218	1,672	1,672	-	-	-	-	-	-	-	-	-	-
2c.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	516	77	593	-	593	-	-	-	-	-	-	-	-	-

Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2c Period-Dependent Costs (continued)																					
2c.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	260	39	298	298	-	-	-	-	-	-	-	-	-	-
2c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	68	10	79	-	79	-	-	-	-	-	-	-	-	-
2c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	76	11	88	88	-	-	-	-	-	-	-	-	-	-
2c.4.13	Security Staff Cost	-	-	-	-	-	-	9,348	1,402	10,751	10,751	-	-	-	-	-	-	-	-	-	137,246
2c.4.14	Utility Staff Cost	-	-	-	-	-	-	1,195	179	1,375	1,375	-	-	-	-	-	-	-	-	-	19,062
2c.4	Subtotal Period 2c Period-Dependent Costs	-	263	9	4	-	38	21,465	2,943	24,721	21,552	3,170	-	-	457	-	-	-	9,141	15	156,308
2c.0	TOTAL PERIOD 2c COST	-	263	9	4	-	38	80,320	11,543	92,176	25,591	66,585	-	-	457	-	-	-	9,141	15	156,308
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	347	35	86	41	-	703	-	373	1,585	1,585	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
2d.1.2.1	Electrical - Contaminated - Fuel Pool	-	152	2	5	103	8	-	56	325	325	-	-	615	23	-	-	-	26,449	2,077	-
2d.1.2.2	Electrical - Decontaminated - Fuel Pool	-	947	12	43	986	-	-	392	2,380	2,380	-	-	5,893	-	-	-	-	239,327	12,340	-
2d.1.2.3	HVAC - Contaminated - Fuel Pool	-	160	4	11	234	18	-	82	508	508	-	-	1,398	53	-	-	-	60,110	2,157	-
2d.1.2.4	Safeguards Chilled Water - RCA	-	85	1	4	83	-	-	34	207	207	-	-	495	-	-	-	-	20,100	1,019	-
2d.1.2.5	Spent Fuel Pool Cooling	303	357	34	32	135	450	-	382	1,693	1,693	-	-	806	1,325	-	-	-	117,816	7,613	-
2d.1.2.6	Station & Instrument Air - RCA Fuel Pool	-	20	0	1	14	-	-	7	42	42	-	-	83	-	-	-	-	3,374	263	-
2d.1.2	Totals	303	1,721	52	96	1,554	476	-	954	5,157	5,157	-	-	9,290	1,401	-	-	-	467,176	25,468	-
2d.1.4	Scaffolding in support of decommissioning	-	233	1	0	6	1	-	59	301	301	-	-	35	3	-	-	-	1,746	1,592	-
2d.1	Subtotal Period 2d Activity Costs	650	1,989	139	138	1,561	1,180	-	1,386	7,042	7,042	-	-	9,325	3,496	-	-	-	601,841	27,637	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	30	-	21	38	-	86	-	44	220	220	-	-	-	197	-	-	-	11,793	38	-
2d.3.2	Process decommissioning chemical flush waste	1	-	34	110	-	251	-	83	478	478	-	-	-	324	-	-	-	34,576	61	-
2d.3.3	Small tool allowance	-	37	-	-	-	-	-	6	42	42	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	975	-	975	-	975	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	31	37	185	215	1,112	514	975	367	3,437	2,462	975	-	6,000	1,050	-	-	-	349,977	246	-
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	59	-	-	-	-	-	-	15	73	73	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	378	38	416	416	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	2,004	200	2,204	2,204	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	575	-	-	-	-	-	144	719	719	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	2,007	-	-	-	-	-	301	2,308	2,308	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	16	7	-	68	-	20	111	111	-	-	-	830	-	-	-	16,609	27	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	506	76	582	582	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	439	44	483	483	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	58	6	64	-	64	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	929	139	1,068	1,068	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	332	50	381	381	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	44	7	50	-	50	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	49	7	56	56	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	875	131	1,006	1,006	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	5,782	867	6,649	4,694	1,955	-	-	-	-	-	-	-	-	84,454
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	6,401	960	7,361	7,361	-	-	-	-	-	-	-	-	-	70,243
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	8,100	1,215	9,315	8,858	456	-	-	-	-	-	-	-	-	126,681
2d.4	Subtotal Period 2d Period-Dependent Costs	59	2,582	16	7	-	68	25,896	4,220	32,848	30,323	2,525	-	-	830	-	-	-	16,609	27	281,377
2d.0	TOTAL PERIOD 2d COST	740	4,608	340	360	2,673	1,763	27,908	6,284	44,675	41,175	3,501	-	15,325	5,377	-	-	-	968,427	27,910	287,617
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-

Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	934	-	934	-	934	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	2,198	190	2,388	1,454	934	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	362	36	398	398	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,771	177	1,948	1,948	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	501	-	-	-	-	-	125	626	626	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	3	-	28	-	8	45	45	-	-	-	334	-	-	-	6,685	11	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	422	42	465	465	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	42	6	48	-	48	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	5,538	831	6,369	4,497	1,873	-	-	-	-	-	-	-	-	80,898
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	4,011	602	4,613	4,175	438	-	-	-	-	-	-	-	-	59,507
2f.4	Subtotal Period 2f Period-Dependent Costs	-	501	7	3	-	28	17,620	2,646	20,803	18,384	2,420	-	-	334	-	-	-	6,685	11	186,687
2f.0	TOTAL PERIOD 2f COST	-	501	7	3	-	28	23,183	3,845	27,566	24,212	3,354	-	-	334	-	-	-	6,685	40,542	189,807
PERIOD 2 TOTALS		5,134	58,338	20,860	7,153	22,473	41,926	290,708	85,924	532,517	429,593	97,348	5,576	138,734	144,239	237	673	-	13,198,890	527,156	1,927,726
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor	-	4,644	-	-	-	-	-	697	5,341	-	-	5,341	-	-	-	-	-	-	44,669	-
3b.1.1.2	Condensate Storage Tank Foundation	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	16	-
3b.1.1.3	Structures below 3' below grade	-	1,651	-	-	-	-	-	248	1,899	-	-	1,899	-	-	-	-	-	-	8,411	-
3b.1.1.4	Turbine	-	2,139	-	-	-	-	-	321	2,460	-	-	2,460	-	-	-	-	-	-	21,985	-
3b.1.1.5	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
3b.1.1	Totals	-	8,803	-	-	-	-	-	1,320	10,123	-	-	10,123	-	-	-	-	-	-	76,939	-
Site Closeout Activities																					
3b.1.2	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
3b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
3b.1	Subtotal Period 3b Activity Costs	-	9,251	-	-	-	-	200	1,418	10,869	231	-	10,639	-	-	-	-	-	-	77,859	1,560
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	2,242	-	-	-	-	5	337	2,583	-	-	2,583	-	-	-	-	-	-	8,386	-
3b.2.2	Intake Structure cofferdam	-	623	-	-	-	-	-	93	716	-	-	716	-	-	-	-	-	-	5,168	-
3b.2.3	Construction Debris	-	-	-	-	-	-	10	2	12	-	-	12	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	3,011	-	-	-	-	-	452	3,462	-	-	3,462	-	-	-	-	-	-	2,904	-
3b.2.5	Disposition of Original Casks	-	24	80	418	-	2,390	-	728	3,640	3,640	-	-	-	8,929	-	-	-	1,059,612	146	-
3b.2	Subtotal Period 3b Additional Costs	-	5,899	80	418	-	2,390	15	1,611	10,413	3,640	-	6,773	-	8,929	-	-	-	1,059,612	16,604	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	121	-	-	-	-	-	18	139	-	-	139	-	-	-	-	-	-	-	-
3b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,649	-	2,649	-	2,649	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	121	-	-	-	-	2,649	18	2,787	-	2,649	139	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	513	51	565	565	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	4,167	417	4,583	-	4,583	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	395	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	218	22	239	-	239	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	157	16	173	-	173	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	397	781	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	119	18	136	-	136	-	-	-	-	-	-	-	-	-

Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3b Period-Dependent Costs (continued)																					
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	361	54	416	153	263	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	4,616	692	5,308	-	5,308	-	-	-	-	-	-	-	-	57,340
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,170	776	5,946	-	1,278	4,668	-	-	-	-	-	-	-	76,637
3b.4	Subtotal Period 3b Period-Dependent Costs	-	7,144	-	-	-	-	27,610	4,960	39,714	1,114	13,158	25,442	-	-	-	-	-	-	-	250,861
3b.0	TOTAL PERIOD 3b COST	-	22,414	80	418	-	2,390	30,474	8,008	63,784	4,985	15,807	42,993	-	8,929	-	-	-	1,059,612	94,463	252,421
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	625,425	93,814	719,239	-	719,239	-	-	-	-	-	-	-	-	-
3c.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	219,357	-	219,357	-	219,357	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	844,782	93,814	938,596	-	938,596	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	42,518	4,252	46,770	-	46,770	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	242,919	24,292	267,210	-	267,210	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	19,571	1,957	21,528	-	21,528	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	13,018	1,302	14,320	-	14,320	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	28,613	4,292	32,905	-	32,905	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	9,828	1,474	11,302	-	11,302	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	10,979	1,647	12,626	-	12,626	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	382,242	57,336	439,578	-	439,578	-	-	-	-	-	-	-	-	4,748,373
3c.4.10	DOC Staff Cost	-	-	-	-	-	-	26,917	4,038	30,955	-	30,955	-	-	-	-	-	-	-	-	182,630
3c.4.11	Utility Staff Cost	-	-	-	-	-	-	165,731	24,860	190,591	-	190,591	-	-	-	-	-	-	-	-	2,419,844
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	942,335	125,449	1,067,784	-	1,067,784	-	-	-	-	-	-	-	-	7,350,846
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	1,787,117	219,263	2,006,380	-	2,006,380	-	-	-	-	-	-	-	-	7,350,846
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1.1	Totals	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3d.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	76	4	80	-	80	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	9	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	53	5	58	58	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	4	0	4	-	4	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	3	0	3	-	3	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	2	0	3	3	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	83	13	96	96	-	-	-	-	-	-	-	-	-	1,037
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	269
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	181	24	204	197	7	-	-	-	-	-	-	-	-	1,306
3d.0	TOTAL PERIOD 3d COST	-	-	1,444	-	-	8,680	256	1,691	12,071	11,984	87	-	-	-	-	-	1,773	344,823	-	1,306
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161
3e.2	Subtotal Period 3e Additional Costs	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161

Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	93	23	116	116	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	56	14	69	69	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	11	3	13	13	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	54	14	68	68	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	21	5	26	26	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	174	43	217	217	-	-	-	-	-	-	-	-	-	2,500
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	129	32	161	161	-	-	-	-	-	-	-	-	-	1,896
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	536	134	670	670	-	-	-	-	-	-	-	-	-	4,396
3e.0	TOTAL PERIOD 3e COST	-	0	2	17	-	142	1,733	473	2,367	2,367	-	-	-	424	-	-	-	65,754	5,882	5,556
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
3f.2	Subtotal Period 3f Additional Costs	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	28	3	31	-	-	31	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	59	-	-	-	-	-	9	68	-	-	68	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	6	-	-	6	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	28	4	32	-	-	32	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	11	2	12	-	-	12	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	89	13	102	-	-	102	-	-	-	-	-	-	-	1,281
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	55	8	63	-	-	63	-	-	-	-	-	-	-	795
3f.4	Subtotal Period 3f Period-Dependent Costs	-	59	-	-	-	-	216	40	315	-	-	315	-	-	-	-	-	-	-	2,076
3f.0	TOTAL PERIOD 3f COST	-	1,187	-	-	-	-	377	233	1,798	-	-	1,798	-	-	-	-	-	-	4,846	2,156
PERIOD 3 TOTALS		-	23,601	1,525	435	-	11,212	1,819,958	229,668	2,086,399	19,335	2,022,273	44,790	-	9,353	-	-	1,773	1,470,189	105,190	7,612,285
TOTAL COST TO DECOMMISSION		8,929	87,919	22,838	8,068	22,651	58,542	2,229,014	336,495	2,774,456	596,408	2,126,090	51,958	144,866	167,553	826	673	1,773	15,279,140	677,859	10,540,740

TOTAL COST TO DECOMMISSION WITH 13.8% CONTINGENCY:	**$2,774,456**	**thousands of 2020 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 21.5% OR:	**$596,408**	**thousands of 2020 dollars**
SPENT FUEL MANAGEMENT COST IS 76.63% OR:	**$2,126,090**	**thousands of 2020 dollars**
NON-NUCLEAR DEMOLITION COST IS 1.87% OR:	**$51,958**	**thousands of 2020 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**169,051**	**Cubic Feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**
TOTAL SCRAP METAL REMOVED:	**32,925**	**Tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**677,859**	**Man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.2	Notification of Cessation of Operations									a											
1a.1.3	Remove fuel & source material									n/a											
1a.1.4	Notification of Permanent Defueling									a											
1a.1.5	Deactivate plant systems & process waste									a											
1a.1.6	Prepare and submit PSDAR	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.7	Review plant dwgs & specs.	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
1a.1.8	Perform detailed rad survey									a											
1a.1.9	Estimate by-product inventory	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.10	End product description	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.11	Detailed by-product inventory	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.12	Define major work sequence	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
1a.1.13	Perform SER and EA	-	-	-	-	-	-	170	26	196	196	-	-	-	-	-	-	-	-	-	1,326
1a.1.14	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	275	41	316	316	-	-	-	-	-	-	-	-	-	2,138
1a.1.16	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
Activity Specifications																					
1a.1.17.1	Plant & temporary facilities	-	-	-	-	-	-	270	41	311	280	-	31	-	-	-	-	-	-	-	2,104
1a.1.17.2	Plant systems	-	-	-	-	-	-	229	34	263	237	-	26	-	-	-	-	-	-	-	1,782
1a.1.17.3	NSSS Decontamination Flush	-	-	-	-	-	-	27	4	32	32	-	-	-	-	-	-	-	-	-	214
1a.1.17.4	Reactor internals	-	-	-	-	-	-	390	59	449	449	-	-	-	-	-	-	-	-	-	3,036
1a.1.17.5	Reactor vessel	-	-	-	-	-	-	357	54	411	411	-	-	-	-	-	-	-	-	-	2,779
1a.1.17.6	Biological shield	-	-	-	-	-	-	27	4	32	32	-	-	-	-	-	-	-	-	-	214
1a.1.17.7	Steam generators	-	-	-	-	-	-	171	26	197	197	-	-	-	-	-	-	-	-	-	1,334
1a.1.17.8	Reinforced concrete	-	-	-	-	-	-	88	13	101	51	-	51	-	-	-	-	-	-	-	684
1a.1.17.9	Main Turbine	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
1a.1.17.10	Main Condensers	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
1a.1.17.11	Plant structures & buildings	-	-	-	-	-	-	171	26	197	99	-	99	-	-	-	-	-	-	-	1,334
1a.1.17.12	Waste management	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
1a.1.17.13	Facility & site closeout	-	-	-	-	-	-	49	7	57	28	-	28	-	-	-	-	-	-	-	385
1a.1.17	Total	-	-	-	-	-	-	2,079	312	2,391	2,105	-	286	-	-	-	-	-	-	-	16,175
Planning & Site Preparations																					
1a.1.18	Prepare dismantling sequence	-	-	-	-	-	-	132	20	152	152	-	-	-	-	-	-	-	-	-	1,026
1a.1.19	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
1a.1.20	Design water clean-up system	-	-	-	-	-	-	77	12	88	88	-	-	-	-	-	-	-	-	-	599
1a.1.21	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
1a.1.22	Procure casks/liners & containers	-	-	-	-	-	-	68	10	78	78	-	-	-	-	-	-	-	-	-	526
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	10,195	1,529	11,724	11,439	-	286	-	-	-	-	-	-	-	33,420
Period 1a Additional Costs																					
1a.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
1a.2	Subtotal Period 1a Additional Costs	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,330	199	1,529	-	1,529	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	8,394	1,259	9,653	9,653	-	-	-	-	-	-	-	-	-	-
1a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	10,973	1,459	12,432	9,653	2,779	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	578	-	-	-	-	-	144	722	722	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	11	5	-	47	-	13	76	76	-	-	-	565	-	-	-	11,299	18	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	638	64	702	702	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-

Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1a Period-Dependent Costs (continued)																					
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	21,681	3,252	24,933	24,933	-	-	-	-	-	-	-	-	-	345,280
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,331	11	5	-	47	41,706	6,122	49,221	46,279	2,942	-	-	565	-	-	-	11,299	18	468,000
1a.0	TOTAL PERIOD 1a COST	-	1,331	11	5	-	47	71,324	10,377	83,095	77,089	5,720	286	-	565	-	-	-	11,299	18	501,420
PERIOD 1b - Decommissioning Preparations																					
Period 1b Direct Decommissioning Activities																					
Detailed Work Procedures																					
1b.1.1.1	Plant systems	-	-	-	-	-	-	260	39	299	269	-	30	-	-	-	-	-	-	-	2,024
1b.1.1.2	NSSS Decontamination Flush	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.3	Reactor internals	-	-	-	-	-	-	137	21	158	158	-	-	-	-	-	-	-	-	-	1,069
1b.1.1.4	Remaining buildings	-	-	-	-	-	-	74	11	85	21	-	64	-	-	-	-	-	-	-	577
1b.1.1.5	CRD cooling assembly	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.6	CRD housings & ICI tubes	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.7	Incore instrumentation	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1b.1.1.8	Reactor vessel	-	-	-	-	-	-	199	30	229	229	-	-	-	-	-	-	-	-	-	1,552
1b.1.1.9	Facility closeout	-	-	-	-	-	-	66	10	76	38	-	38	-	-	-	-	-	-	-	513
1b.1.1.10	Missile shields	-	-	-	-	-	-	25	4	28	28	-	-	-	-	-	-	-	-	-	192
1b.1.1.11	Biological shield	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	513
1b.1.1.12	Steam generators	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
1b.1.1.13	Reinforced concrete	-	-	-	-	-	-	55	8	63	32	-	32	-	-	-	-	-	-	-	428
1b.1.1.14	Main Turbine	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
1b.1.1.15	Main Condensers	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
1b.1.1.16	Auxiliary building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
1b.1.1.17	Reactor building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
1b.1.1	Total	-	-	-	-	-	-	1,827	274	2,101	1,706	-	395	-	-	-	-	-	-	-	14,215
1b.1.2	Decon primary loop	572	-	-	-	-	-	-	286	859	859	-	-	-	-	-	-	-	-	1,067	-
1b.1	Subtotal Period 1b Activity Costs	572	-	-	-	-	-	1,827	560	2,959	2,564	-	395	-	-	-	-	-	-	1,067	14,215
Period 1b Additional Costs																					
1b.2.1	Site Characterization	-	-	-	-	-	-	1,505	451	1,956	1,956	-	-	-	-	-	-	-	-	8,988	3,563
1b.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
1b.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
1b.2	Subtotal Period 1b Additional Costs	-	2,526	356	244	178	1,369	1,505	1,524	7,702	7,702	-	-	6,132	12,843	-	-	-	518,936	32,243	3,563
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
1b.3.3	Process decommissioning water waste	25	-	16	29	-	66	-	35	172	172	-	-	-	152	-	-	-	9,127	30	-
1b.3.4	Process decommissioning chemical flush waste	2	-	61	199	-	3,889	-	1,009	5,159	5,159	-	-	-	-	588	-	-	62,689	110	-
1b.3.5	Small tool allowance	-	36	-	-	-	-	-	5	42	42	-	-	-	-	-	-	-	-	-	-
1b.3.6	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
1b.3.7	Decon rig	2,104	-	-	-	-	-	-	316	2,419	2,419	-	-	-	-	-	-	-	-	-	-
1b.3.8	Spent Fuel Capital and Transfer	-	-	-	-	-	-	399	60	459	-	459	-	-	-	-	-	-	-	-	-
1b.3.9	Retention and Severance	-	-	-	-	-	-	4,017	603	4,620	4,620	-	-	-	-	-	-	-	-	-	-
1b.3.10	Prairie Island Indian Community Payments	-	-	-	-	-	-	623	-	623	-	623	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	3,185	1,236	77	228	-	3,955	6,303	2,555	17,540	16,458	1,082	-	-	152	588	-	-	71,815	140	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	828	83	910	910	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	1,713	171	1,884	1,884	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	449	-	-	-	-	-	112	561	561	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	6	3	-	27	-	8	43	43	-	-	-	324	-	-	-	6,473	11	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	1,617	243	1,859	1,859	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	196	20	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	1,084	108	1,193	-	1,193	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	211	32	242	-	242	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-

Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 1b Period-Dependent Costs (continued)																					
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	4,153	623	4,775	4,775	-	-	-	-	-	-	-	-	-	61,192
1b.4.15	DOC Staff Cost	-	-	-	-	-	-	4,182	627	4,810	4,810	-	-	-	-	-	-	-	-	-	46,672
1b.4.16	Utility Staff Cost	-	-	-	-	-	-	10,811	1,622	12,432	12,432	-	-	-	-	-	-	-	-	-	172,167
1b.4	Subtotal Period 1b Period-Dependent Costs	38	825	6	3	-	27	25,571	3,830	30,299	28,832	1,467	-	-	324	-	-	-	6,473	11	280,031
1b.0	TOTAL PERIOD 1b COST	3,795	4,586	440	475	178	5,351	35,206	8,470	58,501	55,557	2,549	395	6,132	13,319	588	-	-	597,225	33,460	297,808
PERIOD 1 TOTALS		3,795	5,917	451	479	178	5,398	106,531	18,847	141,595	132,646	8,269	681	6,132	13,884	588	-	-	608,524	33,478	799,228
PERIOD 2a - Large Component Removal																					
Period 2a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
2a.1.1.1	Reactor Coolant Piping	54	47	10	18	-	187	-	89	406	406	-	-	-	508	-	-	-	35,411	1,421	-
2a.1.1.2	Pressurizer Relief Tank	24	21	6	12	-	125	-	51	238	238	-	-	-	338	-	-	-	23,594	630	-
2a.1.1.3	Reactor Coolant Pumps & Motors	57	68	110	93	-	463	-	186	977	977	-	-	-	2,332	-	-	-	295,800	2,049	100
2a.1.1.4	Pressurizer	-	77	503	97	-	776	-	278	1,732	1,732	-	-	-	2,196	-	-	-	185,015	1,666	938
2a.1.1.5	Steam Generators	-	3,307	2,269	1,770	2,409	4,001	-	2,681	16,437	16,437	-	-	18,672	11,316	-	-	-	1,689,435	11,613	2,875
2a.1.1.6	CRDMs/ICIs/Service Structure Removal	302	281	218	66	-	938	-	488	2,294	2,294	-	-	-	4,797	-	-	-	177,400	8,104	-
2a.1.1.7	Reactor Vessel Internals	82	4,861	13,621	929	-	9,015	307	11,878	40,693	40,693	-	-	-	501	125	673	-	164,987	25,123	1,163
2a.1.1.8	Reactor Vessel	94	6,046	2,028	728	-	2,975	307	6,804	18,982	18,982	-	-	-	8,073	-	-	-	576,524	25,123	1,163
2a.1.1	Totals	613	14,709	18,764	3,714	2,409	18,480	614	22,455	81,759	81,759	-	-	18,672	30,062	125	673	-	3,148,166	75,729	6,240
Removal of Major Equipment																					
2a.1.2	Main Turbine/Generator	-	331	172	64	527	377	-	283	1,752	1,752	-	-	2,131	1,187	-	-	-	203,265	4,667	-
2a.1.3	Main Condensers	-	2,801	109	62	705	533	-	960	5,170	5,170	-	-	3,800	1,587	-	-	-	271,824	39,151	-
Cascading Costs from Clean Building Demolition																					
2a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
2a.1.4.2	Auxiliary	-	221	-	-	-	-	-	33	254	254	-	-	-	-	-	-	-	-	1,309	-
2a.1.4.3	Radwaste	-	9	-	-	-	-	-	1	10	10	-	-	-	-	-	-	-	-	65	-
2a.1.4	Totals	-	1,023	-	-	-	-	-	154	1,177	1,177	-	-	-	-	-	-	-	-	8,963	-
Disposal of Plant Systems																					
2a.1.5.1	Admin Bldg Ventilation	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	90	-
2a.1.5.2	Air Removal	-	29	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	422	-
2a.1.5.3	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	676	-
2a.1.5.4	Auxiliary Feedwater - RCA	-	38	0	1	30	-	-	14	84	84	-	-	178	-	-	-	-	7,214	486	-
2a.1.5.5	Bleed Steam	-	90	-	-	-	-	-	13	103	-	-	103	-	-	-	-	-	-	1,331	-
2a.1.5.6	Caustic Addition - RCA	-	40	0	2	40	-	-	16	99	99	-	-	240	-	-	-	-	9,761	468	-
2a.1.5.7	Chemical Feed	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	261	-
2a.1.5.8	Chemical Feed - RCA	-	3	0	0	3	-	-	1	7	7	-	-	16	-	-	-	-	634	31	-
2a.1.5.9	Circulating Water	-	27	-	-	-	-	-	4	32	-	-	32	-	-	-	-	-	-	401	-
2a.1.5.10	Condensate	-	525	-	-	-	-	-	79	603	-	-	603	-	-	-	-	-	-	7,537	-
2a.1.5.11	Condensate Polishing	-	208	-	-	-	-	-	31	239	-	-	239	-	-	-	-	-	-	2,987	-
2a.1.5.12	Condensate Polishing - RCA	-	38	1	4	81	-	-	22	145	145	-	-	483	-	-	-	-	19,616	493	-
2a.1.5.13	Electro-Hydraulic	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	143	-
2a.1.5.14	External Circulating Water	-	26	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	385	-
2a.1.5.15	External Circulating Water - RCA	-	72	1	5	121	-	-	37	237	237	-	-	721	-	-	-	-	29,284	938	-
2a.1.5.16	Feedwater	-	127	-	-	-	-	-	19	146	-	-	146	-	-	-	-	-	-	1,840	-
2a.1.5.17	Feedwater - RCA	-	248	8	31	694	-	-	171	1,152	1,152	-	-	4,147	-	-	-	-	168,414	3,377	-
2a.1.5.18	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	504	-
2a.1.5.19	Heater Drain	-	384	-	-	-	-	-	58	441	-	-	441	-	-	-	-	-	-	5,638	-
2a.1.5.20	Hypobromous Acid Feed	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	86	-
2a.1.5.21	Hypobromous Acid Feed - RCA	-	1	0	0	0	-	-	0	2	2	-	-	2	-	-	-	-	100	12	-
2a.1.5.22	Internal Circ Water & CDSR	-	25	-	-	-	-	-	4	29	-	-	29	-	-	-	-	-	-	366	-
2a.1.5.23	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
2a.1.5.24	Main Steam	-	101	-	-	-	-	-	15	116	-	-	116	-	-	-	-	-	-	1,482	-
2a.1.5.25	Main Steam - RCA	-	380	11	38	864	-	-	231	1,525	1,525	-	-	5,166	-	-	-	-	209,799	5,146	-
2a.1.5.26	Repairable Spare Snubbers	-	6	0	0	2	-	-	2	10	10	-	-	12	-	-	-	-	490	82	-
2a.1.5.27	Steam Exclusion	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	32	-
2a.1.5.28	Steam Exclusion - RCA	-	4	0	0	4	-	-	2	10	10	-	-	24	-	-	-	-	966	47	-
2a.1.5.29	Steam Generator Blowdown	-	416	21	27	319	215	-	212	1,210	1,210	-	-	1,906	631	-	-	-	118,130	5,778	-
2a.1.5.30	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-

Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2a.1.5.31	Turbine & Moisture Separators	-	377	-	-	-	-	-	57	434	-	-	434	-	-	-	-	-	-	5,472	-
2a.1.5.32	Turbine Oil Purification	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	757	-
2a.1.5.33	Water Treatment	-	453	-	-	-	-	-	68	521	-	-	521	-	-	-	-	-	-	6,677	-
2a.1.5.34	Water Treatment - RCA	-	20	0	1	19	-	-	8	49	49	-	-	115	-	-	-	-	4,652	252	-
2a.1.5	Totals	-	3,817	43	108	2,177	215	-	1,100	7,461	4,528	-	2,933	13,010	631	-	-	-	569,060	54,280	-
2a.1.6	Scaffolding in support of decommissioning	-	3,020	22	10	188	30	-	794	4,064	4,064	-	-	1,012	89	-	-	-	51,216	26,270	-
2a.1	Subtotal Period 2a Activity Costs	613	25,702	19,110	3,959	6,005	19,635	614	25,745	101,384	98,450	-	2,933	38,625	33,556	125	673	-	4,243,531	209,060	6,240
Period 2a Additional Costs																					
2a.2.1	Retired RPV upper internals package	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
2a.2	Subtotal Period 2a Additional Costs	-	257	387	217	-	1,394	-	1,041	3,296	3,296	-	-	-	376	112	-	-	50,164	3,333	133
Period 2a Collateral Costs																					
2a.3.1	Process decommissioning water waste	49	-	33	60	-	134	-	70	347	347	-	-	-	308	-	-	-	18,487	60	-
2a.3.3	Small tool allowance	-	269	-	-	-	-	-	40	309	278	-	31	-	-	-	-	-	-	-	-
2a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	13,363	2,004	15,368	-	15,368	-	-	-	-	-	-	-	-	-
2a.3.5	Retention and Severance	-	-	-	-	-	-	8,215	1,232	9,447	9,447	-	-	-	-	-	-	-	-	-	-
2a.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,780	-	1,780	-	1,780	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	49	269	33	60	-	134	23,358	3,347	27,250	10,072	17,147	31	-	308	-	-	-	18,487	60	-
Period 2a Period-Dependent Costs																					
2a.4.1	Decon supplies	107	-	-	-	-	-	-	27	134	134	-	-	-	-	-	-	-	-	-	-
2a.4.2	Insurance	-	-	-	-	-	-	690	69	759	759	-	-	-	-	-	-	-	-	-	-
2a.4.3	Property taxes	-	-	-	-	-	-	4,548	455	5,002	5,002	-	-	-	-	-	-	-	-	-	-
2a.4.4	Health physics supplies	-	2,103	-	-	-	-	-	526	2,629	2,629	-	-	-	-	-	-	-	-	-	-
2a.4.5	Heavy equipment rental	-	3,565	-	-	-	-	-	535	4,100	4,100	-	-	-	-	-	-	-	-	-	-
2a.4.6	Disposal of DAW generated	-	-	86	35	-	358	-	103	582	582	-	-	-	4,345	-	-	-	86,891	142	-
2a.4.7	Plant energy budget	-	-	-	-	-	-	2,194	329	2,523	2,523	-	-	-	-	-	-	-	-	-	-
2a.4.8	NRC Fees	-	-	-	-	-	-	526	53	578	578	-	-	-	-	-	-	-	-	-	-
2a.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,647	265	2,912	-	2,912	-	-	-	-	-	-	-	-	-
2a.4.10	Fixed Overhead	-	-	-	-	-	-	1,695	254	1,949	1,949	-	-	-	-	-	-	-	-	-	-
2a.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	602	90	692	-	692	-	-	-	-	-	-	-	-	-
2a.4.12	ISFSI Operating Costs	-	-	-	-	-	-	80	12	92	-	92	-	-	-	-	-	-	-	-	-
2a.4.13	Railroad Track Maintenance	-	-	-	-	-	-	318	48	366	366	-	-	-	-	-	-	-	-	-	-
2a.4.14	Remedial Actions Surveys	-	-	-	-	-	-	1,596	239	1,835	1,835	-	-	-	-	-	-	-	-	-	-
2a.4.15	Security Staff Cost	-	-	-	-	-	-	10,900	1,635	12,534	12,534	-	-	-	-	-	-	-	-	-	160,018
2a.4.16	DOC Staff Cost	-	-	-	-	-	-	20,663	3,099	23,763	23,763	-	-	-	-	-	-	-	-	-	225,210
2a.4.17	Utility Staff Cost	-	-	-	-	-	-	27,056	4,058	31,115	31,115	-	-	-	-	-	-	-	-	-	419,049
2a.4	Subtotal Period 2a Period-Dependent Costs	107	5,668	86	35	-	358	73,514	11,797	91,565	87,870	3,696	-	-	4,345	-	-	-	86,891	142	804,276
2a.0	TOTAL PERIOD 2a COST	770	31,895	19,616	4,270	6,005	21,522	97,486	41,931	223,495	199,687	20,843	2,964	38,625	38,584	237	673	-	4,399,073	212,595	810,649
PERIOD 2b - Site Decontamination																					
Period 2b Direct Decommissioning Activities																					
Disposal of Plant Systems																					
2b.1.1.1	ADT & Misc Ventilation	-	25	1	1	26	3	-	11	66	66	-	-	153	9	-	-	-	6,803	363	-
2b.1.1.2	Aux Bldg Normal Ventilation	-	69	2	6	116	13	-	39	246	246	-	-	692	39	-	-	-	30,595	1,013	-
2b.1.1.3	Aux Bldg Special Ventilation	-	14	0	1	12	2	-	6	34	34	-	-	70	6	-	-	-	3,234	197	-
2b.1.1.4	Battery Rm Special Ventilation	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	24	-
2b.1.1.5	Boron Recycle	0	4	0	0	0	3	-	2	10	10	-	-	3	9	-	-	-	700	50	-
2b.1.1.6	Chemical & Volume Control	749	942	62	57	394	677	-	853	3,736	3,736	-	-	2,356	1,977	-	-	-	223,753	23,197	-
2b.1.1.7	Cold Chemical Lab Ventilation	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
2b.1.1.8	Component Cooling - RCA	-	647	25	88	2,007	-	-	479	3,246	3,246	-	-	11,996	-	-	-	-	487,169	8,583	-
2b.1.1.9	Containment Cooling	-	35	-	-	-	-	-	5	40	-	-	40	-	-	-	-	-	-	502	-
2b.1.1.10	Containment Cooling - RCA	-	302	6	20	459	-	-	148	934	934	-	-	2,743	-	-	-	-	111,390	3,949	-
2b.1.1.11	Containment Hydrogen Control - RCA	-	36	0	1	24	-	-	13	74	74	-	-	141	-	-	-	-	5,742	494	-
2b.1.1.12	Containment Spray - RCA	-	194	3	11	243	-	-	87	538	538	-	-	1,453	-	-	-	-	59,019	2,617	-
2b.1.1.13	Containment Ventilation	-	235	23	49	790	243	-	248	1,587	1,587	-	-	4,721	722	-	-	-	237,643	3,375	-
2b.1.1.14	Control/Relay/Cmptr Rm Vent	-	31	1	2	44	7	-	17	102	102	-	-	260	20	-	-	-	11,878	454	-
2b.1.1.15	Cooling Water	-	159	-	-	-	-	-	24	183	-	-	183	-	-	-	-	-	-	2,344	-
2b.1.1.16	Cooling Water - RCA	-	476	17	62	1,412	-	-	342	2,310	2,310	-	-	8,442	-	-	-	-	342,822	6,311	-
2b.1.1.17	Cranes/Hoists/Elevators - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
2b.1.1.18	D3 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-
2b.1.1.19	D4 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-

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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
2b.1.1.20	D5 Emergency Diesel	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
2b.1.1.21	Electrical - Clean	-	1,714	-	-	-	-	-	257	1,972	-	-	1,972	-	-	-	-	-	-	24,276	-
2b.1.1.22	Electrical - Contaminated	-	475	5	16	334	25	-	178	1,034	1,034	-	-	1,997	75	-	-	-	85,887	6,503	-
2b.1.1.23	Electrical - Decontaminated	-	2,955	38	138	3,138	-	-	1,234	7,503	7,503	-	-	18,753	-	-	-	-	761,569	38,423	-
2b.1.1.24	Filter Rm Ventilation	-	5	0	0	4	0	-	2	11	11	-	-	24	1	-	-	-	1,017	69	-
2b.1.1.25	Fire Protection & Detection	-	204	-	-	-	-	-	31	235	-	-	235	-	-	-	-	-	-	3,009	-
2b.1.1.26	Fire Protection & Detection - RCA	-	246	4	13	306	-	-	110	679	679	-	-	1,828	-	-	-	-	74,245	3,134	-
2b.1.1.27	Fuel Handling	-	74	1	2	34	17	-	28	156	156	-	-	200	49	-	-	-	11,273	1,101	-
2b.1.1.28	Fuel Oil	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
2b.1.1.29	HVAC - Clean	-	151	-	-	-	-	-	23	174	-	-	174	-	-	-	-	-	-	2,373	-
2b.1.1.30	HVAC - Contaminated	-	1,231	29	87	1,798	136	-	627	3,908	3,908	-	-	10,745	405	-	-	-	462,103	16,579	-
2b.1.1.31	Heating	-	322	-	-	-	-	-	48	370	-	-	370	-	-	-	-	-	-	4,804	-
2b.1.1.32	Heating - RCA	-	337	4	14	319	-	-	135	809	809	-	-	1,907	-	-	-	-	77,458	4,086	-
2b.1.1.33	Hot Lab & Sample Rm Ventilation	-	20	0	1	18	1	-	8	48	48	-	-	107	4	-	-	-	4,622	285	-
2b.1.1.34	Incore Instrumentation	0	30	1	2	10	20	-	14	77	77	-	-	60	58	-	-	-	6,143	458	-
2b.1.1.35	Misc Drains & Vents	-	234	12	12	77	145	-	109	590	590	-	-	458	426	-	-	-	46,079	3,180	-
2b.1.1.36	Misc Lab & Service Areas Vent	-	129	8	8	62	84	-	65	356	356	-	-	370	244	-	-	-	30,899	1,713	-
2b.1.1.37	Miscellaneous Gas	-	72	-	-	-	-	-	11	83	-	-	83	-	-	-	-	-	-	1,073	-
2b.1.1.38	Miscellaneous Gas - RCA	-	134	1	4	100	-	-	49	289	289	-	-	600	-	-	-	-	24,378	1,636	-
2b.1.1.39	Radiation Monitoring	-	7	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	111	-
2b.1.1.40	Radiation Monitoring - RCA	-	65	1	2	53	-	-	25	145	145	-	-	316	-	-	-	-	12,826	782	-
2b.1.1.41	Reactor Coolant	163	236	20	16	38	249	-	213	937	937	-	-	229	730	-	-	-	56,440	5,517	-
2b.1.1.42	Reactor Hot Sampling	140	126	11	7	9	108	-	132	533	533	-	-	54	312	-	-	-	22,678	3,686	-
2b.1.1.43	Reactor Makeup	-	41	-	-	-	-	-	6	47	-	-	47	-	-	-	-	-	-	583	-
2b.1.1.44	Reactor Makeup - RCA	-	4	0	0	5	-	-	2	11	11	-	-	28	-	-	-	-	1,148	47	-
2b.1.1.45	Reactor Vessel	9	18	1	0	4	5	-	11	47	47	-	-	22	14	-	-	-	1,816	385	-
2b.1.1.46	Residual Heat Removal	348	393	84	86	477	1,102	-	641	3,132	3,132	-	-	2,853	3,244	-	-	-	324,232	7,112	-
2b.1.1.47	Safeguards Chilled Water	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
2b.1.1.48	Safety Injection	-	874	42	72	1,117	395	-	500	3,000	3,000	-	-	6,676	1,161	-	-	-	345,708	12,284	-
2b.1.1.49	Sampling	-	52	3	2	6	32	-	23	119	119	-	-	37	93	-	-	-	7,628	714	-
2b.1.1.50	Service Bldg & New Cmptr Vent	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	6	-
2b.1.1.51	Shield Bldg Ventilation	-	120	13	25	339	163	-	127	787	787	-	-	2,028	484	-	-	-	113,139	1,743	-
2b.1.1.52	Station & Instrument Air	-	161	-	-	-	-	-	24	185	-	-	185	-	-	-	-	-	-	2,424	-
2b.1.1.53	Station & Instrument Air - RCA	-	299	3	12	272	-	-	118	704	704	-	-	1,625	-	-	-	-	65,986	3,638	-
2b.1.1.54	Turbine Bldg Traps & Drains	-	30	-	-	-	-	-	5	35	-	-	35	-	-	-	-	-	-	462	-
2b.1.1.55	Turbine Bldg Traps & Drains - RCA	-	30	0	1	30	-	-	12	73	73	-	-	180	-	-	-	-	7,321	344	-
2b.1.1.56	Turbine Bldg Ventilation	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	655	-
2b.1.1.57	Unit Coolers	-	23	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	332	-
2b.1.1.58	Unit Coolers - RCA	-	56	0	2	39	-	-	20	117	117	-	-	232	-	-	-	-	9,413	690	-
2b.1.1.59	Waste Gas Disposal	553	479	43	45	410	464	-	585	2,581	2,581	-	-	2,453	1,358	-	-	-	187,339	14,308	-
2b.1.1.60	Waste Liquid Disposal	1,436	1,800	116	100	612	1,234	-	1,595	6,893	6,893	-	-	3,655	3,594	-	-	-	381,754	44,485	-
2b.1.1.61	Waste Solid Disposal	115	145	12	11	65	134	-	140	622	622	-	-	389	393	-	-	-	41,177	3,481	-
2b.1.1	Totals	3,515	16,542	596	980	15,220	5,264	-	9,399	51,516	48,072	-	3,444	90,963	15,429	-	-	-	4,689,210	270,390	-
2b.1.2	Scaffolding in support of decommissioning	-	3,775	27	13	235	37	-	993	5,081	5,081	-	-	1,265	112	-	-	-	64,020	32,837	-
Decontamination of Site Buildings																					
2b.1.3.1	Reactor	1,215	2,808	240	1,236	373	13,625	-	4,981	24,479	24,479	-	-	2,230	83,434	-	-	-	3,633,771	50,962	-
2b.1.3.2	Auxiliary	1,292	422	23	117	177	648	-	960	3,639	3,639	-	-	1,060	6,118	-	-	-	332,495	23,821	-
2b.1.3.3	Backwash Waste Receiving Tank	-	28	3	17	-	97	-	34	179	179	-	-	-	929	-	-	-	43,896	301	-
2b.1.3.4	Drum Transfer & Truck Loading Enclosure	18	9	1	3	3	14	-	16	63	63	-	-	19	135	-	-	-	7,118	369	-
2b.1.3.5	LLRW Storage Enclosure	123	54	3	17	6	96	-	103	403	403	-	-	38	920	-	-	-	44,971	2,426	-
2b.1.3.6	Radwaste	55	24	1	8	7	43	-	47	185	185	-	-	42	412	-	-	-	21,136	1,083	-
2b.1.3.7	Resin Disposal	16	12	1	3	14	14	-	17	76	76	-	-	83	124	-	-	-	9,271	383	-
2b.1.3	Totals	2,720	3,357	271	1,400	581	14,537	-	6,158	29,024	29,024	-	-	3,471	92,071	-	-	-	4,092,658	79,343	-
2b.1.4	Prepare/submit License Termination Plan	-	-	-	-	-	-	225	34	259	259	-	-	-	-	-	-	-	-	-	1,751
2b.1.5	Receive NRC approval of termination plan									a											
2b.1	Subtotal Period 2b Activity Costs	6,235	23,674	895	2,393	16,035	19,839	225	16,584	85,879	82,435	-	3,444	95,700	107,611	-	-	-	8,845,887	382,570	1,751
Period 2b Additional Costs																					
2b.2.1	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
2b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
2b.2.3	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2b.2	Subtotal Period 2b Additional Costs	-	1,175	11	36	606	-	4,573	1,077	7,478	7,478	-	-	5,880	-	-	-	-	147,000	7,427	-

Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2b Collateral Costs																					
2b.3.1	Process decommissioning water waste	166	-	113	203	-	456	-	239	1,176	1,176	-	-	-	1,047	-	-	-	62,844	204	-
2b.3.2	Process decommissioning chemical flush waste	3	-	119	390	-	893	-	295	1,699	1,699	-	-	-	1,154	-	-	-	122,948	216	-
2b.3.3	Small tool allowance	-	446	-	-	-	-	-	67	513	513	-	-	-	-	-	-	-	-	-	-
2b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	51,308	7,696	59,005	-	59,005	-	-	-	-	-	-	-	-	-
2b.3.5	Retention and Severance	-	-	-	-	-	-	2,839	426	3,265	3,265	-	-	-	-	-	-	-	-	-	-
2b.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,348	-	1,348	-	1,348	-	-	-	-	-	-	-	-	-
2b.3.7	On-site survey and release of 0.437 tons clean metallic waste	-	-	-	-	-	-	1	0	1	1	-	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	169	446	232	592	-	1,349	55,497	8,723	67,007	6,654	60,353	-	-	2,201	-	-	-	185,792	420	-
Period 2b Period-Dependent Costs																					
2b.4.1	Decon supplies	1,219	-	-	-	-	-	-	305	1,524	1,524	-	-	-	-	-	-	-	-	-	-
2b.4.2	Insurance	-	-	-	-	-	-	523	52	575	575	-	-	-	-	-	-	-	-	-	-
2b.4.3	Property taxes	-	-	-	-	-	-	3,075	308	3,383	3,383	-	-	-	-	-	-	-	-	-	-
2b.4.4	Health physics supplies	-	2,866	-	-	-	-	-	716	3,582	3,582	-	-	-	-	-	-	-	-	-	-
2b.4.5	Heavy equipment rental	-	2,774	-	-	-	-	-	416	3,190	3,190	-	-	-	-	-	-	-	-	-	-
2b.4.6	Disposal of DAW generated	-	-	103	42	-	429	-	124	698	698	-	-	-	5,209	-	-	-	104,172	170	-
2b.4.7	Plant energy budget	-	-	-	-	-	-	1,313	197	1,509	1,509	-	-	-	-	-	-	-	-	-	-
2b.4.8	NRC Fees	-	-	-	-	-	-	398	40	438	438	-	-	-	-	-	-	-	-	-	-
2b.4.9	Emergency Planning Fees	-	-	-	-	-	-	2,006	201	2,207	-	2,207	-	-	-	-	-	-	-	-	-
2b.4.10	Fixed Overhead	-	-	-	-	-	-	1,284	193	1,477	1,477	-	-	-	-	-	-	-	-	-	-
2b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	456	68	524	-	524	-	-	-	-	-	-	-	-	-
2b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	229	34	264	264	-	-	-	-	-	-	-	-	-	-
2b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	60	9	69	-	69	-	-	-	-	-	-	-	-	-
2b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	67	10	78	78	-	-	-	-	-	-	-	-	-	-
2b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,209	181	1,391	1,391	-	-	-	-	-	-	-	-	-	-
2b.4.16	Security Staff Cost	-	-	-	-	-	-	8,259	1,239	9,497	9,497	-	-	-	-	-	-	-	-	-	121,244
2b.4.17	DOC Staff Cost	-	-	-	-	-	-	15,117	2,268	17,385	17,385	-	-	-	-	-	-	-	-	-	163,904
2b.4.18	Utility Staff Cost	-	-	-	-	-	-	19,642	2,946	22,588	22,588	-	-	-	-	-	-	-	-	-	304,233
2b.4	Subtotal Period 2b Period-Dependent Costs	1,219	5,640	103	42	-	429	53,639	9,307	70,380	67,579	2,800	-	-	5,209	-	-	-	104,172	170	589,381
2b.0	TOTAL PERIOD 2b COST	7,623	30,935	1,242	3,063	16,641	21,617	113,934	35,690	230,744	164,147	63,153	3,444	101,580	115,021	-	-	-	9,282,851	390,587	591,132
PERIOD 2d - Decontamination Following Wet Fuel Storage																					
Period 2d Direct Decommissioning Activities																					
2d.1.1	Remove spent fuel racks	347	35	86	41	-	703	-	373	1,585	1,585	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
2d.1.2.1	Electrical - Contaminated - Fuel Pool	-	203	2	7	145	11	-	77	445	445	-	-	864	33	-	-	-	37,167	2,783	-
2d.1.2.2	Electrical - Decontaminated - Fuel Pool	-	1,269	17	59	1,350	-	-	530	3,225	3,225	-	-	8,069	-	-	-	-	327,668	16,495	-
2d.1.2.3	Fire Protection & Detection - RCA Fuel P	-	37	1	2	48	-	-	17	105	105	-	-	286	-	-	-	-	11,622	476	-
2d.1.2.4	HVAC - Contaminated - Fuel Pool	-	553	13	39	808	61	-	282	1,756	1,756	-	-	4,828	182	-	-	-	207,612	7,448	-
2d.1.2.5	Safeguards Chilled Water - RCA	-	5	0	0	4	-	-	2	11	11	-	-	26	-	-	-	-	1,045	51	-
2d.1.2.6	Spent Fuel Pool Cooling	32	36	3	2	6	37	-	36	152	152	-	-	39	107	-	-	-	8,481	882	-
2d.1.2.7	Spent Fuel Pool Normal Ventilation	-	27	1	2	44	4	-	15	93	93	-	-	265	12	-	-	-	11,505	394	-
2d.1.2	Totals	32	2,130	36	112	2,405	113	-	958	5,786	5,786	-	-	14,376	333	-	-	-	605,100	28,530	-
Decontamination of Site Buildings																					
2d.1.3.1	Fuel Handling of Aux Building	1,029	1,138	13	45	404	195	-	916	3,741	3,741	-	-	2,417	1,652	-	-	-	177,755	30,404	-
2d.1.3	Totals	1,029	1,138	13	45	404	195	-	916	3,741	3,741	-	-	2,417	1,652	-	-	-	177,755	30,404	-
2d.1.4	Scaffolding in support of decommissioning	-	755	5	3	47	7	-	199	1,016	1,016	-	-	253	22	-	-	-	12,804	6,567	-
2d.1	Subtotal Period 2d Activity Costs	1,408	4,058	141	202	2,857	1,018	-	2,445	12,128	12,128	-	-	17,046	4,099	-	-	-	928,579	66,078	-
Period 2d Additional Costs																					
2d.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
2d.2	Subtotal Period 2d Additional Costs	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
Period 2d Collateral Costs																					
2d.3.1	Process decommissioning water waste	45	-	31	56	-	126	-	65	323	323	-	-	-	288	-	-	-	17,293	56	-
2d.3.2	Process decommissioning chemical flush waste	0	-	1	5	-	10	-	3	20	20	-	-	-	13	-	-	-	1,422	2	-
2d.3.3	Small tool allowance	-	83	-	-	-	-	-	12	95	95	-	-	-	-	-	-	-	-	-	-
2d.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
2d.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	975	-	975	-	975	-	-	-	-	-	-	-	-	-
2d.3	Subtotal Period 2d Collateral Costs	45	83	162	128	1,112	314	975	316	3,135	2,160	975	-	6,000	831	-	-	-	322,324	206	-

Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2d Period-Dependent Costs																					
2d.4.1	Decon supplies	236	-	-	-	-	-	-	59	295	295	-	-	-	-	-	-	-	-	-	-
2d.4.2	Insurance	-	-	-	-	-	-	378	38	416	416	-	-	-	-	-	-	-	-	-	-
2d.4.3	Property taxes	-	-	-	-	-	-	2,004	200	2,204	2,204	-	-	-	-	-	-	-	-	-	-
2d.4.4	Health physics supplies	-	794	-	-	-	-	-	198	992	992	-	-	-	-	-	-	-	-	-	-
2d.4.5	Heavy equipment rental	-	2,007	-	-	-	-	-	301	2,308	2,308	-	-	-	-	-	-	-	-	-	-
2d.4.6	Disposal of DAW generated	-	-	40	16	-	165	-	48	268	268	-	-	-	2,002	-	-	-	40,031	65	-
2d.4.7	Plant energy budget	-	-	-	-	-	-	506	76	582	582	-	-	-	-	-	-	-	-	-	-
2d.4.8	NRC Fees	-	-	-	-	-	-	277	28	305	305	-	-	-	-	-	-	-	-	-	-
2d.4.9	Emergency Planning Fees	-	-	-	-	-	-	58	6	64	-	64	-	-	-	-	-	-	-	-	-
2d.4.10	Fixed Overhead	-	-	-	-	-	-	929	139	1,068	1,068	-	-	-	-	-	-	-	-	-	-
2d.4.11	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	332	50	381	381	-	-	-	-	-	-	-	-	-	-
2d.4.12	ISFSI Operating Costs	-	-	-	-	-	-	44	7	50	-	50	-	-	-	-	-	-	-	-	-
2d.4.13	Railroad Track Maintenance	-	-	-	-	-	-	49	7	56	56	-	-	-	-	-	-	-	-	-	-
2d.4.14	Remedial Actions Surveys	-	-	-	-	-	-	875	131	1,006	1,006	-	-	-	-	-	-	-	-	-	-
2d.4.15	Security Staff Cost	-	-	-	-	-	-	5,782	867	6,649	4,694	1,955	-	-	-	-	-	-	-	-	84,454
2d.4.16	DOC Staff Cost	-	-	-	-	-	-	6,401	960	7,361	7,361	-	-	-	-	-	-	-	-	-	70,243
2d.4.17	Utility Staff Cost	-	-	-	-	-	-	8,100	1,215	9,315	8,858	456	-	-	-	-	-	-	-	-	126,681
2d.4	Subtotal Period 2d Period-Dependent Costs	236	2,801	40	16	-	165	25,734	4,330	33,321	30,796	2,525	-	-	2,002	-	-	-	40,031	65	281,377
2d.0	TOTAL PERIOD 2d COST	1,689	6,941	343	346	3,969	1,496	27,746	7,403	49,932	46,432	3,501	-	23,046	6,931	-	-	-	1,290,933	66,348	287,617
PERIOD 2f - License Termination																					
Period 2f Direct Decommissioning Activities																					
2f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
2f.1.2	Terminate license									a											
2f.1	Subtotal Period 2f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 2f Additional Costs																					
2f.2.1	License Termination Survey	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
2f.2	Subtotal Period 2f Additional Costs	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
Period 2f Collateral Costs																					
2f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
2f.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	934	-	934	-	934	-	-	-	-	-	-	-	-	-
2f.3	Subtotal Period 2f Collateral Costs	-	-	-	-	-	-	2,198	190	2,388	1,454	934	-	-	-	-	-	-	-	-	-
Period 2f Period-Dependent Costs																					
2f.4.1	Insurance	-	-	-	-	-	-	362	36	398	398	-	-	-	-	-	-	-	-	-	-
2f.4.2	Property taxes	-	-	-	-	-	-	1,771	177	1,948	1,948	-	-	-	-	-	-	-	-	-	-
2f.4.3	Health physics supplies	-	710	-	-	-	-	-	178	888	888	-	-	-	-	-	-	-	-	-	-
2f.4.4	Disposal of DAW generated	-	-	7	3	-	28	-	8	45	45	-	-	-	334	-	-	-	6,685	11	-
2f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
2f.4.6	NRC Fees	-	-	-	-	-	-	263	26	290	290	-	-	-	-	-	-	-	-	-	-
2f.4.7	Emergency Planning Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
2f.4.8	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
2f.4.9	ISFSI Operating Costs	-	-	-	-	-	-	42	6	48	-	48	-	-	-	-	-	-	-	-	-
2f.4.10	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
2f.4.11	Security Staff Cost	-	-	-	-	-	-	5,538	831	6,369	4,497	1,873	-	-	-	-	-	-	-	-	80,898
2f.4.12	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
2f.4.13	Utility Staff Cost	-	-	-	-	-	-	4,011	602	4,613	4,175	438	-	-	-	-	-	-	-	-	59,507
2f.4	Subtotal Period 2f Period-Dependent Costs	-	710	7	3	-	28	17,461	2,682	20,890	18,470	2,420	-	-	334	-	-	-	6,685	11	186,687
2f.0	TOTAL PERIOD 2f COST	-	710	7	3	-	28	26,867	5,034	32,648	29,294	3,354	-	-	334	-	-	-	6,685	100,906	189,807
PERIOD 2 TOTALS		10,081	70,482	21,208	7,682	26,615	44,663	266,032	90,058	536,819	439,560	90,851	6,408	163,252	160,871	237	673	-	14,979,540	770,436	1,879,206

Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 3b - Site Restoration																					
Period 3b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
3b.1.1.1	Reactor	-	4,645	-	-	-	-	-	697	5,342	-	-	5,342	-	-	-	-	-	-	44,679	-
3b.1.1.2	Auxiliary	-	1,993	-	-	-	-	-	299	2,291	-	-	2,291	-	-	-	-	-	-	11,902	-
3b.1.1.3	Condensate Storage Tank Foundation	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	33	-
3b.1.1.4	Construction Warehouse & Fab Shop	-	130	-	-	-	-	-	19	149	-	-	149	-	-	-	-	-	-	1,405	-
3b.1.1.5	D3/D4 Emergency Generator	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	84	-
3b.1.1.6	Drum Transfer & Truck Loading Enclosure	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	221	-
3b.1.1.7	Hydrogen House	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	47	-
3b.1.1.8	LLRW Storage Enclosure	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	853	-
3b.1.1.9	Misc Structures 2017	-	2,617	-	-	-	-	-	393	3,009	-	-	3,009	-	-	-	-	-	-	22,582	-
3b.1.1.10	Radwaste	-	176	-	-	-	-	-	26	202	-	-	202	-	-	-	-	-	-	1,400	-
3b.1.1.11	Resin Disposal	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	120	-
3b.1.1.12	Structures below 3' below grade	-	1,785	-	-	-	-	-	268	2,052	-	-	2,052	-	-	-	-	-	-	9,238	-
3b.1.1.13	Sulfuric Acid Tank Enclosure	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	35	-
3b.1.1.14	Turbine	-	2,140	-	-	-	-	-	321	2,461	-	-	2,461	-	-	-	-	-	-	21,997	-
3b.1.1.15	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
3b.1.1.16	Warehouse #2	-	24	-	-	-	-	-	4	27	-	-	27	-	-	-	-	-	-	213	-
3b.1.1.17	Waste Neutralizing Tank House	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	56	-
3b.1.1.18	Waste Oil Storage	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	70	-
3b.1.1.19	Water Treatment	-	324	-	-	-	-	-	49	373	-	-	373	-	-	-	-	-	-	2,690	-
3b.1.1.20	Fuel Handling of Aux Building	-	1,095	-	-	-	-	-	164	1,259	-	-	1,259	-	-	-	-	-	-	8,240	-
3b.1.1	Totals	-	15,501	-	-	-	-	-	2,325	17,826	-	-	17,826	-	-	-	-	-	-	127,723	-
Site Closeout Activities																					
3b.1.2	Remove Rubble	-	1,330	-	-	-	-	-	200	1,530	-	-	1,530	-	-	-	-	-	-	6,495	-
3b.1.3	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
3b.1.4	Final report to NRC	-	-	-	-	-	-	86	13	99	99	-	-	-	-	-	-	-	-	-	667
3b.1	Subtotal Period 3b Activity Costs	-	17,279	-	-	-	-	86	2,605	19,969	99	-	19,871	-	-	-	-	-	-	135,138	667
Period 3b Additional Costs																					
3b.2.1	Clean Concrete Disposal	-	4,912	-	-	-	-	10	738	5,660	-	-	5,660	-	-	-	-	-	-	18,372	-
3b.2.2	Intake Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
3b.2.3	Construction Debris	-	-	-	-	-	-	2,150	323	2,473	-	-	2,473	-	-	-	-	-	-	-	-
3b.2.4	Backfill	-	9,257	-	-	-	-	-	1,388	10,645	-	-	10,645	-	-	-	-	-	-	9,327	-
3b.2.5	Disposition of Original Casks	-	24	80	418	-	2,390	-	728	3,640	3,640	-	-	-	8,929	-	-	-	1,059,612	146	-
3b.2	Subtotal Period 3b Additional Costs	-	14,634	80	418	-	2,390	2,160	3,244	22,926	3,640	-	19,286	-	8,929	-	-	-	1,059,612	31,397	-
Period 3b Collateral Costs																					
3b.3.1	Small tool allowance	-	212	-	-	-	-	-	32	244	-	-	244	-	-	-	-	-	-	-	-
3b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,649	-	2,649	-	2,649	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	-	212	-	-	-	-	2,649	32	2,893	-	2,649	244	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Insurance	-	-	-	-	-	-	513	51	565	565	-	-	-	-	-	-	-	-	-	-
3b.4.2	Property taxes	-	-	-	-	-	-	4,167	417	4,583	-	4,583	-	-	-	-	-	-	-	-	-
3b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
3b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	395	-	-	-	-	-	-	-	-	-
3b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	218	22	239	-	239	-	-	-	-	-	-	-	-	-
3b.4.6	Emergency Planning Fees	-	-	-	-	-	-	157	16	173	-	173	-	-	-	-	-	-	-	-	-
3b.4.7	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	397	781	-	-	-	-	-	-	-	-	-
3b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	119	18	136	-	136	-	-	-	-	-	-	-	-	-
3b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	361	54	416	153	263	-	-	-	-	-	-	-	-	-
3b.4.10	Security Staff Cost	-	-	-	-	-	-	4,616	692	5,308	-	5,308	-	-	-	-	-	-	-	-	57,340
3b.4.11	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
3b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,170	776	5,946	-	1,278	4,668	-	-	-	-	-	-	-	76,637
3b.4	Subtotal Period 3b Period-Dependent Costs	-	7,144	-	-	-	-	27,610	4,960	39,714	1,114	13,158	25,442	-	-	-	-	-	-	-	250,861
3b.0	TOTAL PERIOD 3b COST	-	39,269	80	418	-	2,390	32,505	10,840	85,502	4,853	15,807	64,843	-	8,929	-	-	-	1,059,612	166,534	251,528

Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 3c - Fuel Storage Operations/Shipping																					
Period 3c Direct Decommissioning Activities																					
Period 3c Collateral Costs																					
3c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	625,425	93,814	719,239	-	719,239	-	-	-	-	-	-	-	-	-
3c.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	219,357	-	219,357	-	219,357	-	-	-	-	-	-	-	-	-
3c.3	Subtotal Period 3c Collateral Costs	-	-	-	-	-	-	844,782	93,814	938,596	-	938,596	-	-	-	-	-	-	-	-	-
Period 3c Period-Dependent Costs																					
3c.4.1	Insurance	-	-	-	-	-	-	42,518	4,252	46,770	-	46,770	-	-	-	-	-	-	-	-	-
3c.4.2	Property taxes	-	-	-	-	-	-	242,919	24,292	267,210	-	267,210	-	-	-	-	-	-	-	-	-
3c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	19,571	1,957	21,528	-	21,528	-	-	-	-	-	-	-	-	-
3c.4.5	Emergency Planning Fees	-	-	-	-	-	-	13,018	1,302	14,320	-	14,320	-	-	-	-	-	-	-	-	-
3c.4.6	Fixed Overhead	-	-	-	-	-	-	28,613	4,292	32,905	-	32,905	-	-	-	-	-	-	-	-	-
3c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	9,828	1,474	11,302	-	11,302	-	-	-	-	-	-	-	-	-
3c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	10,979	1,647	12,626	-	12,626	-	-	-	-	-	-	-	-	-
3c.4.9	Security Staff Cost	-	-	-	-	-	-	382,242	57,336	439,578	-	439,578	-	-	-	-	-	-	-	-	4,748,373
3c.4.10	DOC Staff Cost	-	-	-	-	-	-	26,917	4,038	30,955	-	30,955	-	-	-	-	-	-	-	-	182,630
3c.4.11	Utility Staff Cost	-	-	-	-	-	-	165,731	24,860	190,591	-	190,591	-	-	-	-	-	-	-	-	2,419,844
3c.4	Subtotal Period 3c Period-Dependent Costs	-	-	-	-	-	-	942,335	125,449	1,067,784	-	1,067,784	-	-	-	-	-	-	-	-	7,350,846
3c.0	TOTAL PERIOD 3c COST	-	-	-	-	-	-	1,787,117	219,263	2,006,380	-	2,006,380	-	-	-	-	-	-	-	-	7,350,846
PERIOD 3d - GTCC shipping																					
Period 3d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
3d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1.1	Totals	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
3d.1	Subtotal Period 3d Activity Costs	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
Period 3d Collateral Costs																					
3d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3d.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-
3d.3	Subtotal Period 3d Collateral Costs	-	-	-	-	-	-	76	4	80	-	80	-	-	-	-	-	-	-	-	-
Period 3d Period-Dependent Costs																					
3d.4.1	Insurance	-	-	-	-	-	-	9	1	10	10	-	-	-	-	-	-	-	-	-	-
3d.4.2	Property taxes	-	-	-	-	-	-	53	5	58	58	-	-	-	-	-	-	-	-	-	-
3d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	4	0	4	-	4	-	-	-	-	-	-	-	-	-
3d.4.5	Emergency Planning Fees	-	-	-	-	-	-	3	0	3	-	3	-	-	-	-	-	-	-	-	-
3d.4.6	Fixed Overhead	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
3d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	2	0	3	3	-	-	-	-	-	-	-	-	-	-
3d.4.8	Security Staff Cost	-	-	-	-	-	-	83	13	96	96	-	-	-	-	-	-	-	-	-	1,037
3d.4.9	Utility Staff Cost	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	269
3d.4	Subtotal Period 3d Period-Dependent Costs	-	-	-	-	-	-	181	24	204	197	7	-	-	-	-	-	-	-	-	1,306
3d.0	TOTAL PERIOD 3d COST	-	-	1,444	-	-	8,680	256	1,691	12,071	11,984	87	-	-	-	-	-	1,773	344,823	-	1,306
PERIOD 3e - ISFSI Decontamination																					
Period 3e Direct Decommissioning Activities																					
Period 3e Additional Costs																					
3e.2.1	License Termination ISFSI	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161
3e.2	Subtotal Period 3e Additional Costs	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161
Period 3e Period-Dependent Costs																					
3e.4.1	Insurance	-	-	-	-	-	-	93	23	116	116	-	-	-	-	-	-	-	-	-	-
3e.4.2	Property taxes	-	-	-	-	-	-	56	14	69	69	-	-	-	-	-	-	-	-	-	-
3e.4.3	Plant energy budget	-	-	-	-	-	-	11	3	13	13	-	-	-	-	-	-	-	-	-	-
3e.4.4	Fixed Overhead	-	-	-	-	-	-	54	14	68	68	-	-	-	-	-	-	-	-	-	-
3e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	21	5	26	26	-	-	-	-	-	-	-	-	-	-
3e.4.6	Security Staff Cost	-	-	-	-	-	-	174	43	217	217	-	-	-	-	-	-	-	-	-	2,500
3e.4.7	Utility Staff Cost	-	-	-	-	-	-	129	32	161	161	-	-	-	-	-	-	-	-	-	1,896
3e.4	Subtotal Period 3e Period-Dependent Costs	-	-	-	-	-	-	536	134	670	670	-	-	-	-	-	-	-	-	-	4,396

Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
3e.0	TOTAL PERIOD 3e COST	-	0	2	17	-	142	1,733	473	2,367	2,367	-	-	-	424	-	-	-	65,754	5,882	5,556
PERIOD 3f - ISFSI Site Restoration																					
Period 3f Direct Decommissioning Activities																					
Period 3f Additional Costs																					
3f.2.1	Demolition and Site Restoration of ISFSI	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
3f.2	Subtotal Period 3f Additional Costs	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
Period 3f Collateral Costs																					
3f.3.1	Small tool allowance	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
3f.3	Subtotal Period 3f Collateral Costs	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
Period 3f Period-Dependent Costs																					
3f.4.2	Property taxes	-	-	-	-	-	-	28	3	31	-	-	31	-	-	-	-	-	-	-	-
3f.4.3	Heavy equipment rental	-	59	-	-	-	-	-	9	68	-	-	68	-	-	-	-	-	-	-	-
3f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	6	-	-	6	-	-	-	-	-	-	-	-
3f.4.5	Fixed Overhead	-	-	-	-	-	-	28	4	32	-	-	32	-	-	-	-	-	-	-	-
3f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	11	2	12	-	-	12	-	-	-	-	-	-	-	-
3f.4.7	Security Staff Cost	-	-	-	-	-	-	89	13	102	-	-	102	-	-	-	-	-	-	-	1,281
3f.4.8	Utility Staff Cost	-	-	-	-	-	-	55	8	63	-	-	63	-	-	-	-	-	-	-	795
3f.4	Subtotal Period 3f Period-Dependent Costs	-	59	-	-	-	-	216	40	315	-	-	315	-	-	-	-	-	-	-	2,076
3f.0	TOTAL PERIOD 3f COST	-	1,187	-	-	-	-	377	233	1,798	-	-	1,798	-	-	-	-	-	-	4,846	2,156
PERIOD 3 TOTALS		-	40,456	1,525	435	-	11,212	1,821,988	232,501	2,108,117	19,203	2,022,273	66,641	-	9,353	-	-	1,773	1,470,189	177,262	7,611,392
TOTAL COST TO DECOMMISSION		13,876	116,855	23,184	8,596	26,793	61,273	2,194,551	341,405	2,786,532	591,409	2,121,394	73,730	169,384	184,108	826	673	1,773	17,058,250	981,176	10,289,830

TOTAL COST TO DECOMMISSION WITH 13.96% CONTINGENCY:	**$2,786,532**	**thousands of 2020 dollars**	
TOTAL NRC LICENSE TERMINATION COST IS 21.22% OR:	**$591,409**	**thousands of 2020 dollars**	
SPENT FUEL MANAGEMENT COST IS 76.13% OR:	**$2,121,394**	**thousands of 2020 dollars**	
NON-NUCLEAR DEMOLITION COST IS 2.65% OR:	**$73,730**	**thousands of 2020 dollars**	
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**185,606**	**Cubic Feet**	
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**	
TOTAL SCRAP METAL REMOVED:	**42,328**	**Tons**	
TOTAL CRAFT LABOR REQUIREMENTS:	**981,176**	**Man-hours**	

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX G

DETAILED COST ANALYSIS

SCENARIO 5: SAFSTOR with 42 Year DFS

Page

Prairie Island Nuclear Generating Plant, Unit 1 .....G-2

Prairie Island Nuclear Generating Plant, Unit 2 .....G-12

Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	415	124	539	539	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	193	29	222	222	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	632	95	727	727	-	-	-	-	-	-	-	-	-	4,920
1a.1.16.2	Plant systems	-	-	-	-	-	-	536	80	616	616	-	-	-	-	-	-	-	-	-	4,167
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
1a.1.16.4	Waste management	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.16	Total	-	-	-	-	-	-	2,083	312	2,395	2,395	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	152	23	175	175	-	-	-	-	-	-	-	-	-	1,183
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1a.1.17	Total	-	-	-	-	-	-	306	46	352	352	-	-	-	-	-	-	-	-	-	2,383
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	13	2	15	15	-	-	-	-	-	-	-	-	-	100
1a.1.19	Drain/de-energize non-cont. systems									a											
1a.1.20	Drain & dry NSSS									a											
1a.1.21	Drain/de-energize contaminated systems									a											
1a.1.22	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	5,027	816	5,844	5,844	-	-	-	-	-	-	-	-	-	35,890
Period 1a Collateral Costs																					
1a.3.1	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	50	-	14	82	82	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	892	89	981	981	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	26,931	4,040	30,971	30,971	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	5	-	50	47,211	6,945	55,590	52,648	2,942	-	-	610	-	-	-	12,190	20	544,960
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	5	-	50	53,487	7,761	62,683	58,492	4,191	-	-	610	-	-	-	12,190	20	580,850

Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
1b.1.1	Totals	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
1b.1	Subtotal Period 1b Activity Costs	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	79	-	52	94	-	212	-	112	549	549	-	-	-	487	-	-	-	29,193	95	-
1b.3.4	Small tool allowance	-	20	-	-	-	-	-	3	23	23	-	-	-	-	-	-	-	-	-	-
1b.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,134	20	52	94	-	212	311	273	2,097	1,785	311	-	-	487	-	-	-	29,193	95	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	449	-	-	-	-	-	-	112	561	561	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	903	90	994	994	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	250	-	-	-	-	-	63	313	313	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	6	3	-	27	-	8	43	43	-	-	-	324	-	-	-	6,486	11	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1b.4	Subtotal Period 1b Period-Dependent Costs	449	438	6	3	-	27	11,709	1,866	14,498	13,764	733	-	-	324	-	-	-	6,486	11	135,867
1b.0	TOTAL PERIOD 1b COST	2,781	458	59	97	-	239	24,696	4,640	32,969	31,924	1,045	-	-	811	-	-	-	35,678	17,108	135,867
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	527	-	-	-	-	-	79	606	606	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	54	-	-	-	-	-	8	62	62	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	12,801	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	75	11	86	86	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	581	-	-	-	-	808	318	1,707	1,707	-	-	-	-	-	-	-	-	16,501	583
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	91	-	60	109	-	245	-	129	634	634	-	-	-	561	-	-	-	33,685	109	-
1c.3.3	Small tool allowance	-	5	-	-	-	-	-	1	6	6	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	163	25	188	-	188	-	-	-	-	-	-	-	-	-
1c.3.5	Retention and Severance	-	-	-	-	-	-	1,032	155	1,187	1,187	-	-	-	-	-	-	-	-	-	-
1c.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	91	5	60	109	-	245	1,507	309	2,325	1,826	499	-	-	561	-	-	-	33,685	109	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	903	90	994	994	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	248	-	-	-	-	-	62	309	309	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	1	-	13	-	4	20	20	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-

Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1c Period-Dependent Costs (continued)																					
1c.4.7	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1c.4.9	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1c.4.13	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1c.4.14	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1c.4	Subtotal Period 1c Period-Dependent Costs	-	435	3	1	-	13	11,709	1,749	13,910	13,177	733	-	-	152	-	-	-	3,039	5	135,867
1c.0	TOTAL PERIOD 1c COST	91	1,021	63	110	-	257	14,024	2,376	17,943	16,710	1,233	-	-	713	-	-	-	36,724	16,615	136,450
PERIOD 1 TOTALS		2,873	2,846	134	212	-	546	92,207	14,777	113,594	107,126	6,468	-	-	2,134	-	-	-	84,593	33,743	853,167
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	54	8	62	62	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	520	130	650	650	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	574	138	712	712	-	-	-	-	-	-	-	-	-	-
Period 2a Additional Costs																					
2a.2.1	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	60,919	9,138	70,057	-	70,057	-	-	-	-	-	-	-	-	-
2a.3.2	Retention and Severance	-	-	-	-	-	-	22,434	3,365	25,799	25,799	-	-	-	-	-	-	-	-	-	-
2a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	4,654	-	4,654	-	4,654	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	88,007	12,503	100,510	25,799	74,712	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,804	180	1,985	1,985	-	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	13,489	1,349	14,838	14,838	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	801	-	-	-	-	-	200	1,001	1,001	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	14	6	-	59	-	17	96	96	-	-	-	714	-	-	-	14,273	23	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	1,208	181	1,389	1,389	-	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	908	91	999	999	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	6,924	692	7,616	-	7,616	-	-	-	-	-	-	-	-	-
2a.4.8	Fixed Overhead	-	-	-	-	-	-	4,432	665	5,097	5,097	-	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	1,573	236	1,809	-	1,809	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	209	31	240	-	240	-	-	-	-	-	-	-	-	-
2a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	462	69	531	531	-	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	29,334	4,400	33,734	24,289	9,446	-	-	-	-	-	-	-	-	431,215
2a.4.13	Utility Staff Cost	-	-	-	-	-	-	3,645	547	4,192	3,517	675	-	-	-	-	-	-	-	-	58,126
2a.4	Subtotal Period 2a Period-Dependent Costs	-	801	14	6	-	59	63,988	8,659	73,527	53,741	19,786	-	-	714	-	-	-	14,273	23	489,341
2a.0	TOTAL PERIOD 2a COST	-	801	14	6	-	59	156,917	21,952	179,749	85,251	94,498	-	-	714	-	-	-	14,273	23	489,341
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	524	79	602	602	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	5,052	1,263	6,315	6,315	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	5,575	1,342	6,917	6,917	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	15,884	2,383	18,267	-	18,267	-	-	-	-	-	-	-	-	-
2b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	45,219	-	45,219	-	45,219	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	61,103	2,383	63,486	-	63,486	-	-	-	-	-	-	-	-	-

Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	17,530	1,753	19,283	19,283	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	131,056	13,106	144,162	144,162	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	4,112	-	-	-	-	-	1,028	5,140	5,140	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	74	30	-	308	-	89	501	501	-	-	-	3,739	-	-	-	74,786	122	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	5,869	880	6,749	6,749	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	8,234	823	9,058	9,058	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	2,684	268	2,952	-	2,952	-	-	-	-	-	-	-	-	-
2b.4.8	Fixed Overhead	-	-	-	-	-	-	5,898	885	6,783	6,783	-	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	2,026	304	2,330	-	2,330	-	-	-	-	-	-	-	-	-
2b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	2,263	339	2,603	2,603	-	-	-	-	-	-	-	-	-	-
2b.4.11	Security Staff Cost	-	-	-	-	-	-	101,034	15,155	116,189	25,562	90,627	-	-	-	-	-	-	-	-	1,355,328
2b.4.12	Utility Staff Cost	-	-	-	-	-	-	49,438	7,416	56,854	35,704	21,150	-	-	-	-	-	-	-	-	752,960
2b.4	Subtotal Period 2b Period-Dependent Costs	-	4,112	74	30	-	308	326,032	42,046	372,602	255,544	117,059	-	-	3,739	-	-	-	74,786	122	2,108,288
2b.0	TOTAL PERIOD 2b COST	-	4,112	74	30	-	308	392,710	45,771	443,005	262,461	180,544	-	-	3,739	-	-	-	74,786	122	2,108,288
PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage																					
Period 2c Direct Decommissioning Activities																					
2c.1.1	Quarterly Inspection									a											
2c.1.2	Semi-annual environmental survey									a											
2c.1.3	Prepare reports									a											
2c.1.4	Bituminous roof replacement	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	-
2c.1.5	Maintenance supplies	-	-	-	-	-	-	1,740	435	2,176	2,176	-	-	-	-	-	-	-	-	-	-
2c.1	Subtotal Period 2c Activity Costs	-	-	-	-	-	-	1,921	462	2,383	2,383	-	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	3,484	348	3,833	3,833	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	28,957	2,896	31,852	31,852	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	1,401	-	-	-	-	-	350	1,752	1,752	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	25	10	-	105	-	30	170	170	-	-	-	1,269	-	-	-	25,389	41	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	2,022	303	2,325	2,325	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	2,559	256	2,814	2,814	-	-	-	-	-	-	-	-	-	-
2c.4.7	Fixed Overhead	-	-	-	-	-	-	2,032	305	2,337	2,337	-	-	-	-	-	-	-	-	-	-
2c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	780	117	897	897	-	-	-	-	-	-	-	-	-	-
2c.4.9	Security Staff Cost	-	-	-	-	-	-	29,821	4,473	34,295	34,295	-	-	-	-	-	-	-	-	-	389,103
2c.4.10	Utility Staff Cost	-	-	-	-	-	-	14,461	2,169	16,630	16,630	-	-	-	-	-	-	-	-	-	226,977
2c.4	Subtotal Period 2c Period-Dependent Costs	-	1,401	25	10	-	105	84,116	11,248	96,905	96,905	-	-	-	1,269	-	-	-	25,389	41	616,079
2c.0	TOTAL PERIOD 2c COST	-	1,401	25	10	-	105	86,036	11,710	99,288	99,288	-	-	-	1,269	-	-	-	25,389	41	616,079
PERIOD 2 TOTALS		-	6,314	113	46	-	472	635,664	79,433	722,042	447,000	275,042	-	-	5,722	-	-	-	114,448	187	3,213,708
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
3a.1.9	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
3a.1.10	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	947	142	1,089	980	-	109	-	-	-	-	-	-	-	7,370
3a.1.11.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
3a.1.11.3	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
3a.1.11.5	Biological shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
3a.1.11.6	Steam generators	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
3a.1.11.8	Main Turbine	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
3a.1.11.9	Main Condensers	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400

Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Activity Specifications (continued)																					
3a.1.11.10	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
3a.1.11.11	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.11.12	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
3a.1.11	Total	-	-	-	-	-	-	5,112	767	5,879	5,175	-	704	-	-	-	-	-	-	-	39,777
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	15,810	2,371	18,181	17,477	-	704	-	-	-	-	-	-	-	77,107
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	3,520	1,056	4,576	4,576	-	-	-	-	-	-	-	-	21,020	8,332
3a.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
3a.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
3a.2	Subtotal Period 3a Additional Costs	-	2,526	356	244	178	1,369	3,520	2,129	10,321	10,321	-	-	6,132	12,843	-	-	-	518,936	44,275	8,332
Period 3a Collateral Costs																					
3a.3.1	Small tool allowance	-	34	-	-	-	-	-	5	39	39	-	-	-	-	-	-	-	-	-	-
3a.3	Subtotal Period 3a Collateral Costs	-	34	-	-	-	-	-	5	39	39	-	-	-	-	-	-	-	-	-	-
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	279	28	307	307	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	2,320	232	2,553	2,553	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	669	-	-	-	-	-	167	836	836	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	4	-	42	-	12	69	69	-	-	-	514	-	-	-	10,287	17	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	335	33	368	368	-	-	-	-	-	-	-	-	-	-
3a.4.8	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
3a.4.9	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
3a.4.10	Security Staff Cost	-	-	-	-	-	-	4,386	658	5,044	5,044	-	-	-	-	-	-	-	-	-	65,000
3a.4.11	Utility Staff Cost	-	-	-	-	-	-	16,379	2,457	18,835	18,835	-	-	-	-	-	-	-	-	-	257,920
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,422	10	4	-	42	26,823	4,169	32,471	32,471	-	-	-	514	-	-	-	10,287	17	322,920
3a.0	TOTAL PERIOD 3a COST	-	3,982	366	248	178	1,411	46,153	8,674	61,013	60,308	-	704	6,132	13,357	-	-	-	529,223	44,292	408,359
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	321	48	369	369	-	-	-	-	-	-	-	-	-	2,500
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD cooling assembly	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	CRD housings & ICI tubes	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
3b.1.1.9	Missile shields	-	-	-	-	-	-	58	9	67	67	-	-	-	-	-	-	-	-	-	450
3b.1.1.10	Biological shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.11	Steam generators	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3b.1.1.12	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
3b.1.1.13	Main Turbine	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
3b.1.1.14	Main Condensers	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
3b.1.1.15	Auxiliary building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1.16	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	4,144	622	4,765	3,841	-	924	-	-	-	-	-	-	-	32,243
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	4,144	622	4,765	3,841	-	924	-	-	-	-	-	-	-	32,243
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-

Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
3b.3	Subtotal Period 3b Collateral Costs	1,055	1,200	-	-	-	-	1,264	528	4,047	4,047	-	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	241	24	266	266	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	1,155	116	1,271	1,271	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	295	-	-	-	-	-	74	369	369	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	6	2	-	24	-	7	39	39	-	-	-	290	-	-	-	5,802	9	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	808	121	930	930	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	167	17	183	183	-	-	-	-	-	-	-	-	-	-
3b.4.9	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
3b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
3b.4.11	Security Staff Cost	-	-	-	-	-	-	2,187	328	2,515	2,515	-	-	-	-	-	-	-	-	-	32,411
3b.4.12	DOC Staff Cost	-	-	-	-	-	-	5,344	802	6,146	6,146	-	-	-	-	-	-	-	-	-	58,080
3b.4.13	Utility Staff Cost	-	-	-	-	-	-	8,167	1,225	9,392	9,392	-	-	-	-	-	-	-	-	-	128,607
3b.4	Subtotal Period 3b Period-Dependent Costs	38	670	6	2	-	24	18,820	2,891	22,450	22,450	-	-	-	290	-	-	-	5,802	9	219,098
3b.0	TOTAL PERIOD 3b COST	1,092	1,870	6	2	-	24	24,227	4,040	31,262	30,338	-	924	-	290	-	-	-	5,802	9	251,341
PERIOD 3 TOTALS		1,092	5,852	372	251	178	1,435	70,380	12,715	92,275	90,647	-	1,628	6,132	13,647	-	-	-	535,025	44,301	659,700
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Reactor Coolant Piping	11	42	10	11	66	94	-	52	285	285	-	-	240	254	-	-	-	33,680	778	-
4a.1.1.2	Pressurizer Relief Tank	5	19	6	7	44	62	-	31	174	174	-	-	160	169	-	-	-	22,441	352	-
4a.1.1.3	Reactor Coolant Pumps & Motors	13	60	46	85	-	463	-	155	822	822	-	-	-	2,332	-	-	-	295,800	1,226	80
4a.1.1.4	Pressurizer	-	77	382	91	-	776	-	265	1,591	1,591	-	-	-	2,196	-	-	-	158,199	1,346	750
4a.1.1.5	Steam Generators	-	3,307	1,690	1,743	2,409	3,885	-	2,590	15,625	15,625	-	-	18,672	10,990	-	-	-	1,581,180	10,253	2,250
4a.1.1.6	CRDMs/ICIs/Service Structure Removal	63	248	205	44	326	454	-	283	1,623	1,623	-	-	2,138	2,146	-	-	-	165,025	4,449	-
4a.1.1.7	Reactor Vessel Internals	53	4,650	11,331	828	-	8,610	278	10,900	36,649	36,649	-	-	-	1,174	-	742	-	167,605	22,373	1,053
4a.1.1.8	Vessel & Internals GTCC Disposal	-	-	-	-	-	8,680	-	1,302	9,982	9,982	-	-	-	-	-	-	1,773	344,823	-	-
4a.1.1.9	Reactor Vessel	-	5,835	1,653	442	-	3,268	278	6,576	18,053	18,053	-	-	-	9,245	-	-	-	579,324	22,373	1,053
4a.1.1	Totals	146	14,237	15,324	3,250	2,845	26,293	556	22,154	84,804	84,804	-	-	21,210	28,505	-	742	1,773	3,348,078	63,151	5,187
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	292	116	35	555	-	-	173	1,170	1,170	-	-	2,243	-	-	-	-	134,601	4,116	-
4a.1.3	Main Condensers	-	2,510	79	33	742	-	-	752	4,115	4,115	-	-	4,000	-	-	-	-	180,000	34,978	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
4a.1.4	Totals	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
Disposal of Plant Systems																					
4a.1.5.1	Air Removal	-	31	-	-	-	-	-	5	36	-	-	36	-	-	-	-	-	-	452	-
4a.1.5.2	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	670	-
4a.1.5.3	Auxiliary Feedwater - RCA	-	47	0	2	36	-	-	17	102	102	-	-	215	-	-	-	-	8,722	601	-
4a.1.5.4	Bleed Steam	-	90	-	-	-	-	-	14	104	-	-	104	-	-	-	-	-	-	1,335	-
4a.1.5.5	Caustic Addition - RCA	-	38	0	2	39	-	-	16	95	95	-	-	233	-	-	-	-	9,453	444	-
4a.1.5.6	Chemical Feed	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	304	-
4a.1.5.7	Chemical Feed - RCA	-	1	0	0	1	-	-	0	3	3	-	-	6	-	-	-	-	243	12	-
4a.1.5.8	Circulating Water	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	619	-
4a.1.5.9	Condensate	-	474	-	-	-	-	-	71	545	-	-	545	-	-	-	-	-	-	6,837	-
4a.1.5.10	Condensate Polishing	-	235	-	-	-	-	-	35	271	-	-	271	-	-	-	-	-	-	3,420	-
4a.1.5.11	Condensate Polishing - RCA	-	183	4	15	348	-	-	101	651	651	-	-	2,078	-	-	-	-	84,395	2,329	-
4a.1.5.12	Electro-hydraulic	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	127	-
4a.1.5.13	Feedwater	-	153	-	-	-	-	-	23	175	-	-	175	-	-	-	-	-	-	2,215	-
4a.1.5.14	Feedwater - RCA	-	195	7	24	537	-	-	133	895	895	-	-	3,208	-	-	-	-	130,294	2,651	-
4a.1.5.15	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	505	-
4a.1.5.16	Heater Drain	-	400	-	-	-	-	-	60	460	-	-	460	-	-	-	-	-	-	5,881	-
4a.1.5.17	Internal Circ Water & CDSR	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	389	-
4a.1.5.18	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
4a.1.5.19	Main Steam	-	115	-	-	-	-	-	17	133	-	-	133	-	-	-	-	-	-	1,690	-
4a.1.5.20	Main Steam - RCA	-	366	10	37	844	-	-	225	1,482	1,482	-	-	5,044	-	-	-	-	204,825	4,956	-
4a.1.5.21	Steam Generator Blowdown	-	434	22	29	340	234	-	224	1,282	1,282	-	-	2,031	686	-	-	-	126,640	5,974	-

Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
4a.1.5.22	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
4a.1.5.23	Turbine & Moisture Separators	-	386	-	-	-	-	-	58	444	-	-	444	-	-	-	-	-	-	5,609	-
4a.1.5.24	Turbine Oil Purification	-	70	-	-	-	-	-	11	81	-	-	81	-	-	-	-	-	-	1,003	-
4a.1.5	Totals	-	3,401	44	108	2,144	234	-	1,037	6,967	4,510	-	2,458	12,815	686	-	-	-	564,572	48,101	-
4a.1.6	Scaffolding in support of decommissioning	-	909	3	1	26	4	-	233	1,176	1,176	-	-	138	12	-	-	-	6,985	6,020	-
4a.1	Subtotal Period 4a Activity Costs	146	22,144	15,566	3,426	6,311	26,530	556	24,467	99,147	96,689	-	2,458	40,406	29,203	-	742	1,773	4,234,235	163,954	5,187
Period 4a Additional Costs																					
4a.2.1	Retired RPV upper internals package	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
4a.2	Subtotal Period 4a Additional Costs	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	2	-	4	8	-	17	-	7	38	38	-	-	-	39	-	-	-	2,337	8	-
4a.3.3	Small tool allowance	-	213	-	-	-	-	-	32	245	220	-	24	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	2	213	4	8	-	17	-	39	283	258	-	24	-	39	-	-	-	2,337	8	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	100	-	-	-	-	-	-	25	125	125	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	643	64	708	708	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	2,715	272	2,987	2,987	-	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,743	-	-	-	-	-	436	2,179	2,179	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	3,325	-	-	-	-	-	499	3,824	3,824	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	59	24	-	245	-	71	398	398	-	-	-	2,971	-	-	-	59,418	97	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	2,047	307	2,354	2,354	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	643	64	707	707	-	-	-	-	-	-	-	-	-	-
4a.4.9	Fixed Overhead	-	-	-	-	-	-	1,581	237	1,818	1,818	-	-	-	-	-	-	-	-	-	-
4a.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	565	85	649	649	-	-	-	-	-	-	-	-	-	-
4a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	83	12	96	96	-	-	-	-	-	-	-	-	-	-
4a.4.12	Remedial Actions Surveys	-	-	-	-	-	-	1,489	223	1,712	1,712	-	-	-	-	-	-	-	-	-	-
4a.4.13	Security Staff Cost	-	-	-	-	-	-	5,167	775	5,943	5,943	-	-	-	-	-	-	-	-	-	76,832
4a.4.14	DOC Staff Cost	-	-	-	-	-	-	17,190	2,579	19,769	19,769	-	-	-	-	-	-	-	-	-	189,964
4a.4.15	Utility Staff Cost	-	-	-	-	-	-	21,633	3,245	24,877	24,877	-	-	-	-	-	-	-	-	-	340,664
4a.4	Subtotal Period 4a Period-Dependent Costs	100	5,068	59	24	-	245	53,755	8,894	68,145	68,145	-	-	-	2,971	-	-	-	59,418	97	607,460
4a.0	TOTAL PERIOD 4a COST	248	27,553	15,796	3,516	6,311	28,375	54,311	34,343	170,454	167,972	-	2,482	40,406	32,785	125	742	1,773	4,345,791	165,725	612,713
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	314	35	86	41	-	703	-	356	1,535	1,535	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
4b.1.2.1	Aux Bldg Normal Ventilation	-	2	0	0	1	-	-	1	3	3	-	-	3	-	-	-	-	140	26	-
4b.1.2.3	Buildings Maintenance	-	5	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	65	-
4b.1.2.4	Chemical & Volume Control	-	1,263	89	90	753	973	-	694	3,861	3,861	-	-	4,498	2,846	-	-	-	366,565	17,235	-
4b.1.2.5	Component Cooling - RCA	-	858	25	91	2,079	-	-	543	3,597	3,597	-	-	12,427	-	-	-	-	504,675	11,242	-
4b.1.2.6	Containment Cooling	-	74	-	-	-	-	-	11	85	-	-	85	-	-	-	-	-	-	1,086	-
4b.1.2.7	Containment Cooling - RCA	-	304	7	25	569	-	-	166	1,070	1,070	-	-	3,400	-	-	-	-	138,090	3,971	-
4b.1.2.8	Containment Hydrogen Control - RCA	-	30	0	1	18	-	-	10	59	59	-	-	105	-	-	-	-	4,278	401	-
4b.1.2.9	Containment Spray - RCA	-	93	2	6	145	-	-	46	293	293	-	-	868	-	-	-	-	35,249	1,217	-
4b.1.2.10	Containment Ventilation	-	229	24	51	828	248	-	254	1,635	1,635	-	-	4,951	737	-	-	-	247,952	3,278	-
4b.1.2.11	Cooling Water	-	163	-	-	-	-	-	24	187	-	-	187	-	-	-	-	-	-	2,396	-
4b.1.2.12	Cooling Water - RCA	-	658	16	57	1,293	-	-	368	2,392	2,392	-	-	7,728	-	-	-	-	313,832	8,594	-
4b.1.2.13	D1 Emergency Diesel	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	730	-
4b.1.2.14	D2 Emergency Diesel	-	36	-	-	-	-	-	5	41	-	-	41	-	-	-	-	-	-	522	-
4b.1.2.15	Diesel Rooms Ventilation	-	9	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	135	-
4b.1.2.16	Electrical - Clean	-	1,905	-	-	-	-	-	286	2,191	-	-	2,191	-	-	-	-	-	-	26,981	-
4b.1.2.17	Electrical - Contaminated	-	553	7	20	423	32	-	213	1,248	1,248	-	-	2,527	95	-	-	-	108,690	7,488	-
4b.1.2.18	Electrical - Contaminated - Fuel Pool	-	137	2	5	103	8	-	53	307	307	-	-	615	23	-	-	-	26,449	1,857	-
4b.1.2.19	Electrical - Decontaminated	-	3,787	48	173	3,940	-	-	1,569	9,518	9,518	-	-	23,551	-	-	-	-	956,401	49,378	-
4b.1.2.20	Electrical - Decontaminated - Fuel Pool	-	947	12	43	986	-	-	392	2,380	2,380	-	-	5,893	-	-	-	-	239,327	12,340	-
4b.1.2.21	Fuel Handling	-	108	6	11	152	73	-	70	421	421	-	-	908	218	-	-	-	50,723	1,595	-
4b.1.2.22	Fuel Oil	-	121	-	-	-	-	-	18	140	-	-	140	-	-	-	-	-	-	1,697	-
4b.1.2.23	HVAC - Clean	-	120	-	-	-	-	-	18	138	-	-	138	-	-	-	-	-	-	1,891	-
4b.1.2.24	HVAC - Contaminated	-	337	9	26	546	41	-	181	1,141	1,141	-	-	3,261	123	-	-	-	140,257	4,335	-

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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes: Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4b.1.2.25	HVAC - Contaminated - Fuel Pool	-	145	4	11	234	18	-	78	489	489	-	-	1,398	53	-	-	-	60,110	1,858	-
4b.1.2.26	Incore Instrumentation	-	25	1	2	10	19	-	13	70	70	-	-	60	57	-	-	-	6,058	382	-
4b.1.2.27	Misc Drains & Vents	-	212	15	13	65	176	-	110	592	592	-	-	390	514	-	-	-	49,062	2,764	-
4b.1.2.28	Reactor Coolant	-	283	21	18	58	265	-	150	796	796	-	-	344	777	-	-	-	64,085	3,865	-
4b.1.2.29	Reactor Hot Sampling	-	125	12	7	11	118	-	65	339	339	-	-	66	342	-	-	-	25,063	1,611	-
4b.1.2.30	Reactor Makeup	-	73	-	-	-	-	-	11	84	-	-	84	-	-	-	-	-	-	1,042	-
4b.1.2.31	Reactor Vessel	-	19	1	0	4	5	-	7	36	36	-	-	26	14	-	-	-	2,000	260	-
4b.1.2.32	Residual Heat Removal	-	378	85	86	484	1,105	-	465	2,603	2,603	-	-	2,895	3,252	-	-	-	326,425	5,374	-
4b.1.2.33	Safeguards Chilled Water	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	259	-
4b.1.2.34	Safeguards Chilled Water - RCA	-	85	1	4	83	-	-	34	207	207	-	-	495	-	-	-	-	20,100	1,019	-
4b.1.2.35	Safety Injection	-	809	42	73	1,136	393	-	486	2,939	2,939	-	-	6,788	1,156	-	-	-	349,908	11,276	-
4b.1.2.36	Sampling	-	54	4	3	10	37	-	25	133	133	-	-	59	107	-	-	-	9,420	731	-
4b.1.2.37	Shield Bldg Ventilation	-	125	14	26	360	165	-	132	821	821	-	-	2,152	491	-	-	-	118,583	1,811	-
4b.1.2.38	Spent Fuel Pool Cooling	-	324	34	32	135	450	-	222	1,198	1,198	-	-	806	1,325	-	-	-	117,816	4,400	-
4b.1.2.39	Station & Instrument Air	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	300	-
4b.1.2.40	Station & Instrument Air - RCA	-	81	1	2	56	-	-	29	169	169	-	-	332	-	-	-	-	13,496	1,053	-
4b.1.2.41	Station & Instrument Air - RCA Fuel Pool	-	20	0	1	14	-	-	7	42	42	-	-	83	-	-	-	-	3,374	263	-
4b.1.2.42	Turbine Bldg Traps & Drains	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	767	-
4b.1.2.43	Unit Coolers	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	611	-
4b.1.2.44	Unit Coolers - RCA	-	55	0	2	39	-	-	20	115	115	-	-	230	-	-	-	-	9,348	683	-
4b.1.2	Totals	-	14,735	481	883	14,533	4,126	-	6,807	41,565	38,474	-	3,091	86,861	12,129	-	-	-	4,307,475	198,796	-
4b.1.3	Scaffolding in support of decommissioning	-	1,363	4	2	38	6	-	349	1,763	1,763	-	-	207	18	-	-	-	10,477	9,030	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor	1,096	2,527	240	1,236	373	7,080	-	3,215	15,766	15,766	-	-	2,230	67,325	-	-	-	3,286,372	45,729	-
4b.1.4.2	Backwash Waste Receiving Tank	-	25	3	17	-	97	-	33	175	175	-	-	-	929	-	-	-	43,896	266	-
4b.1.4	Totals	1,096	2,552	243	1,253	373	7,177	-	3,248	15,941	15,941	-	-	2,230	68,254	-	-	-	3,330,268	45,995	-
4b.1.5	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
4b.1.6	Receive NRC approval of termination plan									a											
4b.1	Subtotal Period 4b Activity Costs	1,410	18,685	814	2,179	14,945	12,012	526	10,839	61,410	58,319	-	3,091	89,298	82,494	-	-	-	7,781,139	254,398	4,096
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
4b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
4b.2.3	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
4b.2.4	License Termination ISFSI	-	24	81	435	-	2,532	1,375	1,112	5,560	5,560	-	-	-	9,355	-	-	-	1,123,457	3,762	5,460
4b.2	Subtotal Period 4b Additional Costs	-	1,199	93	471	606	2,532	2,638	1,848	9,387	9,387	-	-	5,880	9,355	-	-	-	1,270,457	11,189	11,700
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	5	-	9	16	-	37	-	15	83	83	-	-	-	85	-	-	-	5,092	17	-
4b.3.3	Small tool allowance	-	307	-	-	-	-	-	46	353	353	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
4b.3.5	On-site survey and release of 0.0 tons clean metallic waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4b.3	Subtotal Period 4b Collateral Costs	5	307	139	84	1,112	215	-	296	2,158	2,158	-	-	6,000	614	-	-	-	308,700	163	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	564	-	-	-	-	-	-	141	705	705	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	862	86	949	949	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	3,505	351	3,856	3,856	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	2,456	-	-	-	-	-	614	3,070	3,070	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,577	-	-	-	-	-	687	5,263	5,263	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	77	31	-	322	-	93	523	523	-	-	-	3,905	-	-	-	78,097	127	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,165	325	2,490	2,490	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	862	86	948	948	-	-	-	-	-	-	-	-	-	-
4b.4.9	Fixed Overhead	-	-	-	-	-	-	2,118	318	2,436	2,436	-	-	-	-	-	-	-	-	-	-
4b.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	757	113	870	870	-	-	-	-	-	-	-	-	-	-
4b.4.11	Railroad Track Maintenance	-	-	-	-	-	-	111	17	128	128	-	-	-	-	-	-	-	-	-	-
4b.4.12	Remedial Actions Surveys	-	-	-	-	-	-	1,995	299	2,294	2,294	-	-	-	-	-	-	-	-	-	-
4b.4.13	Security Staff Cost	-	-	-	-	-	-	1,202	180	1,383	1,383	-	-	-	-	-	-	-	-	-	20,373
4b.4.14	DOC Staff Cost	-	-	-	-	-	-	15,039	2,256	17,294	17,294	-	-	-	-	-	-	-	-	-	174,093
4b.4.15	Utility Staff Cost	-	-	-	-	-	-	18,793	2,819	21,612	21,612	-	-	-	-	-	-	-	-	-	311,145
4b.4	Subtotal Period 4b Period-Dependent Costs	564	7,033	77	31	-	322	47,410	8,384	63,822	63,822	-	-	-	3,905	-	-	-	78,097	127	505,611
4b.0	TOTAL PERIOD 4b COST	1,979	27,224	1,123	2,765	16,663	15,081	50,574	21,367	136,776	133,686	-	3,091	101,178	96,368	-	-	-	9,438,392	265,878	521,407

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Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 4e - Delay before License Termination																					
Period 4e Direct Decommissioning Activities																					
Period 4e Period-Dependent Costs																					
4e.4.2	Property taxes	-	-	-	-	-	-	1,476	148	1,623	1,623	-	-	-	-	-	-	-	-	-	-
4e.4.3	Health physics supplies	-	87	-	-	-	-	-	22	109	109	-	-	-	-	-	-	-	-	-	-
4e.4.4	Disposal of DAW generated	-	-	2	1	-	6	-	2	11	11	-	-	-	79	-	-	-	1,573	3	-
4e.4.6	NRC Fees	-	-	-	-	-	-	162	16	178	178	-	-	-	-	-	-	-	-	-	-
4e.4.7	Fixed Overhead	-	-	-	-	-	-	939	141	1,079	1,079	-	-	-	-	-	-	-	-	-	-
4e.4.8	Railroad Track Maintenance	-	-	-	-	-	-	49	7	57	57	-	-	-	-	-	-	-	-	-	-
4e.4.9	Utility Staff Cost	-	-	-	-	-	-	696	104	801	801	-	-	-	-	-	-	-	-	-	11,488
4e.4	Subtotal Period 4e Period-Dependent Costs	-	87	2	1	-	6	3,322	440	3,858	3,858	-	-	-	79	-	-	-	1,573	3	11,488
4e.0	TOTAL PERIOD 4e COST	-	87	2	1	-	6	3,322	440	3,858	3,858	-	-	-	79	-	-	-	1,573	3	11,488
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
Period 4f Period-Dependent Costs																					
4f.4.2	Property taxes	-	-	-	-	-	-	1,335	133	1,468	1,468	-	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	499	-	-	-	-	-	125	624	624	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	7	3	-	27	-	8	45	45	-	-	-	332	-	-	-	6,649	11	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC Fees	-	-	-	-	-	-	422	42	465	465	-	-	-	-	-	-	-	-	-	-
4f.4.7	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
4f.4.8	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
4f.4.9	Security Staff Cost	-	-	-	-	-	-	805	121	926	926	-	-	-	-	-	-	-	-	-	11,668
4f.4.10	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
4f.4.11	Utility Staff Cost	-	-	-	-	-	-	3,772	566	4,338	4,338	-	-	-	-	-	-	-	-	-	56,395
4f.4	Subtotal Period 4f Period-Dependent Costs	-	499	7	3	-	27	11,752	1,808	14,096	14,096	-	-	-	332	-	-	-	6,649	11	114,346
4f.0	TOTAL PERIOD 4f COST	-	499	7	3	-	27	16,381	3,007	19,924	19,924	-	-	-	332	-	-	-	6,649	40,542	117,466
PERIOD 4 TOTALS		2,227	55,364	16,927	6,284	22,974	43,490	124,588	59,158	331,012	325,439	-	5,573	141,584	129,564	125	742	1,773	13,792,410	472,147	1,263,075
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor	-	4,644	-	-	-	-	-	697	5,341	-	-	5,341	-	-	-	-	-	-	44,669	-
5b.1.1.2	Condensate Storage Tank Foundation	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	16	-
5b.1.1.3	Structures below 3' below grade	-	1,785	-	-	-	-	-	268	2,052	-	-	2,052	-	-	-	-	-	-	9,238	-
5b.1.1.4	Turbine	-	2,139	-	-	-	-	-	321	2,460	-	-	2,460	-	-	-	-	-	-	21,985	-
5b.1.1.5	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
5b.1.1	Totals	-	8,936	-	-	-	-	-	1,340	10,276	-	-	10,276	-	-	-	-	-	-	77,765	-
Site Closeout Activities																					
5b.1.2	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
5b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	9,384	-	-	-	-	200	1,438	11,022	231	-	10,792	-	-	-	-	-	-	78,686	1,560
Period 5b Additional Costs																					
5b.2.1	Clean Concrete Disposal	-	2,242	-	-	-	-	5	337	2,583	-	-	2,583	-	-	-	-	-	-	8,386	-
5b.2.2	Intake Structure Cofferdam	-	623	-	-	-	-	-	93	716	-	-	716	-	-	-	-	-	-	5,168	-

Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 5b Additional Costs (continued)																					
5b.2.3	Construction Debris	-	-	-	-	-	-	10	2	12	-	-	12	-	-	-	-	-	-	-	-
5b.2.4	Backfill	-	3,011	-	-	-	-	-	452	3,462	-	-	3,462	-	-	-	-	-	-	2,904	-
5b.2.5	Demolition and Site Restoration of ISFSI	-	515	-	-	-	-	68	87	670	-	-	670	-	-	-	-	-	-	2,219	80
5b.2	Subtotal Period 5b Additional Costs	-	6,390	-	-	-	-	82	971	7,443	-	-	7,443	-	-	-	-	-	-	18,677	80
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	125	-	-	-	-	-	19	143	-	-	143	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	125	-	-	-	-	-	19	143	-	-	143	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.2	Property taxes	-	-	-	-	-	-	3,481	348	3,829	-	-	3,829	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	-	395	-	-	-	-	-	-	-	-
5b.4.5	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	-	-	1,178	-	-	-	-	-	-	-	-
5b.4.6	Railroad Track Maintenance	-	-	-	-	-	-	133	20	152	-	-	152	-	-	-	-	-	-	-	-
5b.4.7	Security Staff Cost	-	-	-	-	-	-	2,055	308	2,363	-	-	2,363	-	-	-	-	-	-	-	29,221
5b.4.8	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
5b.4.9	Utility Staff Cost	-	-	-	-	-	-	3,831	575	4,406	-	-	4,406	-	-	-	-	-	-	-	57,340
5b.4	Subtotal Period 5b Period-Dependent Costs	-	7,144	-	-	-	-	21,789	4,166	33,099	-	-	33,099	-	-	-	-	-	-	-	203,445
5b.0	TOTAL PERIOD 5b COST	-	23,042	-	-	-	-	22,072	6,593	51,707	231	-	51,476	-	-	-	-	-	-	97,363	205,085
PERIOD 5 TOTALS		-	23,042	-	-	-	-	22,072	6,593	51,707	231	-	51,476	-	-	-	-	-	-	97,363	205,085
TOTAL COST TO DECOMMISSION		6,192	93,417	17,547	6,792	23,152	45,943	944,911	172,676	1,310,629	970,442	281,510	58,677	147,716	151,067	125	742	1,773	14,526,470	647,741	6,194,735

TOTAL COST TO DECOMMISSION WITH 15.17% CONTINGENCY:	**$1,310,629**	**thousands of 2020 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 74.04% OR:	**$970,442**	**thousands of 2020 dollars**
SPENT FUEL MANAGEMENT COST IS 21.48% OR:	**$281,510**	**thousands of 2020 dollars**
NON-NUCLEAR DEMOLITION COST IS 4.48% OR:	**$58,677**	**thousands of 2020 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**151,935**	**Cubic Feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**
TOTAL SCRAP METAL REMOVED:	**33,003**	**Tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**647,741**	**Man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	415	124	539	539	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.11	End product description	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	82	12	95	95	-	-	-	-	-	-	-	-	-	641
1a.1.13	Define major work sequence	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.14	Perform SER and EA	-	-	-	-	-	-	170	26	196	196	-	-	-	-	-	-	-	-	-	1,326
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	275	41	316	316	-	-	-	-	-	-	-	-	-	2,138
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	270	41	311	311	-	-	-	-	-	-	-	-	-	2,104
1a.1.16.2	Plant systems	-	-	-	-	-	-	229	34	263	263	-	-	-	-	-	-	-	-	-	1,782
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	171	26	197	197	-	-	-	-	-	-	-	-	-	1,334
1a.1.16.4	Waste management	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.16	Total	-	-	-	-	-	-	891	134	1,024	1,024	-	-	-	-	-	-	-	-	-	6,930
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	65	10	75	75	-	-	-	-	-	-	-	-	-	506
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	513
1a.1.17	Total	-	-	-	-	-	-	131	20	151	151	-	-	-	-	-	-	-	-	-	1,019
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	43
1a.1.19	Drain/de-energize non-cont. systems									a											
1a.1.20	Drain & dry NSSS									a											
1a.1.21	Drain/de-energize contaminated systems									a											
1a.1.22	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	2,387	420	2,807	2,807	-	-	-	-	-	-	-	-	-	15,347
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,330	199	1,529	-	1,529	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	8,394	1,259	9,653	9,653	-	-	-	-	-	-	-	-	-	-
1a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	10,973	1,459	12,432	9,653	2,779	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	604	-	-	-	-	-	151	755	755	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	49	-	14	80	80	-	-	-	597	-	-	-	11,944	19	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	516	52	567	567	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	25,478	3,822	29,300	29,300	-	-	-	-	-	-	-	-	-	400,944
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,357	12	5	-	49	45,381	6,687	53,491	50,549	2,942	-	-	597	-	-	-	11,944	19	523,664
1a.0	TOTAL PERIOD 1a COST	-	1,357	12	5	-	49	58,742	8,566	68,730	63,010	5,720	-	-	597	-	-	-	11,944	19	539,011

Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
1b.1.1.2	Auxiliary	1,244	-	-	-	-	-	-	622	1,866	1,866	-	-	-	-	-	-	-	-	17,950	-
1b.1.1.3	Drum Transfer & Truck Loading Enclosure	17	-	-	-	-	-	-	8	25	25	-	-	-	-	-	-	-	-	244	-
1b.1.1.4	LLRW Storage Enclosure	116	-	-	-	-	-	-	58	175	175	-	-	-	-	-	-	-	-	1,673	-
1b.1.1.5	Radwaste	52	-	-	-	-	-	-	26	78	78	-	-	-	-	-	-	-	-	749	-
1b.1.1.6	Resin Disposal	15	-	-	-	-	-	-	8	23	23	-	-	-	-	-	-	-	-	221	-
1b.1.1.7	Fuel Handling of Aux Building	1,014	-	-	-	-	-	-	507	1,521	1,521	-	-	-	-	-	-	-	-	13,854	-
1b.1.1	Totals	3,658	-	-	-	-	-	-	1,829	5,486	5,486	-	-	-	-	-	-	-	-	51,694	-
1b.1	Subtotal Period 1b Activity Costs	3,658	-	-	-	-	-	-	1,829	5,486	5,486	-	-	-	-	-	-	-	-	51,694	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	107	-	71	128	-	288	-	152	747	747	-	-	-	661	-	-	-	39,679	129	-
1b.3.4	Small tool allowance	-	61	-	-	-	-	-	9	70	70	-	-	-	-	-	-	-	-	-	-
1b.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	309	46	356	-	356	-	-	-	-	-	-	-	-	-
1b.3.6	Retention and Severance	-	-	-	-	-	-	2,296	344	2,640	2,640	-	-	-	-	-	-	-	-	-	-
1b.3.7	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,162	61	71	128	-	288	2,917	710	5,337	4,670	667	-	-	661	-	-	-	39,679	129	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,334	-	-	-	-	-	-	333	1,667	1,667	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	902	90	993	993	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	448	-	-	-	-	-	112	560	560	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	13	5	-	53	-	15	86	86	-	-	-	641	-	-	-	12,830	21	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	98	10	108	108	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1b.4	Subtotal Period 1b Period-Dependent Costs	1,334	635	13	5	-	53	11,645	2,138	15,823	15,089	733	-	-	641	-	-	-	12,830	21	135,867
1b.0	TOTAL PERIOD 1b COST	6,153	696	84	133	-	341	23,012	5,944	36,364	34,963	1,401	-	-	1,303	-	-	-	52,509	51,844	135,867
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	527	-	-	-	-	-	79	606	606	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	54	-	-	-	-	-	8	62	62	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	12,801	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	32	5	37	37	-	-	-	-	-	-	-	-	-	249
1c.1	Subtotal Period 1c Activity Costs	-	581	-	-	-	-	765	312	1,658	1,658	-	-	-	-	-	-	-	-	16,501	249
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	91	-	60	109	-	245	-	129	634	634	-	-	-	561	-	-	-	33,685	109	-
1c.3.2	Process decommissioning chemical flush waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1c.3.3	Small tool allowance	-	5	-	-	-	-	-	1	6	6	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	90	13	103	-	103	-	-	-	-	-	-	-	-	-
1c.3.5	Retention and Severance	-	-	-	-	-	-	1,722	258	1,980	1,980	-	-	-	-	-	-	-	-	-	-
1c.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-

Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1c Period-Dependent Costs																					
1c.3	Subtotal Period 1c Collateral Costs	91	5	60	109	-	245	2,123	401	3,034	2,619	415	-	-	561	-	-	-	33,685	109	-
1c.4.1	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	901	90	991	991	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	248	-	-	-	-	-	62	309	309	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	1	-	13	-	4	20	20	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	98	10	108	108	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1c.4.9	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1c.4.13	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1c.4.14	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1c.4	Subtotal Period 1c Period-Dependent Costs	-	435	3	1	-	13	11,643	1,742	13,838	13,104	733	-	-	152	-	-	-	3,039	5	135,867
1c.0	TOTAL PERIOD 1c COST	91	1,021	63	110	-	257	14,531	2,456	18,530	17,382	1,148	-	-	713	-	-	-	36,724	16,615	136,116
PERIOD 1 TOTALS		6,244	3,074	159	248	-	647	96,285	16,965	123,623	115,354	8,269	-	-	2,613	-	-	-	101,177	68,478	810,994
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	223	33	256	256	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	349	87	437	437	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	572	121	693	693	-	-	-	-	-	-	-	-	-	-
Period 2a Additional Costs																					
2a.2.1	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	59,354	8,903	68,257	-	68,257	-	-	-	-	-	-	-	-	-
2a.3.2	Retention and Severance	-	-	-	-	-	-	11,054	1,658	12,712	12,712	-	-	-	-	-	-	-	-	-	-
2a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	3,128	-	3,128	-	3,128	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	73,536	10,561	84,097	12,712	71,385	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,213	121	1,334	1,334	-	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	9,065	907	9,972	9,972	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	617	-	-	-	-	-	154	771	771	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	11	5	-	47	-	14	77	77	-	-	-	576	-	-	-	11,523	19	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	812	122	934	934	-	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	536	54	590	590	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	4,653	465	5,119	-	5,119	-	-	-	-	-	-	-	-	-
2a.4.8	Fixed Overhead	-	-	-	-	-	-	2,979	447	3,426	3,426	-	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	1,057	159	1,216	-	1,216	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	140	21	161	-	161	-	-	-	-	-	-	-	-	-
2a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	385	58	443	443	-	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	19,158	2,874	22,032	15,863	6,169	-	-	-	-	-	-	-	-	281,262
2a.4.13	Utility Staff Cost	-	-	-	-	-	-	13,370	2,006	15,376	12,900	2,476	-	-	-	-	-	-	-	-	205,738
2a.4	Subtotal Period 2a Period-Dependent Costs	-	617	11	5	-	47	53,370	7,400	61,450	46,309	15,140	-	-	576	-	-	-	11,523	19	486,999
2a.0	TOTAL PERIOD 2a COST	-	617	11	5	-	47	131,825	18,734	151,240	64,714	86,525	-	-	576	-	-	-	11,523	19	486,999
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	3,222	483	3,705	3,705	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	5,052	1,263	6,315	6,315	-	-	-	-	-	-	-	-	-	-

Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	8,274	1,746	10,020	10,020	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	15,884	2,383	18,267	-	18,267	-	-	-	-	-	-	-	-	-
2b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	45,219	-	45,219	-	45,219	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	61,103	2,383	63,486	-	63,486	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	17,530	1,753	19,283	19,283	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	131,056	13,106	144,162	144,162	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	4,112	-	-	-	-	-	1,028	5,140	5,140	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	74	30	-	308	-	89	501	501	-	-	-	3,739	-	-	-	74,786	122	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	5,869	880	6,749	6,749	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	7,459	746	8,205	8,205	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	2,684	268	2,952	-	2,952	-	-	-	-	-	-	-	-	-
2b.4.8	Fixed Overhead	-	-	-	-	-	-	5,898	885	6,783	6,783	-	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	2,026	304	2,330	-	2,330	-	-	-	-	-	-	-	-	-
2b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	2,263	339	2,603	2,603	-	-	-	-	-	-	-	-	-	-
2b.4.11	Security Staff Cost	-	-	-	-	-	-	101,034	15,155	116,189	25,562	90,627	-	-	-	-	-	-	-	-	1,355,328
2b.4.12	Utility Staff Cost	-	-	-	-	-	-	49,438	7,416	56,854	35,704	21,150	-	-	-	-	-	-	-	-	752,960
2b.4	Subtotal Period 2b Period-Dependent Costs	-	4,112	74	30	-	308	325,257	41,969	371,750	254,691	117,059	-	-	3,739	-	-	-	74,786	122	2,108,288
2b.0	TOTAL PERIOD 2b COST	-	4,112	74	30	-	308	394,634	46,098	445,256	264,712	180,544	-	-	3,739	-	-	-	74,786	122	2,108,288
PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage																					
Period 2c Direct Decommissioning Activities																					
2c.1.1	Quarterly Inspection									a											
2c.1.2	Semi-annual environmental survey									a											
2c.1.3	Prepare reports									a											
2c.1.4	Bituminous roof replacement	-	-	-	-	-	-	1,180	177	1,357	1,357	-	-	-	-	-	-	-	-	-	-
2c.1.5	Maintenance supplies	-	-	-	-	-	-	1,851	463	2,313	2,313	-	-	-	-	-	-	-	-	-	-
2c.1	Subtotal Period 2c Activity Costs	-	-	-	-	-	-	3,031	640	3,671	3,671	-	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	3,705	370	4,075	4,075	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	30,788	3,079	33,867	33,867	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	1,428	-	-	-	-	-	357	1,785	1,785	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	25	10	-	105	-	30	171	171	-	-	-	1,274	-	-	-	25,478	42	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	2,150	322	2,472	2,472	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	2,606	261	2,866	2,866	-	-	-	-	-	-	-	-	-	-
2c.4.7	Fixed Overhead	-	-	-	-	-	-	2,161	324	2,485	2,485	-	-	-	-	-	-	-	-	-	-
2c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	829	124	953	953	-	-	-	-	-	-	-	-	-	-
2c.4.9	Utility Staff Cost	-	-	-	-	-	-	6,584	988	7,572	7,572	-	-	-	-	-	-	-	-	-	110,326
2c.4	Subtotal Period 2c Period-Dependent Costs	-	1,428	25	10	-	105	48,823	5,856	56,247	56,247	-	-	-	1,274	-	-	-	25,478	42	110,326
2c.0	TOTAL PERIOD 2c COST	-	1,428	25	10	-	105	51,854	6,496	59,918	59,918	-	-	-	1,274	-	-	-	25,478	42	110,326
PERIOD 2 TOTALS		-	6,157	111	45	-	461	578,313	71,327	656,413	389,344	267,069	-	-	5,589	-	-	-	111,786	182	2,705,613
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
3a.1.6	Define major work sequence	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
3a.1.7	Perform SER and EA	-	-	-	-	-	-	170	26	196	196	-	-	-	-	-	-	-	-	-	1,326
3a.1.8	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
3a.1.9	Perform Site-Specific Cost Study	-	-	-	-	-	-	275	41	316	316	-	-	-	-	-	-	-	-	-	2,138
3a.1.10	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
Activity Specifications																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	405	61	466	419	-	47	-	-	-	-	-	-	-	3,151
3a.1.11.2	Plant systems	-	-	-	-	-	-	229	34	263	237	-	26	-	-	-	-	-	-	-	1,782
3a.1.11.3	Reactor internals	-	-	-	-	-	-	390	59	449	449	-	-	-	-	-	-	-	-	-	3,036

Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	357	54	411	411	-	-	-	-	-	-	-	-	-	2,779
3a.1.11.5	Biological shield	-	-	-	-	-	-	27	4	32	32	-	-	-	-	-	-	-	-	-	214
3a.1.11.6	Steam generators	-	-	-	-	-	-	171	26	197	197	-	-	-	-	-	-	-	-	-	1,334
Activity Specifications (continued)																					
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	88	13	101	51	-	51	-	-	-	-	-	-	-	684
3a.1.11.8	Main Turbine	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
3a.1.11.9	Main Condensers	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
3a.1.11.10	Plant structures & buildings	-	-	-	-	-	-	171	26	197	99	-	99	-	-	-	-	-	-	-	1,334
3a.1.11.11	Waste management	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
3a.1.11.12	Facility & site closeout	-	-	-	-	-	-	49	7	57	28	-	28	-	-	-	-	-	-	-	385
3a.1.11	Total	-	-	-	-	-	-	2,186	328	2,514	2,213	-	301	-	-	-	-	-	-	-	17,009
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	132	20	152	152	-	-	-	-	-	-	-	-	-	1,026
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	77	12	88	88	-	-	-	-	-	-	-	-	-	599
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	68	10	78	78	-	-	-	-	-	-	-	-	-	526
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	10,137	1,521	11,658	11,357	-	301	-	-	-	-	-	-	-	32,971
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	1,505	451	1,956	1,956	-	-	-	-	-	-	-	-	8,988	3,563
3a.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
3a.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
3a.2	Subtotal Period 3a Additional Costs	-	2,526	356	244	178	1,369	1,505	1,524	7,702	7,702	-	-	6,132	12,843	-	-	-	518,936	32,243	3,563
Period 3a Collateral Costs																					
3a.3.1	Small tool allowance	-	34	-	-	-	-	-	5	39	39	-	-	-	-	-	-	-	-	-	-
3a.3	Subtotal Period 3a Collateral Costs	-	34	-	-	-	-	-	5	39	39	-	-	-	-	-	-	-	-	-	-
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	279	28	307	307	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	2,249	225	2,474	2,474	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	641	-	-	-	-	-	160	802	802	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	4	-	40	-	11	64	64	-	-	-	481	-	-	-	9,613	16	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	260	26	286	286	-	-	-	-	-	-	-	-	-	-
3a.4.8	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
3a.4.9	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
3a.4.10	Security Staff Cost	-	-	-	-	-	-	368	55	424	424	-	-	-	-	-	-	-	-	-	6,240
3a.4.11	Utility Staff Cost	-	-	-	-	-	-	12,056	1,808	13,864	13,864	-	-	-	-	-	-	-	-	-	199,680
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,394	10	4	-	40	18,336	2,896	22,679	22,679	-	-	-	481	-	-	-	9,613	16	205,920
3a.0	TOTAL PERIOD 3a COST	-	3,954	366	248	178	1,409	29,979	5,946	42,079	41,778	-	301	6,132	13,324	-	-	-	528,549	32,259	242,454
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	260	39	299	269	-	30	-	-	-	-	-	-	-	2,024
3b.1.1.2	Reactor internals	-	-	-	-	-	-	137	21	158	158	-	-	-	-	-	-	-	-	-	1,069
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	74	11	85	21	-	64	-	-	-	-	-	-	-	577
3b.1.1.4	CRD cooling assembly	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3b.1.1.5	CRD housings & ICI tubes	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3b.1.1.6	Incore instrumentation	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	199	30	229	229	-	-	-	-	-	-	-	-	-	1,552
3b.1.1.8	Facility closeout	-	-	-	-	-	-	66	10	76	38	-	38	-	-	-	-	-	-	-	513
3b.1.1.9	Missile shields	-	-	-	-	-	-	25	4	28	28	-	-	-	-	-	-	-	-	-	192
3b.1.1.10	Biological shield	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	513
3b.1.1.11	Steam generators	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
3b.1.1.12	Reinforced concrete	-	-	-	-	-	-	55	8	63	32	-	32	-	-	-	-	-	-	-	428
3b.1.1.13	Main Turbine	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
3b.1.1.14	Main Condensers	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
3b.1.1.15	Auxiliary building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
3b.1.1.16	Reactor building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
3b.1.1	Total	-	-	-	-	-	-	1,772	266	2,038	1,643	-	395	-	-	-	-	-	-	-	13,787

Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	1,772	266	2,038	1,643	-	395	-	-	-	-	-	-	-	13,787
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	1,055	1,200	-	-	-	-	1,264	528	4,047	4,047	-	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	241	24	266	266	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	1,019	102	1,121	1,121	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	274	-	-	-	-	-	68	342	342	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	5	2	-	22	-	6	35	35	-	-	-	264	-	-	-	5,286	9	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	808	121	930	930	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	129	13	142	142	-	-	-	-	-	-	-	-	-	-
3b.4.9	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
3b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
3b.4.11	Security Staff Cost	-	-	-	-	-	-	184	28	211	211	-	-	-	-	-	-	-	-	-	3,111
3b.4.12	DOC Staff Cost	-	-	-	-	-	-	3,727	559	4,287	4,287	-	-	-	-	-	-	-	-	-	42,523
3b.4.13	Utility Staff Cost	-	-	-	-	-	-	6,011	902	6,913	6,913	-	-	-	-	-	-	-	-	-	99,566
3b.4	Subtotal Period 3b Period-Dependent Costs	38	649	5	2	-	22	12,870	2,002	15,588	15,588	-	-	-	264	-	-	-	5,286	9	145,201
3b.0	TOTAL PERIOD 3b COST	1,092	1,849	5	2	-	22	15,906	2,795	21,672	21,277	-	395	-	264	-	-	-	5,286	9	158,988
PERIOD 3 TOTALS		1,092	5,803	371	250	178	1,430	45,885	8,741	63,751	63,054	-	696	6,132	13,588	-	-	-	533,835	32,267	401,442
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Reactor Coolant Piping	11	42	10	11	66	94	-	52	285	285	-	-	240	254	-	-	-	33,680	778	-
4a.1.1.2	Pressurizer Relief Tank	5	19	6	7	44	62	-	31	174	174	-	-	160	169	-	-	-	22,441	352	-
4a.1.1.3	Reactor Coolant Pumps & Motors	13	60	46	85	-	463	-	155	822	822	-	-	-	2,332	-	-	-	295,800	1,226	80
4a.1.1.4	Pressurizer	-	77	382	91	-	776	-	265	1,591	1,591	-	-	-	2,196	-	-	-	158,199	1,346	750
4a.1.1.5	Steam Generators	-	3,307	1,690	1,743	2,409	3,885	-	2,590	15,625	15,625	-	-	18,672	10,990	-	-	-	1,581,180	10,253	2,250
4a.1.1.6	CRDMs/ICIs/Service Structure Removal	63	248	205	44	326	454	-	283	1,623	1,623	-	-	2,138	2,146	-	-	-	165,025	4,449	-
4a.1.1.7	Reactor Vessel Internals	51	4,650	11,350	862	-	7,848	278	10,531	35,570	35,570	-	-	-	1,174	-	673	-	167,337	22,373	1,053
4a.1.1.8	Vessel & Internals GTCC Disposal	-	-	-	-	-	8,680	-	1,302	9,982	9,982	-	-	-	-	-	-	1,773	344,823	-	-
4a.1.1.9	Reactor Vessel	-	5,835	1,653	442	-	3,268	278	6,576	18,053	18,053	-	-	-	9,245	-	-	-	579,324	22,373	1,053
4a.1.1	Totals	144	14,237	15,343	3,284	2,845	25,531	556	21,785	83,725	83,725	-	-	21,210	28,505	-	673	1,773	3,347,810	63,151	5,187
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	292	116	35	555	-	-	173	1,170	1,170	-	-	2,243	-	-	-	-	134,601	4,116	-
4a.1.3	Main Condensers	-	2,510	79	33	742	-	-	752	4,115	4,115	-	-	4,000	-	-	-	-	180,000	34,978	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
4a.1.4.2	Auxiliary	-	221	-	-	-	-	-	33	254	254	-	-	-	-	-	-	-	-	1,309	-
4a.1.4.3	Radwaste	-	9	-	-	-	-	-	1	10	10	-	-	-	-	-	-	-	-	65	-
4a.1.4	Totals	-	1,023	-	-	-	-	-	154	1,177	1,177	-	-	-	-	-	-	-	-	8,963	-
Disposal of Plant Systems																					
4a.1.5.1	Admin Bldg Ventilation	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	90	-
4a.1.5.2	Air Removal	-	29	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	422	-
4a.1.5.3	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	676	-
4a.1.5.4	Auxiliary Feedwater - RCA	-	38	0	1	30	-	-	14	84	84	-	-	178	-	-	-	-	7,214	486	-
4a.1.5.5	Bleed Steam	-	90	-	-	-	-	-	13	103	-	-	103	-	-	-	-	-	-	1,331	-
4a.1.5.6	Caustic Addition - RCA	-	40	0	2	40	-	-	16	99	99	-	-	240	-	-	-	-	9,761	468	-
4a.1.5.7	Chemical Feed	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	261	-
4a.1.5.8	Chemical Feed - RCA	-	3	0	0	3	-	-	1	7	7	-	-	16	-	-	-	-	634	31	-
4a.1.5.9	Circulating Water	-	27	-	-	-	-	-	4	32	-	-	32	-	-	-	-	-	-	401	-
4a.1.5.10	Condensate	-	525	-	-	-	-	-	79	603	-	-	603	-	-	-	-	-	-	7,537	-
4a.1.5.11	Condensate Polishing	-	208	-	-	-	-	-	31	239	-	-	239	-	-	-	-	-	-	2,987	-
4a.1.5.12	Condensate Polishing - RCA	-	38	1	4	81	-	-	22	145	145	-	-	483	-	-	-	-	19,616	493	-
4a.1.5.13	Electro-Hydraulic	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	143	-

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Disposal of Plant Systems (continued)																					
4a.1.5.14	External Circulating Water	-	26	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	385	-
4a.1.5.15	External Circulating Water - RCA	-	72	1	5	121	-	-	37	237	237	-	-	721	-	-	-	-	29,284	938	-
4a.1.5.16	Feedwater	-	127	-	-	-	-	-	19	146	-	-	146	-	-	-	-	-	-	1,840	-
4a.1.5.17	Feedwater - RCA	-	248	8	31	694	-	-	171	1,152	1,152	-	-	4,147	-	-	-	-	168,414	3,377	-
4a.1.5.18	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	504	-
4a.1.5.19	Heater Drain	-	384	-	-	-	-	-	58	441	-	-	441	-	-	-	-	-	-	5,638	-
4a.1.5.20	Hypobromous Acid Feed	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	86	-
4a.1.5.21	Hypobromous Acid Feed - RCA	-	1	0	0	0	-	-	0	2	2	-	-	2	-	-	-	-	100	12	-
4a.1.5.22	Internal Circ Water & CDSR	-	25	-	-	-	-	-	4	29	-	-	29	-	-	-	-	-	-	366	-
4a.1.5.23	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
4a.1.5.24	Main Steam	-	101	-	-	-	-	-	15	116	-	-	116	-	-	-	-	-	-	1,482	-
4a.1.5.25	Main Steam - RCA	-	380	11	38	864	-	-	231	1,525	1,525	-	-	5,166	-	-	-	-	209,799	5,146	-
4a.1.5.26	Repairable Spare Snubbers	-	6	0	0	2	-	-	2	10	10	-	-	12	-	-	-	-	490	82	-
4a.1.5.27	Steam Exclusion	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	32	-
4a.1.5.28	Steam Exclusion - RCA	-	4	0	0	4	-	-	2	10	10	-	-	24	-	-	-	-	966	47	-
4a.1.5.29	Steam Generator Blowdown	-	378	21	27	319	215	-	202	1,162	1,162	-	-	1,906	631	-	-	-	118,130	5,179	-
4a.1.5.30	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
4a.1.5.31	Turbine & Moisture Separators	-	377	-	-	-	-	-	57	434	-	-	434	-	-	-	-	-	-	5,472	-
4a.1.5.32	Turbine Oil Purification	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	757	-
4a.1.5.33	Water Treatment	-	453	-	-	-	-	-	68	521	-	-	521	-	-	-	-	-	-	6,677	-
4a.1.5.34	Water Treatment - RCA	-	20	0	1	19	-	-	8	49	49	-	-	115	-	-	-	-	4,652	252	-
4a.1.5	Totals	-	3,779	43	108	2,177	215	-	1,091	7,413	4,480	-	2,933	13,010	631	-	-	-	569,060	53,681	-
4a.1.6	Scaffolding in support of decommissioning	-	2,865	22	10	188	30	-	755	3,870	3,870	-	-	1,012	89	-	-	-	51,216	23,719	-
4a.1	Subtotal Period 4a Activity Costs	144	24,706	15,603	3,470	6,506	25,776	556	24,709	101,471	98,537	-	2,933	41,476	29,226	-	673	1,773	4,282,686	188,606	5,187
Period 4a Additional Costs																					
4a.2.1	Retired RPV Upper Internals Package	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
4a.2	Subtotal Period 4a Additional Costs	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	3	-	4	8	-	17	-	7	39	39	-	-	-	40	-	-	-	2,408	8	-
4a.3.3	Small tool allowance	-	241	-	-	-	-	-	36	277	249	-	28	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	3	241	4	8	-	17	-	43	316	288	-	28	-	40	-	-	-	2,408	8	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	100	-	-	-	-	-	-	25	125	125	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	643	64	708	708	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	2,668	267	2,935	2,935	-	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,881	-	-	-	-	-	470	2,351	2,351	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	3,325	-	-	-	-	-	499	3,824	3,824	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	70	29	-	293	-	85	477	477	-	-	-	3,554	-	-	-	71,089	116	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	2,047	307	2,354	2,354	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	420	42	461	461	-	-	-	-	-	-	-	-	-	-
4a.4.9	Fixed Overhead	-	-	-	-	-	-	1,581	237	1,818	1,818	-	-	-	-	-	-	-	-	-	-
4a.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	565	85	649	649	-	-	-	-	-	-	-	-	-	-
4a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	83	12	96	96	-	-	-	-	-	-	-	-	-	-
4a.4.12	Remedial Actions Surveys	-	-	-	-	-	-	1,489	223	1,712	1,712	-	-	-	-	-	-	-	-	-	-
4a.4.13	Security Staff Cost	-	-	-	-	-	-	4,486	673	5,159	5,159	-	-	-	-	-	-	-	-	-	67,000
4a.4.14	DOC Staff Cost	-	-	-	-	-	-	17,103	2,565	19,668	19,668	-	-	-	-	-	-	-	-	-	189,200
4a.4.15	Utility Staff Cost	-	-	-	-	-	-	21,194	3,179	24,374	24,374	-	-	-	-	-	-	-	-	-	335,701
4a.4	Subtotal Period 4a Period-Dependent Costs	100	5,206	70	29	-	293	52,278	8,734	66,709	66,709	-	-	-	3,554	-	-	-	71,089	116	591,901
4a.0	TOTAL PERIOD 4a COST	246	30,281	15,844	3,564	6,506	27,669	52,834	34,430	171,375	168,414	-	2,961	41,476	33,393	125	673	1,773	4,405,984	190,397	597,154
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	314	35	86	41	-	703	-	356	1,535	1,535	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
4b.1.2.1	ADT & Misc Ventilation	-	22	1	1	26	3	-	10	63	63	-	-	153	9	-	-	-	6,803	325	-
4b.1.2.2	Aux Bldg Normal Ventilation	-	62	2	6	116	13	-	37	237	237	-	-	692	39	-	-	-	30,595	906	-
4b.1.2.3	Aux Bldg Special Ventilation	-	12	0	1	12	2	-	5	32	32	-	-	70	6	-	-	-	3,234	176	-
4b.1.2.4	Battery Rm Special Ventilation	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	24	-
4b.1.2.5	Boron Recycle	-	3	0	0	0	3	-	2	9	9	-	-	3	9	-	-	-	700	45	-

Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4b.1.2.6	Chemical & Volume Control	-	858	62	57	394	677	-	458	2,507	2,507	-	-	2,356	1,977	-	-	-	223,753	11,575	-
4b.1.2.7	Cold Chemical Lab Ventilation	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
4b.1.2.8	Component Cooling - RCA	-	647	25	88	2,007	-	-	479	3,246	3,246	-	-	11,996	-	-	-	-	487,169	8,583	-
4b.1.2.9	Containment Cooling	-	35	-	-	-	-	-	5	40	-	-	40	-	-	-	-	-	-	502	-
4b.1.2.10	Containment Cooling - RCA	-	302	6	20	459	-	-	148	934	934	-	-	2,743	-	-	-	-	111,390	3,949	-
4b.1.2.11	Containment Hydrogen Control - RCA	-	36	0	1	24	-	-	13	74	74	-	-	141	-	-	-	-	5,742	494	-
4b.1.2.12	Containment Spray - RCA	-	194	3	11	243	-	-	87	538	538	-	-	1,453	-	-	-	-	59,019	2,617	-
4b.1.2.13	Containment Ventilation	-	211	23	49	790	243	-	242	1,558	1,558	-	-	4,721	722	-	-	-	237,643	3,016	-
4b.1.2.14	Control/Relay/Cmptr Rm Vent	-	28	1	2	44	7	-	16	98	98	-	-	260	20	-	-	-	11,878	406	-
4b.1.2.15	Cooling Water	-	159	-	-	-	-	-	24	183	-	-	183	-	-	-	-	-	-	2,344	-
4b.1.2.16	Cooling Water - RCA	-	476	17	62	1,412	-	-	342	2,310	2,310	-	-	8,442	-	-	-	-	342,822	6,311	-
4b.1.2.17	Cranes/Hoists/Elevators - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
4b.1.2.18	D3 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-
4b.1.2.19	D4 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-
4b.1.2.20	D5 Emergency Diesel	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
4b.1.2.21	Electrical - Clean	-	1,714	-	-	-	-	-	257	1,972	-	-	1,972	-	-	-	-	-	-	24,276	-
4b.1.2.22	Electrical - Contaminated	-	430	5	16	334	25	-	167	978	978	-	-	1,997	75	-	-	-	85,887	5,813	-
4b.1.2.23	Electrical - Contaminated - Fuel Pool	-	184	2	7	145	11	-	72	421	421	-	-	864	33	-	-	-	37,167	2,488	-
4b.1.2.24	Electrical - Decontaminated	-	2,955	38	138	3,138	-	-	1,234	7,503	7,503	-	-	18,753	-	-	-	-	761,569	38,423	-
4b.1.2.25	Electrical - Decontaminated - Fuel Pool	-	1,269	17	59	1,350	-	-	530	3,225	3,225	-	-	8,069	-	-	-	-	327,668	16,495	-
4b.1.2.26	Filter Rm Ventilation	-	4	0	0	4	0	-	2	10	10	-	-	24	1	-	-	-	1,017	61	-
4b.1.2.27	Fire Protection & Detection	-	204	-	-	-	-	-	31	235	-	-	235	-	-	-	-	-	-	3,009	-
4b.1.2.28	Fire Protection & Detection - RCA	-	246	4	13	306	-	-	110	679	679	-	-	1,828	-	-	-	-	74,245	3,134	-
4b.1.2.29	Fire Protection & Detection - RCA Fuel P	-	37	1	2	48	-	-	17	105	105	-	-	286	-	-	-	-	11,622	476	-
4b.1.2.30	Fuel Handling	-	66	1	2	34	17	-	26	146	146	-	-	200	49	-	-	-	11,273	983	-
4b.1.2.31	Fuel Oil	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
4b.1.2.32	HVAC - Clean	-	151	-	-	-	-	-	23	174	-	-	174	-	-	-	-	-	-	2,373	-
4b.1.2.33	HVAC - Contaminated	-	1,112	29	87	1,798	136	-	598	3,759	3,759	-	-	10,745	405	-	-	-	462,103	14,282	-
4b.1.2.34	HVAC - Contaminated - Fuel Pool	-	499	13	39	808	61	-	268	1,689	1,689	-	-	4,828	182	-	-	-	207,612	6,417	-
4b.1.2.35	Heating	-	322	-	-	-	-	-	48	370	-	-	370	-	-	-	-	-	-	4,804	-
4b.1.2.36	Heating - RCA	-	337	4	14	319	-	-	135	809	809	-	-	1,907	-	-	-	-	77,458	4,086	-
4b.1.2.37	Hot Lab & Sample Rm Ventilation	-	17	0	1	18	1	-	8	46	46	-	-	107	4	-	-	-	4,622	255	-
4b.1.2.38	Incore Instrumentation	-	27	1	2	10	20	-	13	73	73	-	-	60	58	-	-	-	6,143	412	-
4b.1.2.39	Misc Drains & Vents	-	213	12	12	77	145	-	104	563	563	-	-	458	426	-	-	-	46,079	2,841	-
4b.1.2.40	Misc Lab & Service Areas Vent	-	118	8	8	62	84	-	62	342	342	-	-	370	244	-	-	-	30,899	1,537	-
4b.1.2.41	Miscellaneous Gas	-	72	-	-	-	-	-	11	83	-	-	83	-	-	-	-	-	-	1,073	-
4b.1.2.42	Miscellaneous Gas - RCA	-	134	1	4	100	-	-	49	289	289	-	-	600	-	-	-	-	24,378	1,636	-
4b.1.2.43	Radiation Monitoring	-	7	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	111	-
4b.1.2.44	Radiation Monitoring - RCA	-	65	1	2	53	-	-	25	145	145	-	-	316	-	-	-	-	12,826	782	-
4b.1.2.45	Reactor Coolant	-	216	20	16	38	249	-	126	666	666	-	-	229	730	-	-	-	56,440	2,891	-
4b.1.2.46	Reactor Hot Sampling	-	116	11	7	9	108	-	60	311	311	-	-	54	312	-	-	-	22,678	1,499	-
4b.1.2.47	Reactor Makeup	-	41	-	-	-	-	-	6	47	-	-	47	-	-	-	-	-	-	583	-
4b.1.2.48	Reactor Makeup - RCA	-	4	0	0	5	-	-	2	11	11	-	-	28	-	-	-	-	1,148	47	-
4b.1.2.49	Reactor Vessel	-	16	1	0	4	5	-	6	32	32	-	-	22	14	-	-	-	1,816	225	-
4b.1.2.50	Residual Heat Removal	-	354	84	86	477	1,102	-	457	2,562	2,562	-	-	2,853	3,244	-	-	-	324,232	5,039	-
4b.1.2.51	Safeguards Chilled Water	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
4b.1.2.52	Safeguards Chilled Water - RCA	-	5	0	0	4	-	-	2	11	11	-	-	26	-	-	-	-	1,045	51	-
4b.1.2.53	Safety Injection	-	793	42	72	1,117	395	-	479	2,898	2,898	-	-	6,676	1,161	-	-	-	345,708	11,029	-
4b.1.2.54	Sampling	-	48	3	2	6	32	-	22	113	113	-	-	37	93	-	-	-	7,628	645	-
4b.1.2.55	Service Bldg & New Cmptr Vent	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	6	-
4b.1.2.56	Shield Bldg Ventilation	-	108	13	25	339	163	-	124	771	771	-	-	2,028	484	-	-	-	113,139	1,555	-
4b.1.2.57	Spent Fuel Pool Cooling	-	33	3	2	6	37	-	19	101	101	-	-	39	107	-	-	-	8,481	427	-
4b.1.2.58	Spent Fuel Pool Normal Ventilation	-	24	1	2	44	4	-	14	90	90	-	-	265	12	-	-	-	11,505	352	-
4b.1.2.59	Station & Instrument Air	-	161	-	-	-	-	-	24	185	-	-	185	-	-	-	-	-	-	2,424	-
4b.1.2.60	Station & Instrument Air - RCA	-	299	3	12	272	-	-	118	704	704	-	-	1,625	-	-	-	-	65,986	3,638	-
4b.1.2.61	Turbine Bldg Traps & Drains	-	30	-	-	-	-	-	5	35	-	-	35	-	-	-	-	-	-	462	-
4b.1.2.62	Turbine Bldg Traps & Drains - RCA	-	30	0	1	30	-	-	12	73	73	-	-	180	-	-	-	-	7,321	344	-
4b.1.2.63	Turbine Bldg Ventilation	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	655	-
4b.1.2.64	Unit Coolers	-	23	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	332	-
4b.1.2.65	Unit Coolers - RCA	-	56	0	2	39	-	-	20	117	117	-	-	232	-	-	-	-	9,413	690	-
4b.1.2.66	Waste Gas Disposal	-	438	43	45	410	464	-	298	1,699	1,699	-	-	2,453	1,358	-	-	-	187,339	5,879	-
4b.1.2.67	Waste Liquid Disposal	-	1,642	116	100	612	1,234	-	837	4,541	4,541	-	-	3,655	3,594	-	-	-	381,754	22,011	-
4b.1.2.68	Waste Solid Disposal	-	132	12	11	65	134	-	79	433	433	-	-	389	393	-	-	-	41,177	1,781	-
4b.1.2	Totals	-	17,877	633	1,092	17,625	5,377	-	8,385	50,989	47,545	-	3,444	105,339	15,761	-	-	-	5,294,310	240,033	-
4b.1.3	Scaffolding in support of decommissioning	-	4,297	33	15	281	45	-	1,133	5,804	5,804	-	-	1,518	134	-	-	-	76,824	35,578	-

Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Decontamination of Site Buildings																					
4b.1.4.1	Reactor	1,096	2,528	240	1,236	373	7,080	-	3,215	15,768	15,768	-	-	2,230	67,331	-	-	-	3,286,725	45,740	-
4b.1.4.2	Auxiliary	1,168	375	23	117	177	648	-	886	3,395	3,395	-	-	1,060	6,118	-	-	-	332,495	21,235	-
4b.1.4.3	Backwash Waste Receiving Tank	-	25	3	17	-	97	-	33	175	175	-	-	-	929	-	-	-	43,896	266	-
4b.1.4.4	Drum Transfer & Truck Loading Enclosure	16	8	1	3	3	14	-	15	59	59	-	-	19	135	-	-	-	7,118	328	-
4b.1.4.5	LLRW Storage Enclosure	111	48	3	17	6	96	-	95	377	377	-	-	38	920	-	-	-	44,971	2,151	-
4b.1.4.6	Radwaste	50	21	1	8	7	43	-	43	174	174	-	-	42	412	-	-	-	21,136	964	-
4b.1.4.7	Resin Disposal	15	11	1	3	14	14	-	16	72	72	-	-	83	124	-	-	-	9,271	340	-
4b.1.4.8	Fuel Handling of Aux Building	924	1,015	13	45	404	195	-	833	3,430	3,430	-	-	2,417	1,652	-	-	-	177,755	27,145	-
4b.1.4	Totals	3,380	4,031	285	1,445	985	8,187	-	5,137	23,450	23,450	-	-	5,889	77,619	-	-	-	3,923,368	98,170	-
4b.1.5	Prepare/submit License Termination Plan	-	-	-	-	-	-	225	34	259	259	-	-	-	-	-	-	-	-	-	1,751
4b.1.6	Receive NRC approval of termination plan									a											
4b.1	Subtotal Period 4b Activity Costs	3,693	26,240	1,036	2,594	18,892	14,312	225	15,045	82,037	78,593	-	3,444	112,746	95,607	-	-	-	9,427,420	374,358	1,751
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
4b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
4b.2.3	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
4b.2.4	License Termination ISFSI	-	24	81	435	-	2,532	1,375	1,112	5,560	5,560	-	-	-	9,355	-	-	-	1,123,457	3,762	5,460
4b.2	Subtotal Period 4b Additional Costs	-	1,199	93	471	606	2,532	2,638	1,848	9,387	9,387	-	-	5,880	9,355	-	-	-	1,270,457	11,189	11,700
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	7	-	12	21	-	48	-	20	107	107	-	-	-	109	-	-	-	6,547	21	-
4b.3.3	Small tool allowance	-	443	-	-	-	-	-	66	509	509	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
4b.3	Subtotal Period 4b Collateral Costs	7	443	142	88	1,112	225	1	320	2,338	2,338	-	-	6,000	638	-	-	-	310,155	168	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,449	-	-	-	-	-	-	362	1,811	1,811	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	862	86	949	949	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	3,404	340	3,745	3,745	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	3,232	-	-	-	-	-	808	4,041	4,041	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,577	-	-	-	-	-	687	5,263	5,263	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	116	47	-	482	-	139	784	784	-	-	-	5,849	-	-	-	116,984	191	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,165	325	2,490	2,490	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	562	56	618	618	-	-	-	-	-	-	-	-	-	-
4b.4.9	Fixed Overhead	-	-	-	-	-	-	2,118	318	2,436	2,436	-	-	-	-	-	-	-	-	-	-
4b.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	757	113	870	870	-	-	-	-	-	-	-	-	-	-
4b.4.11	Railroad Track Maintenance	-	-	-	-	-	-	111	17	128	128	-	-	-	-	-	-	-	-	-	-
4b.4.12	Remedial Actions Surveys	-	-	-	-	-	-	1,995	299	2,294	2,294	-	-	-	-	-	-	-	-	-	-
4b.4.13	Security Staff Cost	-	-	-	-	-	-	7,811	1,172	8,983	8,983	-	-	-	-	-	-	-	-	-	115,753
4b.4.14	DOC Staff Cost	-	-	-	-	-	-	22,641	3,396	26,038	26,038	-	-	-	-	-	-	-	-	-	248,175
4b.4.15	Utility Staff Cost	-	-	-	-	-	-	27,954	4,193	32,147	32,147	-	-	-	-	-	-	-	-	-	437,085
4b.4	Subtotal Period 4b Period-Dependent Costs	1,449	7,809	116	47	-	482	70,383	12,312	92,598	92,598	-	-	-	5,849	-	-	-	116,984	191	801,014
4b.0	TOTAL PERIOD 4b COST	5,149	35,691	1,386	3,201	20,610	17,552	73,246	29,526	186,361	182,916	-	3,444	124,626	111,449	-	-	-	11,125,020	385,906	814,465
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-

Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 4f Period-Dependent Costs																					
4f.4.2	Property taxes	-	-	-	-	-	-	1,335	133	1,468	1,468	-	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	709	-	-	-	-	-	177	886	886	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	7	3	-	27	-	8	45	45	-	-	-	332	-	-	-	6,649	11	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC Fees	-	-	-	-	-	-	263	26	290	290	-	-	-	-	-	-	-	-	-	-
4f.4.7	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
4f.4.8	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
4f.4.9	Security Staff Cost	-	-	-	-	-	-	805	121	926	926	-	-	-	-	-	-	-	-	-	11,668
4f.4.10	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
4f.4.11	Utility Staff Cost	-	-	-	-	-	-	3,772	566	4,338	4,338	-	-	-	-	-	-	-	-	-	56,395
4f.4	Subtotal Period 4f Period-Dependent Costs	-	709	7	3	-	27	11,593	1,844	14,182	14,182	-	-	-	332	-	-	-	6,649	11	114,346
4f.0	TOTAL PERIOD 4f COST	-	709	7	3	-	27	20,064	4,196	25,006	25,006	-	-	-	332	-	-	-	6,649	100,906	117,466
PERIOD 4 TOTALS		5,395	66,681	17,237	6,768	27,115	45,248	146,144	68,152	382,741	376,336	-	6,405	166,102	145,174	125	673	1,773	15,537,650	677,209	1,529,086
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor	-	4,645	-	-	-	-	-	697	5,342	-	-	5,342	-	-	-	-	-	-	44,679	-
5b.1.1.2	Auxiliary	-	1,993	-	-	-	-	-	299	2,291	-	-	2,291	-	-	-	-	-	-	11,902	-
5b.1.1.3	Condensate Storage Tank Foundation	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	33	-
5b.1.1.4	Construction Warehouse & Fab Shop	-	130	-	-	-	-	-	19	149	-	-	149	-	-	-	-	-	-	1,405	-
5b.1.1.5	D3/D4 Emergency Generator	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	84	-
5b.1.1.6	Drum Transfer & Truck Loading Enclosure	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	221	-
5b.1.1.7	Hydrogen House	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	47	-
5b.1.1.8	LLRW Storage Enclosure	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	853	-
5b.1.1.9	Misc Structures 2017	-	2,617	-	-	-	-	-	393	3,009	-	-	3,009	-	-	-	-	-	-	22,582	-
5b.1.1.10	Radwaste	-	176	-	-	-	-	-	26	202	-	-	202	-	-	-	-	-	-	1,400	-
5b.1.1.11	Resin Disposal	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	120	-
5b.1.1.12	Structures below 3' below grade	-	1,785	-	-	-	-	-	268	2,052	-	-	2,052	-	-	-	-	-	-	9,238	-
5b.1.1.13	Sulfuric Acid Tank Enclosure	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	35	-
5b.1.1.14	Turbine	-	2,140	-	-	-	-	-	321	2,461	-	-	2,461	-	-	-	-	-	-	21,997	-
5b.1.1.15	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
5b.1.1.16	Warehouse #2	-	24	-	-	-	-	-	4	27	-	-	27	-	-	-	-	-	-	213	-
5b.1.1.17	Waste Neutralizing Tank House	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	56	-
5b.1.1.18	Waste Oil Storage	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	70	-
5b.1.1.19	Water Treatment	-	324	-	-	-	-	-	49	373	-	-	373	-	-	-	-	-	-	2,690	-
5b.1.1.20	Fuel Handling of Aux Building	-	1,095	-	-	-	-	-	164	1,259	-	-	1,259	-	-	-	-	-	-	8,240	-
5b.1.1	Totals	-	15,501	-	-	-	-	-	2,325	17,826	-	-	17,826	-	-	-	-	-	-	127,723	-
Site Closeout Activities																					
5b.1.2	Remove Rubble	-	1,517	-	-	-	-	-	228	1,745	-	-	1,745	-	-	-	-	-	-	7,408	-
5b.1.3	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	86	13	99	99	-	-	-	-	-	-	-	-	-	667
5b.1	Subtotal Period 5b Activity Costs	-	17,466	-	-	-	-	86	2,633	20,185	99	-	20,086	-	-	-	-	-	-	136,051	667
Period 5b Additional Costs																					
5b.2.1	Clean Concrete Disposal	-	4,912	-	-	-	-	10	738	5,660	-	-	5,660	-	-	-	-	-	-	18,372	-
5b.2.2	Intake Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
5b.2.3	Construction Debris	-	-	-	-	-	-	2,150	323	2,473	-	-	2,473	-	-	-	-	-	-	-	-
5b.2.4	Backfill	-	9,257	-	-	-	-	-	1,388	10,645	-	-	10,645	-	-	-	-	-	-	9,327	-
5b.2.5	Demolition and Site Restoration of ISFSI	-	515	-	-	-	-	68	87	670	-	-	670	-	-	-	-	-	-	2,219	80
5b.2	Subtotal Period 5b Additional Costs	-	15,125	-	-	-	-	2,227	2,603	19,955	-	-	19,955	-	-	-	-	-	-	33,470	80
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	216	-	-	-	-	-	32	249	-	-	249	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	216	-	-	-	-	-	32	249	-	-	249	-	-	-	-	-	-	-	-

Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 5b Period-Dependent Costs																					
5b.4.2	Property taxes	-	-	-	-	-	-	3,481	348	3,829	-	-	3,829	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	-	395	-	-	-	-	-	-	-	-
5b.4.5	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	-	-	1,178	-	-	-	-	-	-	-	-
5b.4.6	Railroad Track Maintenance	-	-	-	-	-	-	133	20	152	-	-	152	-	-	-	-	-	-	-	-
5b.4.7	Security Staff Cost	-	-	-	-	-	-	2,055	308	2,363	-	-	2,363	-	-	-	-	-	-	-	29,221
5b.4.8	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
5b.4.9	Utility Staff Cost	-	-	-	-	-	-	3,831	575	4,406	-	-	4,406	-	-	-	-	-	-	-	57,340
5b.4	Subtotal Period 5b Period-Dependent Costs	-	7,144	-	-	-	-	21,789	4,166	33,099	-	-	33,099	-	-	-	-	-	-	-	203,445
5b.0	TOTAL PERIOD 5b COST	-	39,951	-	-	-	-	24,102	9,434	73,487	99	-	73,389	-	-	-	-	-	-	169,521	204,192
PERIOD 5 TOTALS		-	39,951	-	-	-	-	24,102	9,434	73,487	99	-	73,389	-	-	-	-	-	-	169,521	204,192
TOTAL COST TO DECOMMISSION		12,732	121,667	17,878	7,311	27,293	47,786	890,729	174,619	1,300,016	944,187	275,338	80,490	172,234	166,965	125	673	1,773	16,284,450	947,658	5,651,326

TOTAL COST TO DECOMMISSION WITH 15.52% CONTINGENCY:	**$1,300,016**	**thousands of 2020 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 72.63% OR:	**$944,187**	**thousands of 2020 dollars**
SPENT FUEL MANAGEMENT COST IS 21.18% OR:	**$275,338**	**thousands of 2020 dollars**
NON-NUCLEAR DEMOLITION COST IS 6.19% OR:	**$80,490**	**thousands of 2020 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**167,763**	**Cubic Feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**
TOTAL SCRAP METAL REMOVED:	**42,406**	**Tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**947,658**	**Man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX H

DETAILED COST ANALYSIS

SCENARIO 6: SAFSTOR with 60 Year DFS

Page

Prairie Island Nuclear Generating Plant, Unit 1 .....H-2

Prairie Island Nuclear Generating Plant, Unit 2 .....H-12

Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	415	124	539	539	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	193	29	222	222	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	632	95	727	727	-	-	-	-	-	-	-	-	-	4,920
1a.1.16.2	Plant systems	-	-	-	-	-	-	536	80	616	616	-	-	-	-	-	-	-	-	-	4,167
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
1a.1.16.4	Waste management	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.16	Total	-	-	-	-	-	-	2,083	312	2,395	2,395	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	152	23	175	175	-	-	-	-	-	-	-	-	-	1,183
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1a.1.17	Total	-	-	-	-	-	-	306	46	352	352	-	-	-	-	-	-	-	-	-	2,383
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	13	2	15	15	-	-	-	-	-	-	-	-	-	100
1a.1.19	Drain/de-energize non-cont. systems									a											
1a.1.20	Drain & dry NSSS									a											
1a.1.21	Drain/de-energize contaminated systems									a											
1a.1.22	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	5,027	816	5,844	5,844	-	-	-	-	-	-	-	-	-	35,890
Period 1a Collateral Costs																					
1a.3.1	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	50	-	14	82	82	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	892	89	981	981	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	26,931	4,040	30,971	30,971	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	5	-	50	47,211	6,945	55,590	52,648	2,942	-	-	610	-	-	-	12,190	20	544,960
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	5	-	50	53,487	7,761	62,683	58,492	4,191	-	-	610	-	-	-	12,190	20	580,850

Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
1b.1.1	Totals	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
1b.1	Subtotal Period 1b Activity Costs	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	79	-	52	94	-	212	-	112	549	549	-	-	-	487	-	-	-	29,193	95	-
1b.3.4	Small tool allowance	-	20	-	-	-	-	-	3	23	23	-	-	-	-	-	-	-	-	-	-
1b.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,134	20	52	94	-	212	311	273	2,097	1,785	311	-	-	487	-	-	-	29,193	95	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	449	-	-	-	-	-	-	112	561	561	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	903	90	994	994	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	250	-	-	-	-	-	63	313	313	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	6	3	-	27	-	8	43	43	-	-	-	324	-	-	-	6,486	11	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1b.4	Subtotal Period 1b Period-Dependent Costs	449	438	6	3	-	27	11,709	1,866	14,498	13,764	733	-	-	324	-	-	-	6,486	11	135,867
1b.0	TOTAL PERIOD 1b COST	2,781	458	59	97	-	239	24,696	4,640	32,969	31,924	1,045	-	-	811	-	-	-	35,678	17,108	135,867
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	527	-	-	-	-	-	79	606	606	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	54	-	-	-	-	-	8	62	62	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	12,801	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	75	11	86	86	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	581	-	-	-	-	808	318	1,707	1,707	-	-	-	-	-	-	-	-	16,501	583
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	91	-	60	109	-	245	-	129	634	634	-	-	-	561	-	-	-	33,685	109	-
1c.3.3	Small tool allowance	-	5	-	-	-	-	-	1	6	6	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	163	25	188	-	188	-	-	-	-	-	-	-	-	-
1c.3.5	Retention and Severance	-	-	-	-	-	-	1,032	155	1,187	1,187	-	-	-	-	-	-	-	-	-	-
1c.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	91	5	60	109	-	245	1,507	309	2,325	1,826	499	-	-	561	-	-	-	33,685	109	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	903	90	994	994	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	248	-	-	-	-	-	62	309	309	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	1	-	13	-	4	20	20	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-

Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1c Period-Dependent Costs (continued)																					
1c.4.7	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1c.4.9	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1c.4.13	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1c.4.14	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1c.4	Subtotal Period 1c Period-Dependent Costs	-	435	3	1	-	13	11,709	1,749	13,910	13,177	733	-	-	152	-	-	-	3,039	5	135,867
1c.0	TOTAL PERIOD 1c COST	91	1,021	63	110	-	257	14,024	2,376	17,943	16,710	1,233	-	-	713	-	-	-	36,724	16,615	136,450
PERIOD 1 TOTALS		2,873	2,846	134	212	-	546	92,207	14,777	113,594	107,126	6,468	-	-	2,134	-	-	-	84,593	33,743	853,167
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	54	8	62	62	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	520	130	650	650	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	574	138	712	712	-	-	-	-	-	-	-	-	-	-
Period 2a Additional Costs																					
2a.2.1	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	59,836	8,975	68,812	-	68,812	-	-	-	-	-	-	-	-	-
2a.3.2	Retention and Severance	-	-	-	-	-	-	22,434	3,365	25,799	25,799	-	-	-	-	-	-	-	-	-	-
2a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	4,654	-	4,654	-	4,654	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	86,924	12,341	99,265	25,799	73,466	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,804	180	1,985	1,985	-	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	13,489	1,349	14,838	14,838	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	801	-	-	-	-	-	200	1,001	1,001	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	14	6	-	59	-	17	96	96	-	-	-	714	-	-	-	14,273	23	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	1,208	181	1,389	1,389	-	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	908	91	999	999	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	6,924	692	7,616	-	7,616	-	-	-	-	-	-	-	-	-
2a.4.8	Fixed Overhead	-	-	-	-	-	-	4,432	665	5,097	5,097	-	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	1,573	236	1,809	-	1,809	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	209	31	240	-	240	-	-	-	-	-	-	-	-	-
2a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	462	69	531	531	-	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	29,334	4,400	33,734	24,289	9,446	-	-	-	-	-	-	-	-	431,215
2a.4.13	Utility Staff Cost	-	-	-	-	-	-	3,645	547	4,192	3,517	675	-	-	-	-	-	-	-	-	58,126
2a.4	Subtotal Period 2a Period-Dependent Costs	-	801	14	6	-	59	63,988	8,659	73,527	53,741	19,786	-	-	714	-	-	-	14,273	23	489,341
2a.0	TOTAL PERIOD 2a COST	-	801	14	6	-	59	155,834	21,790	178,504	85,251	93,252	-	-	714	-	-	-	14,273	23	489,341
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	567	85	652	652	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	5,471	1,368	6,839	6,839	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	6,038	1,453	7,491	7,491	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	18,218	2,733	20,951	-	20,951	-	-	-	-	-	-	-	-	-
2b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	48,970	-	48,970	-	48,970	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	67,188	2,733	69,921	-	69,921	-	-	-	-	-	-	-	-	-

Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	18,984	1,898	20,882	20,882	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	141,925	14,192	156,117	156,117	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	4,453	-	-	-	-	-	1,113	5,566	5,566	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	80	33	-	334	-	96	543	543	-	-	-	4,049	-	-	-	80,989	132	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	6,356	953	7,309	7,309	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	8,917	892	9,809	9,809	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	2,906	291	3,197	-	3,197	-	-	-	-	-	-	-	-	-
2b.4.8	Fixed Overhead	-	-	-	-	-	-	6,388	958	7,346	7,346	-	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	2,194	329	2,523	-	2,523	-	-	-	-	-	-	-	-	-
2b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	2,451	368	2,819	2,819	-	-	-	-	-	-	-	-	-	-
2b.4.11	Security Staff Cost	-	-	-	-	-	-	109,414	16,412	125,826	27,682	98,145	-	-	-	-	-	-	-	-	1,467,751
2b.4.12	Utility Staff Cost	-	-	-	-	-	-	53,539	8,031	61,570	38,666	22,904	-	-	-	-	-	-	-	-	815,417
2b.4	Subtotal Period 2b Period-Dependent Costs	-	4,453	80	33	-	334	353,073	45,534	403,506	276,738	126,768	-	-	4,049	-	-	-	80,989	132	2,283,168
2b.0	TOTAL PERIOD 2b COST	-	4,453	80	33	-	334	426,299	49,719	480,918	284,229	196,689	-	-	4,049	-	-	-	80,989	132	2,283,168
PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage																					
Period 2c Direct Decommissioning Activities																					
2c.1.1	Quarterly Inspection									a											
2c.1.2	Semi-annual environmental survey									a											
2c.1.3	Prepare reports									a											
2c.1.4	Bituminous roof replacement	-	-	-	-	-	-	137	21	157	157	-	-	-	-	-	-	-	-	-	-
2c.1.5	Maintenance supplies	-	-	-	-	-	-	1,321	330	1,652	1,652	-	-	-	-	-	-	-	-	-	-
2c.1	Subtotal Period 2c Activity Costs	-	-	-	-	-	-	1,458	351	1,809	1,809	-	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	2,645	265	2,910	2,910	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	21,986	2,199	24,185	24,185	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	1,064	-	-	-	-	-	266	1,330	1,330	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	19	8	-	79	-	23	129	129	-	-	-	964	-	-	-	19,276	31	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	1,535	230	1,765	1,765	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	1,943	194	2,137	2,137	-	-	-	-	-	-	-	-	-	-
2c.4.7	Fixed Overhead	-	-	-	-	-	-	1,543	231	1,774	1,774	-	-	-	-	-	-	-	-	-	-
2c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	592	89	681	681	-	-	-	-	-	-	-	-	-	-
2c.4.9	Security Staff Cost	-	-	-	-	-	-	22,641	3,396	26,037	26,037	-	-	-	-	-	-	-	-	-	295,417
2c.4.10	Utility Staff Cost	-	-	-	-	-	-	10,979	1,647	12,626	12,626	-	-	-	-	-	-	-	-	-	172,327
2c.4	Subtotal Period 2c Period-Dependent Costs	-	1,064	19	8	-	79	63,865	8,540	73,575	73,575	-	-	-	964	-	-	-	19,276	31	467,744
2c.0	TOTAL PERIOD 2c COST	-	1,064	19	8	-	79	65,323	8,891	75,384	75,384	-	-	-	964	-	-	-	19,276	31	467,744
PERIOD 2 TOTALS		-	6,318	114	46	-	472	647,456	80,400	734,806	444,864	289,942	-	-	5,727	-	-	-	114,538	187	3,240,253
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
3a.1.9	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
3a.1.10	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	947	142	1,089	980	-	109	-	-	-	-	-	-	-	7,370
3a.1.11.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
3a.1.11.3	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
3a.1.11.5	Biological shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
3a.1.11.6	Steam generators	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
3a.1.11.8	Main Turbine	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
3a.1.11.9	Main Condensers	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400

Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Activity Specifications (continued)																					
3a.1.11.10	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
3a.1.11.11	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.11.12	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
3a.1.11	Total	-	-	-	-	-	-	5,112	767	5,879	5,175	-	704	-	-	-	-	-	-	-	39,777
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	15,810	2,371	18,181	17,477	-	704	-	-	-	-	-	-	-	77,107
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	3,520	1,056	4,576	4,576	-	-	-	-	-	-	-	-	21,020	8,332
3a.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
3a.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
3a.2	Subtotal Period 3a Additional Costs	-	2,526	356	244	178	1,369	3,520	2,129	10,321	10,321	-	-	6,132	12,843	-	-	-	518,936	44,275	8,332
Period 3a Collateral Costs																					
3a.3.1	Small tool allowance	-	34	-	-	-	-	-	5	39	39	-	-	-	-	-	-	-	-	-	-
3a.3	Subtotal Period 3a Collateral Costs	-	34	-	-	-	-	-	5	39	39	-	-	-	-	-	-	-	-	-	-
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	279	28	307	307	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	2,320	232	2,553	2,553	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	669	-	-	-	-	-	167	836	836	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	4	-	42	-	12	69	69	-	-	-	514	-	-	-	10,287	17	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	335	33	368	368	-	-	-	-	-	-	-	-	-	-
3a.4.8	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
3a.4.9	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
3a.4.10	Security Staff Cost	-	-	-	-	-	-	4,386	658	5,044	5,044	-	-	-	-	-	-	-	-	-	65,000
3a.4.11	Utility Staff Cost	-	-	-	-	-	-	16,379	2,457	18,835	18,835	-	-	-	-	-	-	-	-	-	257,920
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,422	10	4	-	42	26,823	4,169	32,471	32,471	-	-	-	514	-	-	-	10,287	17	322,920
3a.0	TOTAL PERIOD 3a COST	-	3,982	366	248	178	1,411	46,153	8,674	61,013	60,308	-	704	6,132	13,357	-	-	-	529,223	44,292	408,359
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	321	48	369	369	-	-	-	-	-	-	-	-	-	2,500
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD cooling assembly	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	CRD housings & ICI tubes	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
3b.1.1.9	Missile shields	-	-	-	-	-	-	58	9	67	67	-	-	-	-	-	-	-	-	-	450
3b.1.1.10	Biological shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.11	Steam generators	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3b.1.1.12	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
3b.1.1.13	Main Turbine	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
3b.1.1.14	Main Condensers	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
3b.1.1.15	Auxiliary building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1.16	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	4,144	622	4,765	3,841	-	924	-	-	-	-	-	-	-	32,243
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	4,144	622	4,765	3,841	-	924	-	-	-	-	-	-	-	32,243
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-

Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
3b.3	Subtotal Period 3b Collateral Costs	1,055	1,200	-	-	-	-	1,264	528	4,047	4,047	-	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	241	24	266	266	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	1,155	116	1,271	1,271	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	295	-	-	-	-	-	74	369	369	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	6	2	-	24	-	7	39	39	-	-	-	290	-	-	-	5,802	9	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	808	121	930	930	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	167	17	183	183	-	-	-	-	-	-	-	-	-	-
3b.4.9	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
3b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
3b.4.11	Security Staff Cost	-	-	-	-	-	-	2,187	328	2,515	2,515	-	-	-	-	-	-	-	-	-	32,411
3b.4.12	DOC Staff Cost	-	-	-	-	-	-	5,344	802	6,146	6,146	-	-	-	-	-	-	-	-	-	58,080
3b.4.13	Utility Staff Cost	-	-	-	-	-	-	8,167	1,225	9,392	9,392	-	-	-	-	-	-	-	-	-	128,607
3b.4	Subtotal Period 3b Period-Dependent Costs	38	670	6	2	-	24	18,820	2,891	22,450	22,450	-	-	-	290	-	-	-	5,802	9	219,098
3b.0	TOTAL PERIOD 3b COST	1,092	1,870	6	2	-	24	24,227	4,040	31,262	30,338	-	924	-	290	-	-	-	5,802	9	251,341
PERIOD 3 TOTALS		1,092	5,852	372	251	178	1,435	70,380	12,715	92,275	90,647	-	1,628	6,132	13,647	-	-	-	535,025	44,301	659,700
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Reactor Coolant Piping	11	42	10	11	66	94	-	52	285	285	-	-	240	254	-	-	-	33,680	778	-
4a.1.1.2	Pressurizer Relief Tank	5	19	6	7	44	62	-	31	174	174	-	-	160	169	-	-	-	22,441	352	-
4a.1.1.3	Reactor Coolant Pumps & Motors	13	60	46	85	-	463	-	155	822	822	-	-	-	2,332	-	-	-	295,800	1,226	80
4a.1.1.4	Pressurizer	-	77	382	91	-	776	-	265	1,591	1,591	-	-	-	2,196	-	-	-	158,199	1,346	750
4a.1.1.5	Steam Generators	-	3,307	1,690	1,743	2,409	3,885	-	2,590	15,625	15,625	-	-	18,672	10,990	-	-	-	1,581,180	10,253	2,250
4a.1.1.6	CRDMs/ICIs/Service Structure Removal	63	248	205	44	326	454	-	283	1,623	1,623	-	-	2,138	2,146	-	-	-	165,025	4,449	-
4a.1.1.7	Reactor Vessel Internals	53	4,650	11,331	828	-	8,610	278	10,900	36,649	36,649	-	-	-	1,174	-	742	-	167,605	22,373	1,053
4a.1.1.8	Vessel & Internals GTCC Disposal	-	-	-	-	-	8,680	-	1,302	9,982	9,982	-	-	-	-	-	-	1,773	344,823	-	-
4a.1.1.9	Reactor Vessel	-	5,835	1,653	442	-	3,268	278	6,576	18,053	18,053	-	-	-	9,245	-	-	-	579,324	22,373	1,053
4a.1.1	Totals	146	14,237	15,324	3,250	2,845	26,293	556	22,154	84,804	84,804	-	-	21,210	28,505	-	742	1,773	3,348,078	63,151	5,187
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	292	116	35	555	-	-	173	1,170	1,170	-	-	2,243	-	-	-	-	134,601	4,116	-
4a.1.3	Main Condensers	-	2,510	79	33	742	-	-	752	4,115	4,115	-	-	4,000	-	-	-	-	180,000	34,978	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
4a.1.4	Totals	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
Disposal of Plant Systems																					
4a.1.5.1	Air Removal	-	31	-	-	-	-	-	5	36	-	-	36	-	-	-	-	-	-	452	-
4a.1.5.2	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	670	-
4a.1.5.3	Auxiliary Feedwater - RCA	-	47	0	2	36	-	-	17	102	102	-	-	215	-	-	-	-	8,722	601	-
4a.1.5.4	Bleed Steam	-	90	-	-	-	-	-	14	104	-	-	104	-	-	-	-	-	-	1,335	-
4a.1.5.5	Caustic Addition - RCA	-	38	0	2	39	-	-	16	95	95	-	-	233	-	-	-	-	9,453	444	-
4a.1.5.6	Chemical Feed	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	304	-
4a.1.5.7	Chemical Feed - RCA	-	1	0	0	1	-	-	0	3	3	-	-	6	-	-	-	-	243	12	-
4a.1.5.8	Circulating Water	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	619	-
4a.1.5.9	Condensate	-	474	-	-	-	-	-	71	545	-	-	545	-	-	-	-	-	-	6,837	-
4a.1.5.10	Condensate Polishing	-	235	-	-	-	-	-	35	271	-	-	271	-	-	-	-	-	-	3,420	-
4a.1.5.11	Condensate Polishing - RCA	-	183	4	15	348	-	-	101	651	651	-	-	2,078	-	-	-	-	84,395	2,329	-
4a.1.5.12	Electro-hydraulic	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	127	-
4a.1.5.13	Feedwater	-	153	-	-	-	-	-	23	175	-	-	175	-	-	-	-	-	-	2,215	-
4a.1.5.14	Feedwater - RCA	-	195	7	24	537	-	-	133	895	895	-	-	3,208	-	-	-	-	130,294	2,651	-
4a.1.5.15	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	505	-
4a.1.5.16	Heater Drain	-	400	-	-	-	-	-	60	460	-	-	460	-	-	-	-	-	-	5,881	-
4a.1.5.17	Internal Circ Water & CDSR	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	389	-
4a.1.5.18	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
4a.1.5.19	Main Steam	-	115	-	-	-	-	-	17	133	-	-	133	-	-	-	-	-	-	1,690	-
4a.1.5.20	Main Steam - RCA	-	366	10	37	844	-	-	225	1,482	1,482	-	-	5,044	-	-	-	-	204,825	4,956	-
4a.1.5.21	Steam Generator Blowdown	-	434	22	29	340	234	-	224	1,282	1,282	-	-	2,031	686	-	-	-	126,640	5,974	-

Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
4a.1.5.22	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
4a.1.5.23	Turbine & Moisture Separators	-	386	-	-	-	-	-	58	444	-	-	444	-	-	-	-	-	-	5,609	-
4a.1.5.24	Turbine Oil Purification	-	70	-	-	-	-	-	11	81	-	-	81	-	-	-	-	-	-	1,003	-
4a.1.5	Totals	-	3,401	44	108	2,144	234	-	1,037	6,967	4,510	-	2,458	12,815	686	-	-	-	564,572	48,101	-
4a.1.6	Scaffolding in support of decommissioning	-	909	3	1	26	4	-	233	1,176	1,176	-	-	138	12	-	-	-	6,985	6,020	-
4a.1	Subtotal Period 4a Activity Costs	146	22,144	15,566	3,426	6,311	26,530	556	24,467	99,147	96,689	-	2,458	40,406	29,203	-	742	1,773	4,234,235	163,954	5,187
Period 4a Additional Costs																					
4a.2.1	Retired RPV upper internals package	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
4a.2	Subtotal Period 4a Additional Costs	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	2	-	4	8	-	17	-	7	38	38	-	-	-	39	-	-	-	2,337	8	-
4a.3.3	Small tool allowance	-	213	-	-	-	-	-	32	245	220	-	24	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	2	213	4	8	-	17	-	39	283	258	-	24	-	39	-	-	-	2,337	8	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	100	-	-	-	-	-	-	25	125	125	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	643	64	708	708	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	2,715	272	2,987	2,987	-	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,743	-	-	-	-	-	436	2,179	2,179	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	3,325	-	-	-	-	-	499	3,824	3,824	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	59	24	-	245	-	71	398	398	-	-	-	2,971	-	-	-	59,418	97	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	2,047	307	2,354	2,354	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	643	64	707	707	-	-	-	-	-	-	-	-	-	-
4a.4.9	Fixed Overhead	-	-	-	-	-	-	1,581	237	1,818	1,818	-	-	-	-	-	-	-	-	-	-
4a.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	565	85	649	649	-	-	-	-	-	-	-	-	-	-
4a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	83	12	96	96	-	-	-	-	-	-	-	-	-	-
4a.4.12	Remedial Actions Surveys	-	-	-	-	-	-	1,489	223	1,712	1,712	-	-	-	-	-	-	-	-	-	-
4a.4.13	Security Staff Cost	-	-	-	-	-	-	5,167	775	5,943	5,943	-	-	-	-	-	-	-	-	-	76,832
4a.4.14	DOC Staff Cost	-	-	-	-	-	-	17,190	2,579	19,769	19,769	-	-	-	-	-	-	-	-	-	189,964
4a.4.15	Utility Staff Cost	-	-	-	-	-	-	21,633	3,245	24,877	24,877	-	-	-	-	-	-	-	-	-	340,664
4a.4	Subtotal Period 4a Period-Dependent Costs	100	5,068	59	24	-	245	53,755	8,894	68,145	68,145	-	-	-	2,971	-	-	-	59,418	97	607,460
4a.0	TOTAL PERIOD 4a COST	248	27,553	15,796	3,516	6,311	28,375	54,311	34,343	170,454	167,972	-	2,482	40,406	32,785	125	742	1,773	4,345,791	165,725	612,713
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	314	35	86	41	-	703	-	356	1,535	1,535	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
4b.1.2.1	Aux Bldg Normal Ventilation	-	2	0	0	1	-	-	1	3	3	-	-	3	-	-	-	-	140	26	-
4b.1.2.3	Buildings Maintenance	-	5	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	65	-
4b.1.2.4	Chemical & Volume Control	-	1,263	89	90	753	973	-	694	3,861	3,861	-	-	4,498	2,846	-	-	-	366,565	17,235	-
4b.1.2.5	Component Cooling - RCA	-	858	25	91	2,079	-	-	543	3,597	3,597	-	-	12,427	-	-	-	-	504,675	11,242	-
4b.1.2.6	Containment Cooling	-	74	-	-	-	-	-	11	85	-	-	85	-	-	-	-	-	-	1,086	-
4b.1.2.7	Containment Cooling - RCA	-	304	7	25	569	-	-	166	1,070	1,070	-	-	3,400	-	-	-	-	138,090	3,971	-
4b.1.2.8	Containment Hydrogen Control - RCA	-	30	0	1	18	-	-	10	59	59	-	-	105	-	-	-	-	4,278	401	-
4b.1.2.9	Containment Spray - RCA	-	93	2	6	145	-	-	46	293	293	-	-	868	-	-	-	-	35,249	1,217	-
4b.1.2.10	Containment Ventilation	-	229	24	51	828	248	-	254	1,635	1,635	-	-	4,951	737	-	-	-	247,952	3,278	-
4b.1.2.11	Cooling Water	-	163	-	-	-	-	-	24	187	-	-	187	-	-	-	-	-	-	2,396	-
4b.1.2.12	Cooling Water - RCA	-	658	16	57	1,293	-	-	368	2,392	2,392	-	-	7,728	-	-	-	-	313,832	8,594	-
4b.1.2.13	D1 Emergency Diesel	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	730	-
4b.1.2.14	D2 Emergency Diesel	-	36	-	-	-	-	-	5	41	-	-	41	-	-	-	-	-	-	522	-
4b.1.2.15	Diesel Rooms Ventilation	-	9	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	135	-
4b.1.2.16	Electrical - Clean	-	1,905	-	-	-	-	-	286	2,191	-	-	2,191	-	-	-	-	-	-	26,981	-
4b.1.2.17	Electrical - Contaminated	-	553	7	20	423	32	-	213	1,248	1,248	-	-	2,527	95	-	-	-	108,690	7,488	-
4b.1.2.18	Electrical - Contaminated - Fuel Pool	-	137	2	5	103	8	-	53	307	307	-	-	615	23	-	-	-	26,449	1,857	-
4b.1.2.19	Electrical - Decontaminated	-	3,787	48	173	3,940	-	-	1,569	9,518	9,518	-	-	23,551	-	-	-	-	956,401	49,378	-
4b.1.2.20	Electrical - Decontaminated - Fuel Pool	-	947	12	43	986	-	-	392	2,380	2,380	-	-	5,893	-	-	-	-	239,327	12,340	-
4b.1.2.21	Fuel Handling	-	108	6	11	152	73	-	70	421	421	-	-	908	218	-	-	-	50,723	1,595	-
4b.1.2.22	Fuel Oil	-	121	-	-	-	-	-	18	140	-	-	140	-	-	-	-	-	-	1,697	-
4b.1.2.23	HVAC - Clean	-	120	-	-	-	-	-	18	138	-	-	138	-	-	-	-	-	-	1,891	-
4b.1.2.24	HVAC - Contaminated	-	337	9	26	546	41	-	181	1,141	1,141	-	-	3,261	123	-	-	-	140,257	4,335	-

Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4b.1.2.25	HVAC - Contaminated - Fuel Pool	-	145	4	11	234	18	-	78	489	489	-	-	1,398	53	-	-	-	60,110	1,858	-
4b.1.2.26	Incore Instrumentation	-	25	1	2	10	19	-	13	70	70	-	-	60	57	-	-	-	6,058	382	-
4b.1.2.27	Misc Drains & Vents	-	212	15	13	65	176	-	110	592	592	-	-	390	514	-	-	-	49,062	2,764	-
4b.1.2.28	Reactor Coolant	-	283	21	18	58	265	-	150	796	796	-	-	344	777	-	-	-	64,085	3,865	-
4b.1.2.29	Reactor Hot Sampling	-	125	12	7	11	118	-	65	339	339	-	-	66	342	-	-	-	25,063	1,611	-
4b.1.2.30	Reactor Makeup	-	73	-	-	-	-	-	11	84	-	-	84	-	-	-	-	-	-	1,042	-
4b.1.2.31	Reactor Vessel	-	19	1	0	4	5	-	7	36	36	-	-	26	14	-	-	-	2,000	260	-
4b.1.2.32	Residual Heat Removal	-	378	85	86	484	1,105	-	465	2,603	2,603	-	-	2,895	3,252	-	-	-	326,425	5,374	-
4b.1.2.33	Safeguards Chilled Water	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	259	-
4b.1.2.34	Safeguards Chilled Water - RCA	-	85	1	4	83	-	-	34	207	207	-	-	495	-	-	-	-	20,100	1,019	-
4b.1.2.35	Safety Injection	-	809	42	73	1,136	393	-	486	2,939	2,939	-	-	6,788	1,156	-	-	-	349,908	11,276	-
4b.1.2.36	Sampling	-	54	4	3	10	37	-	25	133	133	-	-	59	107	-	-	-	9,420	731	-
4b.1.2.37	Shield Bldg Ventilation	-	125	14	26	360	165	-	132	821	821	-	-	2,152	491	-	-	-	118,583	1,811	-
4b.1.2.38	Spent Fuel Pool Cooling	-	324	34	32	135	450	-	222	1,198	1,198	-	-	806	1,325	-	-	-	117,816	4,400	-
4b.1.2.39	Station & Instrument Air	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	300	-
4b.1.2.40	Station & Instrument Air - RCA	-	81	1	2	56	-	-	29	169	169	-	-	332	-	-	-	-	13,496	1,053	-
4b.1.2.41	Station & Instrument Air - RCA Fuel Pool	-	20	0	1	14	-	-	7	42	42	-	-	83	-	-	-	-	3,374	263	-
4b.1.2.42	Turbine Bldg Traps & Drains	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	767	-
4b.1.2.43	Unit Coolers	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	611	-
4b.1.2.44	Unit Coolers - RCA	-	55	0	2	39	-	-	20	115	115	-	-	230	-	-	-	-	9,348	683	-
4b.1.2	Totals	-	14,735	481	883	14,533	4,126	-	6,807	41,565	38,474	-	3,091	86,861	12,129	-	-	-	4,307,475	198,796	-
4b.1.3	Scaffolding in support of decommissioning	-	1,363	4	2	38	6	-	349	1,763	1,763	-	-	207	18	-	-	-	10,477	9,030	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor	1,096	2,527	240	1,236	373	7,080	-	3,215	15,766	15,766	-	-	2,230	67,325	-	-	-	3,286,372	45,729	-
4b.1.4.2	Backwash Waste Receiving Tank	-	25	3	17	-	97	-	33	175	175	-	-	-	929	-	-	-	43,896	266	-
4b.1.4	Totals	1,096	2,552	243	1,253	373	7,177	-	3,248	15,941	15,941	-	-	2,230	68,254	-	-	-	3,330,268	45,995	-
4b.1.5	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
4b.1.6	Receive NRC approval of termination plan									a											
4b.1	Subtotal Period 4b Activity Costs	1,410	18,685	814	2,179	14,945	12,012	526	10,839	61,410	58,319	-	3,091	89,298	82,494	-	-	-	7,781,139	254,398	4,096
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
4b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
4b.2.3	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
4b.2.4	License Termination ISFSI	-	24	81	435	-	2,532	1,375	1,112	5,560	5,560	-	-	-	9,355	-	-	-	1,123,457	3,762	5,460
4b.2	Subtotal Period 4b Additional Costs	-	1,199	93	471	606	2,532	2,638	1,848	9,387	9,387	-	-	5,880	9,355	-	-	-	1,270,457	11,189	11,700
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	5	-	9	16	-	37	-	15	83	83	-	-	-	85	-	-	-	5,092	17	-
4b.3.2	Process decommissioning chemical flush waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4b.3.3	Small tool allowance	-	307	-	-	-	-	-	46	353	353	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
4b.3	Subtotal Period 4b Collateral Costs	5	307	139	84	1,112	215	-	296	2,158	2,158	-	-	6,000	614	-	-	-	308,700	163	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	564	-	-	-	-	-	-	141	705	705	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	862	86	949	949	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	3,505	351	3,856	3,856	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	2,456	-	-	-	-	-	614	3,070	3,070	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,577	-	-	-	-	-	687	5,263	5,263	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	77	31	-	322	-	93	523	523	-	-	-	3,905	-	-	-	78,097	127	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,165	325	2,490	2,490	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	862	86	948	948	-	-	-	-	-	-	-	-	-	-
4b.4.9	Fixed Overhead	-	-	-	-	-	-	2,118	318	2,436	2,436	-	-	-	-	-	-	-	-	-	-
4b.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	757	113	870	870	-	-	-	-	-	-	-	-	-	-
4b.4.11	Railroad Track Maintenance	-	-	-	-	-	-	111	17	128	128	-	-	-	-	-	-	-	-	-	-
4b.4.12	Remedial Actions Surveys	-	-	-	-	-	-	1,995	299	2,294	2,294	-	-	-	-	-	-	-	-	-	-
4b.4.13	Security Staff Cost	-	-	-	-	-	-	1,202	180	1,383	1,383	-	-	-	-	-	-	-	-	-	20,373
4b.4.14	DOC Staff Cost	-	-	-	-	-	-	15,039	2,256	17,294	17,294	-	-	-	-	-	-	-	-	-	174,093
4b.4.15	Utility Staff Cost	-	-	-	-	-	-	18,793	2,819	21,612	21,612	-	-	-	-	-	-	-	-	-	311,145
4b.4	Subtotal Period 4b Period-Dependent Costs	564	7,033	77	31	-	322	47,410	8,384	63,822	63,822	-	-	-	3,905	-	-	-	78,097	127	505,611
4b.0	TOTAL PERIOD 4b COST	1,979	27,224	1,123	2,765	16,663	15,081	50,574	21,367	136,776	133,686	-	3,091	101,178	96,368	-	-	-	9,438,392	265,878	521,407

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Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 4e - Delay before License Termination																					
Period 4e Direct Decommissioning Activities																					
Period 4e Period-Dependent Costs																					
4e.4.2	Property taxes	-	-	-	-	-	-	1,476	148	1,623	1,623	-	-	-	-	-	-	-	-	-	-
4e.4.3	Health physics supplies	-	87	-	-	-	-	-	22	109	109	-	-	-	-	-	-	-	-	-	-
4e.4.4	Disposal of DAW generated	-	-	2	1	-	6	-	2	11	11	-	-	-	79	-	-	-	1,573	3	-
4e.4.6	NRC Fees	-	-	-	-	-	-	162	16	178	178	-	-	-	-	-	-	-	-	-	-
4e.4.7	Fixed Overhead	-	-	-	-	-	-	939	141	1,079	1,079	-	-	-	-	-	-	-	-	-	-
4e.4.8	Railroad Track Maintenance	-	-	-	-	-	-	49	7	57	57	-	-	-	-	-	-	-	-	-	-
4e.4.9	Utility Staff Cost	-	-	-	-	-	-	696	104	801	801	-	-	-	-	-	-	-	-	-	11,488
4e.4	Subtotal Period 4e Period-Dependent Costs	-	87	2	1	-	6	3,322	440	3,858	3,858	-	-	-	79	-	-	-	1,573	3	11,488
4e.0	TOTAL PERIOD 4e COST	-	87	2	1	-	6	3,322	440	3,858	3,858	-	-	-	79	-	-	-	1,573	3	11,488
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
Period 4f Period-Dependent Costs																					
4f.4.2	Property taxes	-	-	-	-	-	-	1,335	133	1,468	1,468	-	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	499	-	-	-	-	-	125	624	624	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	7	3	-	27	-	8	45	45	-	-	-	332	-	-	-	6,649	11	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC Fees	-	-	-	-	-	-	422	42	465	465	-	-	-	-	-	-	-	-	-	-
4f.4.7	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
4f.4.8	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
4f.4.9	Security Staff Cost	-	-	-	-	-	-	805	121	926	926	-	-	-	-	-	-	-	-	-	11,668
4f.4.10	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
4f.4.11	Utility Staff Cost	-	-	-	-	-	-	3,772	566	4,338	4,338	-	-	-	-	-	-	-	-	-	56,395
4f.4	Subtotal Period 4f Period-Dependent Costs	-	499	7	3	-	27	11,752	1,808	14,096	14,096	-	-	-	332	-	-	-	6,649	11	114,346
4f.0	TOTAL PERIOD 4f COST	-	499	7	3	-	27	16,381	3,007	19,924	19,924	-	-	-	332	-	-	-	6,649	40,542	117,466
PERIOD 4 TOTALS		2,227	55,364	16,927	6,284	22,974	43,490	124,588	59,158	331,012	325,439	-	5,573	141,584	129,564	125	742	1,773	13,792,410	472,147	1,263,075
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor	-	4,644	-	-	-	-	-	697	5,341	-	-	5,341	-	-	-	-	-	-	44,669	-
5b.1.1.2	Condensate Storage Tank Foundation	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	16	-
5b.1.1.3	Structures below 3' below grade	-	1,785	-	-	-	-	-	268	2,052	-	-	2,052	-	-	-	-	-	-	9,238	-
5b.1.1.4	Turbine	-	2,139	-	-	-	-	-	321	2,460	-	-	2,460	-	-	-	-	-	-	21,985	-
5b.1.1.5	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
5b.1.1	Totals	-	8,936	-	-	-	-	-	1,340	10,276	-	-	10,276	-	-	-	-	-	-	77,765	-
Site Closeout Activities																					
5b.1.2	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
5b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	9,384	-	-	-	-	200	1,438	11,022	231	-	10,792	-	-	-	-	-	-	78,686	1,560

Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 5b Additional Costs																					
5b.2.1	Clean Concrete Disposal	-	2,242	-	-	-	-	5	337	2,583	-	-	2,583	-	-	-	-	-	-	8,386	-
5b.2.2	Intake Structure Cofferdam	-	623	-	-	-	-	-	93	716	-	-	716	-	-	-	-	-	-	5,168	-
5b.2.3	Construction Debris	-	-	-	-	-	-	10	2	12	-	-	12	-	-	-	-	-	-	-	-
5b.2.4	Backfill	-	3,011	-	-	-	-	-	452	3,462	-	-	3,462	-	-	-	-	-	-	2,904	-
5b.2.5	Demolition and Site Restoration of ISFSI	-	515	-	-	-	-	68	87	670	-	-	670	-	-	-	-	-	-	2,219	80
5b.2	Subtotal Period 5b Additional Costs	-	6,390	-	-	-	-	82	971	7,443	-	-	7,443	-	-	-	-	-	-	18,677	80
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	125	-	-	-	-	-	19	143	-	-	143	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	125	-	-	-	-	-	19	143	-	-	143	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.2	Property taxes	-	-	-	-	-	-	3,481	348	3,829	-	-	3,829	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	-	395	-	-	-	-	-	-	-	-
5b.4.5	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	-	-	1,178	-	-	-	-	-	-	-	-
5b.4.6	Railroad Track Maintenance	-	-	-	-	-	-	133	20	152	-	-	152	-	-	-	-	-	-	-	-
5b.4.7	Security Staff Cost	-	-	-	-	-	-	2,055	308	2,363	-	-	2,363	-	-	-	-	-	-	-	29,221
5b.4.8	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
5b.4.9	Utility Staff Cost	-	-	-	-	-	-	3,831	575	4,406	-	-	4,406	-	-	-	-	-	-	-	57,340
5b.4	Subtotal Period 5b Period-Dependent Costs	-	7,144	-	-	-	-	21,789	4,166	33,099	-	-	33,099	-	-	-	-	-	-	-	203,445
5b.0	TOTAL PERIOD 5b COST	-	23,042	-	-	-	-	22,072	6,593	51,707	231	-	51,476	-	-	-	-	-	-	97,363	205,085
PERIOD 5 TOTALS		-	23,042	-	-	-	-	22,072	6,593	51,707	231	-	51,476	-	-	-	-	-	-	97,363	205,085
TOTAL COST TO DECOMMISSION		6,192	93,421	17,547	6,792	23,152	45,943	956,703	173,643	1,323,393	968,306	296,410	58,677	147,716	151,072	125	742	1,773	14,526,560	647,742	6,221,279

TOTAL COST TO DECOMMISSION WITH 15.1% CONTINGENCY:	**$1,323,393**	**thousands of 2020 dollars**	
TOTAL NRC LICENSE TERMINATION COST IS 73.17% OR:	**$968,306**	**thousands of 2020 dollars**	
SPENT FUEL MANAGEMENT COST IS 22.4% OR:	**$296,410**	**thousands of 2020 dollars**	
NON-NUCLEAR DEMOLITION COST IS 4.43% OR:	**$58,677**	**thousands of 2020 dollars**	
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**151,940**	**Cubic Feet**	
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**	
TOTAL SCRAP METAL REMOVED:	**33,003**	**Tons**	
TOTAL CRAFT LABOR REQUIREMENTS:	**647,742**	**Man-hours**	

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	415	124	539	539	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.11	End product description	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	82	12	95	95	-	-	-	-	-	-	-	-	-	641
1a.1.13	Define major work sequence	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.14	Perform SER and EA	-	-	-	-	-	-	170	26	196	196	-	-	-	-	-	-	-	-	-	1,326
1a.1.15	Perform Site-Specific Cost Study	-	-	-	-	-	-	275	41	316	316	-	-	-	-	-	-	-	-	-	2,138
Activity Specifications																					
1a.1.16.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	270	41	311	311	-	-	-	-	-	-	-	-	-	2,104
1a.1.16.2	Plant systems	-	-	-	-	-	-	229	34	263	263	-	-	-	-	-	-	-	-	-	1,782
1a.1.16.3	Plant structures and buildings	-	-	-	-	-	-	171	26	197	197	-	-	-	-	-	-	-	-	-	1,334
1a.1.16.4	Waste management	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.16.5	Facility and site dormancy	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.16	Total	-	-	-	-	-	-	891	134	1,024	1,024	-	-	-	-	-	-	-	-	-	6,930
Detailed Work Procedures																					
1a.1.17.1	Plant systems	-	-	-	-	-	-	65	10	75	75	-	-	-	-	-	-	-	-	-	506
1a.1.17.2	Facility closeout & dormancy	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	513
1a.1.17	Total	-	-	-	-	-	-	131	20	151	151	-	-	-	-	-	-	-	-	-	1,019
1a.1.18	Procure vacuum drying system	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	43
1a.1.19	Drain/de-energize non-cont. systems									a											
1a.1.20	Drain & dry NSSS									a											
1a.1.21	Drain/de-energize contaminated systems									a											
1a.1.22	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	2,387	420	2,807	2,807	-	-	-	-	-	-	-	-	-	15,347
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,330	199	1,529	-	1,529	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	8,394	1,259	9,653	9,653	-	-	-	-	-	-	-	-	-	-
1a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	10,973	1,459	12,432	9,653	2,779	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	604	-	-	-	-	-	151	755	755	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	49	-	14	80	80	-	-	-	597	-	-	-	11,944	19	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	516	52	567	567	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	25,478	3,822	29,300	29,300	-	-	-	-	-	-	-	-	-	400,944
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,357	12	5	-	49	45,381	6,687	53,491	50,549	2,942	-	-	597	-	-	-	11,944	19	523,664
1a.0	TOTAL PERIOD 1a COST	-	1,357	12	5	-	49	58,742	8,566	68,730	63,010	5,720	-	-	597	-	-	-	11,944	19	539,011

Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
1b.1.1.2	Auxiliary	1,244	-	-	-	-	-	-	622	1,866	1,866	-	-	-	-	-	-	-	-	17,950	-
1b.1.1.3	Drum Transfer & Truck Loading Enclosure	17	-	-	-	-	-	-	8	25	25	-	-	-	-	-	-	-	-	244	-
1b.1.1.4	LLRW Storage Enclosure	116	-	-	-	-	-	-	58	175	175	-	-	-	-	-	-	-	-	1,673	-
1b.1.1.5	Radwaste	52	-	-	-	-	-	-	26	78	78	-	-	-	-	-	-	-	-	749	-
1b.1.1.6	Resin Disposal	15	-	-	-	-	-	-	8	23	23	-	-	-	-	-	-	-	-	221	-
1b.1.1.7	Fuel Handling of Aux Building	1,014	-	-	-	-	-	-	507	1,521	1,521	-	-	-	-	-	-	-	-	13,854	-
1b.1.1	Totals	3,658	-	-	-	-	-	-	1,829	5,486	5,486	-	-	-	-	-	-	-	-	51,694	-
1b.1	Subtotal Period 1b Activity Costs	3,658	-	-	-	-	-	-	1,829	5,486	5,486	-	-	-	-	-	-	-	-	51,694	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	107	-	71	128	-	288	-	152	747	747	-	-	-	661	-	-	-	39,679	129	-
1b.3.4	Small tool allowance	-	61	-	-	-	-	-	9	70	70	-	-	-	-	-	-	-	-	-	-
1b.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	309	46	356	-	356	-	-	-	-	-	-	-	-	-
1b.3.6	Retention and Severance	-	-	-	-	-	-	2,296	344	2,640	2,640	-	-	-	-	-	-	-	-	-	-
1b.3.7	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,162	61	71	128	-	288	2,917	710	5,337	4,670	667	-	-	661	-	-	-	39,679	129	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,334	-	-	-	-	-	-	333	1,667	1,667	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	902	90	993	993	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	448	-	-	-	-	-	112	560	560	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	13	5	-	53	-	15	86	86	-	-	-	641	-	-	-	12,830	21	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	98	10	108	108	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1b.4	Subtotal Period 1b Period-Dependent Costs	1,334	635	13	5	-	53	11,645	2,138	15,823	15,089	733	-	-	641	-	-	-	12,830	21	135,867
1b.0	TOTAL PERIOD 1b COST	6,153	696	84	133	-	341	23,012	5,944	36,364	34,963	1,401	-	-	1,303	-	-	-	52,509	51,844	135,867
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	527	-	-	-	-	-	79	606	606	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	54	-	-	-	-	-	8	62	62	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	12,801	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	32	5	37	37	-	-	-	-	-	-	-	-	-	249
1c.1	Subtotal Period 1c Activity Costs	-	581	-	-	-	-	765	312	1,658	1,658	-	-	-	-	-	-	-	-	16,501	249
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	91	-	60	109	-	245	-	129	634	634	-	-	-	561	-	-	-	33,685	109	-
1c.3.3	Small tool allowance	-	5	-	-	-	-	-	1	6	6	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	90	13	103	-	103	-	-	-	-	-	-	-	-	-
1c.3.5	Retention and Severance	-	-	-	-	-	-	1,722	258	1,980	1,980	-	-	-	-	-	-	-	-	-	-
1c.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	91	5	60	109	-	245	2,123	401	3,034	2,619	415	-	-	561	-	-	-	33,685	109	-

Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	901	90	991	991	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	248	-	-	-	-	62	309	309	-	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	1	-	13	-	4	20	20	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	98	10	108	108	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1c.4.9	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1c.4.13	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1c.4.14	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1c.4	Subtotal Period 1c Period-Dependent Costs	-	435	3	1	-	13	11,643	1,742	13,838	13,104	733	-	-	152	-	-	-	3,039	5	135,867
1c.0	TOTAL PERIOD 1c COST	91	1,021	63	110	-	257	14,531	2,456	18,530	17,382	1,148	-	-	713	-	-	-	36,724	16,615	136,116
PERIOD 1 TOTALS		6,244	3,074	159	248	-	647	96,285	16,965	123,623	115,354	8,269	-	-	2,613	-	-	-	101,177	68,478	810,994
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	223	33	256	256	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	349	87	437	437	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	572	121	693	693	-	-	-	-	-	-	-	-	-	-
Period 2a Additional Costs																					
2a.2.1	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	58,271	8,741	67,011	-	67,011	-	-	-	-	-	-	-	-	-
2a.3.2	Retention and Severance	-	-	-	-	-	-	11,054	1,658	12,712	12,712	-	-	-	-	-	-	-	-	-	-
2a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	3,128	-	3,128	-	3,128	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	72,453	10,399	82,851	12,712	70,139	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,213	121	1,334	1,334	-	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	9,065	907	9,972	9,972	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	617	-	-	-	-	-	154	771	771	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	11	5	-	47	-	14	77	77	-	-	-	576	-	-	-	11,523	19	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	812	122	934	934	-	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	536	54	590	590	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	4,653	465	5,119	-	5,119	-	-	-	-	-	-	-	-	-
2a.4.8	Fixed Overhead	-	-	-	-	-	-	2,979	447	3,426	3,426	-	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	1,057	159	1,216	-	1,216	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	140	21	161	-	161	-	-	-	-	-	-	-	-	-
2a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	385	58	443	443	-	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	19,158	2,874	22,032	15,863	6,169	-	-	-	-	-	-	-	-	281,262
2a.4.13	Utility Staff Cost	-	-	-	-	-	-	13,370	2,006	15,376	12,900	2,476	-	-	-	-	-	-	-	-	205,738
2a.4	Subtotal Period 2a Period-Dependent Costs	-	617	11	5	-	47	53,370	7,400	61,450	46,309	15,140	-	-	576	-	-	-	11,523	19	486,999
2a.0	TOTAL PERIOD 2a COST	-	617	11	5	-	47	130,742	18,572	149,994	64,714	85,280	-	-	576	-	-	-	11,523	19	486,999
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	3,489	523	4,013	4,013	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	5,471	1,368	6,839	6,839	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	8,960	1,891	10,851	10,851	-	-	-	-	-	-	-	-	-	-

Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	18,218	2,733	20,951	-	20,951	-	-	-	-	-	-	-	-	-
2b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	48,970	-	48,970	-	48,970	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	67,188	2,733	69,921	-	69,921	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	18,984	1,898	20,882	20,882	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	141,925	14,192	156,117	156,117	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	4,453	-	-	-	-	-	1,113	5,566	5,566	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	80	33	-	334	-	96	543	543	-	-	-	4,049	-	-	-	80,989	132	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	6,356	953	7,309	7,309	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	8,078	808	8,886	8,886	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	2,906	291	3,197	-	3,197	-	-	-	-	-	-	-	-	-
2b.4.8	Fixed Overhead	-	-	-	-	-	-	6,388	958	7,346	7,346	-	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	2,194	329	2,523	-	2,523	-	-	-	-	-	-	-	-	-
2b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	2,451	368	2,819	2,819	-	-	-	-	-	-	-	-	-	-
2b.4.11	Security Staff Cost	-	-	-	-	-	-	109,414	16,412	125,826	27,682	98,145	-	-	-	-	-	-	-	-	1,467,751
2b.4.12	Utility Staff Cost	-	-	-	-	-	-	53,539	8,031	61,570	38,666	22,904	-	-	-	-	-	-	-	-	815,417
2b.4	Subtotal Period 2b Period-Dependent Costs	-	4,453	80	33	-	334	352,234	45,450	402,583	275,815	126,768	-	-	4,049	-	-	-	80,989	132	2,283,168
2b.0	TOTAL PERIOD 2b COST	-	4,453	80	33	-	334	428,382	50,074	483,356	286,666	196,689	-	-	4,049	-	-	-	80,989	132	2,283,168
PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage																					
Period 2c Direct Decommissioning Activities																					
2c.1.1	Quarterly Inspection									a											
2c.1.2	Semi-annual environmental survey									a											
2c.1.3	Prepare reports									a											
2c.1.4	Bituminous roof replacement	-	-	-	-	-	-	913	137	1,050	1,050	-	-	-	-	-	-	-	-	-	-
2c.1.5	Maintenance supplies	-	-	-	-	-	-	1,431	358	1,789	1,789	-	-	-	-	-	-	-	-	-	-
2c.1	Subtotal Period 2c Activity Costs	-	-	-	-	-	-	2,345	495	2,839	2,839	-	-	-	-	-	-	-	-	-	-
Period 2c Period-Dependent Costs																					
2c.4.1	Insurance	-	-	-	-	-	-	2,866	287	3,152	3,152	-	-	-	-	-	-	-	-	-	-
2c.4.2	Property taxes	-	-	-	-	-	-	23,818	2,382	26,200	26,200	-	-	-	-	-	-	-	-	-	-
2c.4.3	Health physics supplies	-	1,105	-	-	-	-	-	276	1,381	1,381	-	-	-	-	-	-	-	-	-	-
2c.4.4	Disposal of DAW generated	-	-	20	8	-	81	-	23	132	132	-	-	-	985	-	-	-	19,708	32	-
2c.4.5	Plant energy budget	-	-	-	-	-	-	1,663	249	1,913	1,913	-	-	-	-	-	-	-	-	-	-
2c.4.6	NRC Fees	-	-	-	-	-	-	2,016	202	2,217	2,217	-	-	-	-	-	-	-	-	-	-
2c.4.7	Fixed Overhead	-	-	-	-	-	-	1,671	251	1,922	1,922	-	-	-	-	-	-	-	-	-	-
2c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	641	96	738	738	-	-	-	-	-	-	-	-	-	-
2c.4.9	Utility Staff Cost	-	-	-	-	-	-	5,093	764	5,857	5,857	-	-	-	-	-	-	-	-	-	85,343
2c.4	Subtotal Period 2c Period-Dependent Costs	-	1,105	20	8	-	81	37,769	4,530	43,512	43,512	-	-	-	985	-	-	-	19,708	32	85,343
2c.0	TOTAL PERIOD 2c COST	-	1,105	20	8	-	81	40,113	5,025	46,351	46,351	-	-	-	985	-	-	-	19,708	32	85,343
PERIOD 2 TOTALS		-	6,174	111	45	-	462	599,238	73,670	679,701	397,732	281,969	-	-	5,611	-	-	-	112,220	183	2,855,510
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
3a.1.6	Define major work sequence	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
3a.1.7	Perform SER and EA	-	-	-	-	-	-	170	26	196	196	-	-	-	-	-	-	-	-	-	1,326
3a.1.8	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
3a.1.9	Perform Site-Specific Cost Study	-	-	-	-	-	-	275	41	316	316	-	-	-	-	-	-	-	-	-	2,138
3a.1.10	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
Activity Specifications																					
3a.1.11.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	405	61	466	419	-	47	-	-	-	-	-	-	-	3,151
3a.1.11.2	Plant systems	-	-	-	-	-	-	229	34	263	237	-	26	-	-	-	-	-	-	-	1,782
3a.1.11.3	Reactor internals	-	-	-	-	-	-	390	59	449	449	-	-	-	-	-	-	-	-	-	3,036
3a.1.11.4	Reactor vessel	-	-	-	-	-	-	357	54	411	411	-	-	-	-	-	-	-	-	-	2,779
3a.1.11.5	Biological shield	-	-	-	-	-	-	27	4	32	32	-	-	-	-	-	-	-	-	-	214

Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Activity Specifications (continued)																					
3a.1.11.6	Steam generators	-	-	-	-	-	-	171	26	197	197	-	-	-	-	-	-	-	-	-	1,334
3a.1.11.7	Reinforced concrete	-	-	-	-	-	-	88	13	101	51	-	51	-	-	-	-	-	-	-	684
3a.1.11.8	Main Turbine	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
3a.1.11.9	Main Condensers	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
3a.1.11.10	Plant structures & buildings	-	-	-	-	-	-	171	26	197	99	-	99	-	-	-	-	-	-	-	1,334
3a.1.11.11	Waste management	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
3a.1.11.12	Facility & site closeout	-	-	-	-	-	-	49	7	57	28	-	28	-	-	-	-	-	-	-	385
3a.1.11	Total	-	-	-	-	-	-	2,186	328	2,514	2,213	-	301	-	-	-	-	-	-	-	17,009
Planning & Site Preparations																					
3a.1.12	Prepare dismantling sequence	-	-	-	-	-	-	132	20	152	152	-	-	-	-	-	-	-	-	-	1,026
3a.1.13	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
3a.1.14	Design water clean-up system	-	-	-	-	-	-	77	12	88	88	-	-	-	-	-	-	-	-	-	599
3a.1.15	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
3a.1.16	Procure casks/liners & containers	-	-	-	-	-	-	68	10	78	78	-	-	-	-	-	-	-	-	-	526
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	10,137	1,521	11,658	11,357	-	301	-	-	-	-	-	-	-	32,971
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	1,505	451	1,956	1,956	-	-	-	-	-	-	-	-	8,988	3,563
3a.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
3a.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
3a.2	Subtotal Period 3a Additional Costs	-	2,526	356	244	178	1,369	1,505	1,524	7,702	7,702	-	-	6,132	12,843	-	-	-	518,936	32,243	3,563
Period 3a Collateral Costs																					
3a.3.1	Small tool allowance	-	34	-	-	-	-	-	5	39	39	-	-	-	-	-	-	-	-	-	-
3a.3	Subtotal Period 3a Collateral Costs	-	34	-	-	-	-	-	5	39	39	-	-	-	-	-	-	-	-	-	-
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	279	28	307	307	-	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	2,249	225	2,474	2,474	-	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	641	-	-	-	-	-	160	802	802	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	4	-	40	-	11	64	64	-	-	-	481	-	-	-	9,613	16	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC Fees	-	-	-	-	-	-	260	26	286	286	-	-	-	-	-	-	-	-	-	-
3a.4.8	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
3a.4.9	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
3a.4.10	Security Staff Cost	-	-	-	-	-	-	368	55	424	424	-	-	-	-	-	-	-	-	-	6,240
3a.4.11	Utility Staff Cost	-	-	-	-	-	-	12,056	1,808	13,864	13,864	-	-	-	-	-	-	-	-	-	199,680
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,394	10	4	-	40	18,336	2,896	22,679	22,679	-	-	-	481	-	-	-	9,613	16	205,920
3a.0	TOTAL PERIOD 3a COST	-	3,954	366	248	178	1,409	29,979	5,946	42,079	41,778	-	301	6,132	13,324	-	-	-	528,549	32,259	242,454
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	260	39	299	269	-	30	-	-	-	-	-	-	-	2,024
3b.1.1.2	Reactor internals	-	-	-	-	-	-	137	21	158	158	-	-	-	-	-	-	-	-	-	1,069
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	74	11	85	21	-	64	-	-	-	-	-	-	-	577
3b.1.1.4	CRD cooling assembly	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3b.1.1.5	CRD housings & ICI tubes	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3b.1.1.6	Incore instrumentation	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	199	30	229	229	-	-	-	-	-	-	-	-	-	1,552
3b.1.1.8	Facility closeout	-	-	-	-	-	-	66	10	76	38	-	38	-	-	-	-	-	-	-	513
3b.1.1.9	Missile shields	-	-	-	-	-	-	25	4	28	28	-	-	-	-	-	-	-	-	-	192
3b.1.1.10	Biological shield	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	513
3b.1.1.11	Steam generators	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
3b.1.1.12	Reinforced concrete	-	-	-	-	-	-	55	8	63	32	-	32	-	-	-	-	-	-	-	428
3b.1.1.13	Main Turbine	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
3b.1.1.14	Main Condensers	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
3b.1.1.15	Auxiliary building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
3b.1.1.16	Reactor building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
3b.1.1	Total	-	-	-	-	-	-	1,772	266	2,038	1,643	-	395	-	-	-	-	-	-	-	13,787
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	1,772	266	2,038	1,643	-	395	-	-	-	-	-	-	-	13,787

Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	1,055	1,200	-	-	-	-	1,264	528	4,047	4,047	-	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	241	24	266	266	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	1,019	102	1,121	1,121	-	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	274	-	-	-	-	-	68	342	342	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	5	2	-	22	-	6	35	35	-	-	-	264	-	-	-	5,286	9	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	808	121	930	930	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC Fees	-	-	-	-	-	-	129	13	142	142	-	-	-	-	-	-	-	-	-	-
3b.4.9	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
3b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
3b.4.11	Security Staff Cost	-	-	-	-	-	-	184	28	211	211	-	-	-	-	-	-	-	-	-	3,111
3b.4.12	DOC Staff Cost	-	-	-	-	-	-	3,727	559	4,287	4,287	-	-	-	-	-	-	-	-	-	42,523
3b.4.13	Utility Staff Cost	-	-	-	-	-	-	6,011	902	6,913	6,913	-	-	-	-	-	-	-	-	-	99,566
3b.4	Subtotal Period 3b Period-Dependent Costs	38	649	5	2	-	22	12,870	2,002	15,588	15,588	-	-	-	264	-	-	-	5,286	9	145,201
3b.0	TOTAL PERIOD 3b COST	1,092	1,849	5	2	-	22	15,906	2,795	21,672	21,277	-	395	-	264	-	-	-	5,286	9	158,988
PERIOD 3 TOTALS		1,092	5,803	371	250	178	1,430	45,885	8,741	63,751	63,054	-	696	6,132	13,588	-	-	-	533,835	32,267	401,442
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Reactor Coolant Piping	11	42	10	11	66	94	-	52	285	285	-	-	240	254	-	-	-	33,680	778	-
4a.1.1.2	Pressurizer Relief Tank	5	19	6	7	44	62	-	31	174	174	-	-	160	169	-	-	-	22,441	352	-
4a.1.1.3	Reactor Coolant Pumps & Motors	13	60	46	85	-	463	-	155	822	822	-	-	-	2,332	-	-	-	295,800	1,226	80
4a.1.1.4	Pressurizer	-	77	382	91	-	776	-	265	1,591	1,591	-	-	-	2,196	-	-	-	158,199	1,346	750
4a.1.1.5	Steam Generators	-	3,307	1,690	1,743	2,409	3,885	-	2,590	15,625	15,625	-	-	18,672	10,990	-	-	-	1,581,180	10,253	2,250
4a.1.1.6	CRDMs/ICIs/Service Structure Removal	63	248	205	44	326	454	-	283	1,623	1,623	-	-	2,138	2,146	-	-	-	165,025	4,449	-
4a.1.1.7	Reactor Vessel Internals	51	4,650	11,350	862	-	7,848	278	10,531	35,570	35,570	-	-	-	1,174	-	673	-	167,337	22,373	1,053
4a.1.1.8	Vessel & Internals GTCC Disposal	-	-	-	-	-	8,680	-	1,302	9,982	9,982	-	-	-	-	-	-	1,773	344,823	-	-
4a.1.1.9	Reactor Vessel	-	5,835	1,653	442	-	3,268	278	6,576	18,053	18,053	-	-	-	9,245	-	-	-	579,324	22,373	1,053
4a.1.1	Totals	144	14,237	15,343	3,284	2,845	25,531	556	21,785	83,725	83,725	-	-	21,210	28,505	-	673	1,773	3,347,810	63,151	5,187
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	292	116	35	555	-	-	173	1,170	1,170	-	-	2,243	-	-	-	-	134,601	4,116	-
4a.1.3	Main Condensers	-	2,510	79	33	742	-	-	752	4,115	4,115	-	-	4,000	-	-	-	-	180,000	34,978	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
4a.1.4.2	Auxiliary	-	221	-	-	-	-	-	33	254	254	-	-	-	-	-	-	-	-	1,309	-
4a.1.4.3	Radwaste	-	9	-	-	-	-	-	1	10	10	-	-	-	-	-	-	-	-	65	-
4a.1.4	Totals	-	1,023	-	-	-	-	-	154	1,177	1,177	-	-	-	-	-	-	-	-	8,963	-
Disposal of Plant Systems																					
4a.1.5.1	Admin Bldg Ventilation	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	90	-
4a.1.5.2	Air Removal	-	29	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	422	-
4a.1.5.3	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	676	-
4a.1.5.4	Auxiliary Feedwater - RCA	-	38	0	1	30	-	-	14	84	84	-	-	178	-	-	-	-	7,214	486	-
4a.1.5.5	Bleed Steam	-	90	-	-	-	-	-	13	103	-	-	103	-	-	-	-	-	-	1,331	-
4a.1.5.6	Caustic Addition - RCA	-	40	0	2	40	-	-	16	99	99	-	-	240	-	-	-	-	9,761	468	-
4a.1.5.7	Chemical Feed	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	261	-
4a.1.5.8	Chemical Feed - RCA	-	3	0	0	3	-	-	1	7	7	-	-	16	-	-	-	-	634	31	-
4a.1.5.9	Circulating Water	-	27	-	-	-	-	-	4	32	-	-	32	-	-	-	-	-	-	401	-
4a.1.5.10	Condensate	-	525	-	-	-	-	-	79	603	-	-	603	-	-	-	-	-	-	7,537	-
4a.1.5.11	Condensate Polishing	-	208	-	-	-	-	-	31	239	-	-	239	-	-	-	-	-	-	2,987	-
4a.1.5.12	Condensate Polishing - RCA	-	38	1	4	81	-	-	22	145	145	-	-	483	-	-	-	-	19,616	493	-
4a.1.5.13	Electro-Hydraulic	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	143	-
4a.1.5.14	External Circulating Water	-	26	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	385	-
4a.1.5.15	External Circulating Water - RCA	-	72	1	5	121	-	-	37	237	237	-	-	721	-	-	-	-	29,284	938	-

Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4a.1.5.16	Feedwater	-	127	-	-	-	-	-	19	146	-	-	146	-	-	-	-	-	-	1,840	-
4a.1.5.17	Feedwater - RCA	-	248	8	31	694	-	-	171	1,152	1,152	-	-	4,147	-	-	-	-	168,414	3,377	-
4a.1.5.18	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	504	-
4a.1.5.19	Heater Drain	-	384	-	-	-	-	-	58	441	-	-	441	-	-	-	-	-	-	5,638	-
4a.1.5.20	Hypobromous Acid Feed	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	86	-
4a.1.5.21	Hypobromous Acid Feed - RCA	-	1	0	0	0	-	-	0	2	2	-	-	2	-	-	-	-	100	12	-
4a.1.5.22	Internal Circ Water & CDSR	-	25	-	-	-	-	-	4	29	-	-	29	-	-	-	-	-	-	366	-
4a.1.5.23	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
4a.1.5.24	Main Steam	-	101	-	-	-	-	-	15	116	-	-	116	-	-	-	-	-	-	1,482	-
4a.1.5.25	Main Steam - RCA	-	380	11	38	864	-	-	231	1,525	1,525	-	-	5,166	-	-	-	-	209,799	5,146	-
4a.1.5.26	Repairable Spare Snubbers	-	6	0	0	2	-	-	2	10	10	-	-	12	-	-	-	-	490	82	-
4a.1.5.27	Steam Exclusion	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	32	-
4a.1.5.28	Steam Exclusion - RCA	-	4	0	0	4	-	-	2	10	10	-	-	24	-	-	-	-	966	47	-
4a.1.5.29	Steam Generator Blowdown	-	378	21	27	319	215	-	202	1,162	1,162	-	-	1,906	631	-	-	-	118,130	5,179	-
4a.1.5.30	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
4a.1.5.31	Turbine & Moisture Separators	-	377	-	-	-	-	-	57	434	-	-	434	-	-	-	-	-	-	5,472	-
4a.1.5.32	Turbine Oil Purification	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	757	-
4a.1.5.33	Water Treatment	-	453	-	-	-	-	-	68	521	-	-	521	-	-	-	-	-	-	6,677	-
4a.1.5.34	Water Treatment - RCA	-	20	0	1	19	-	-	8	49	49	-	-	115	-	-	-	-	4,652	252	-
4a.1.5	Totals	-	3,779	43	108	2,177	215	-	1,091	7,413	4,480	-	2,933	13,010	631	-	-	-	569,060	53,681	-
4a.1.6	Scaffolding in support of decommissioning	-	2,865	22	10	188	30	-	755	3,870	3,870	-	-	1,012	89	-	-	-	51,216	23,719	-
4a.1	Subtotal Period 4a Activity Costs	144	24,706	15,603	3,470	6,506	25,776	556	24,709	101,471	98,537	-	2,933	41,476	29,226	-	673	1,773	4,282,686	188,606	5,187
Period 4a Additional Costs																					
4a.2.1	Retired RPV Upper Internals Package	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
4a.2	Subtotal Period 4a Additional Costs	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	3	-	4	8	-	17	-	7	39	39	-	-	-	40	-	-	-	2,408	8	-
4a.3.3	Small tool allowance	-	241	-	-	-	-	-	36	277	249	-	28	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	3	241	4	8	-	17	-	43	316	288	-	28	-	40	-	-	-	2,408	8	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	100	-	-	-	-	-	-	25	125	125	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	643	64	708	708	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	2,668	267	2,935	2,935	-	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,881	-	-	-	-	-	470	2,351	2,351	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	3,325	-	-	-	-	-	499	3,824	3,824	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	70	29	-	293	-	85	477	477	-	-	-	3,554	-	-	-	71,089	116	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	2,047	307	2,354	2,354	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC Fees	-	-	-	-	-	-	420	42	461	461	-	-	-	-	-	-	-	-	-	-
4a.4.9	Fixed Overhead	-	-	-	-	-	-	1,581	237	1,818	1,818	-	-	-	-	-	-	-	-	-	-
4a.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	565	85	649	649	-	-	-	-	-	-	-	-	-	-
4a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	83	12	96	96	-	-	-	-	-	-	-	-	-	-
4a.4.12	Remedial Actions Surveys	-	-	-	-	-	-	1,489	223	1,712	1,712	-	-	-	-	-	-	-	-	-	-
4a.4.13	Security Staff Cost	-	-	-	-	-	-	4,486	673	5,159	5,159	-	-	-	-	-	-	-	-	-	67,000
4a.4.14	DOC Staff Cost	-	-	-	-	-	-	17,103	2,565	19,668	19,668	-	-	-	-	-	-	-	-	-	189,200
4a.4.15	Utility Staff Cost	-	-	-	-	-	-	21,194	3,179	24,374	24,374	-	-	-	-	-	-	-	-	-	335,701
4a.4	Subtotal Period 4a Period-Dependent Costs	100	5,206	70	29	-	293	52,278	8,734	66,709	66,709	-	-	-	3,554	-	-	-	71,089	116	591,901
4a.0	TOTAL PERIOD 4a COST	246	30,281	15,844	3,564	6,506	27,669	52,834	34,430	171,375	168,414	-	2,961	41,476	33,393	125	673	1,773	4,405,984	190,397	597,154
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	314	35	86	41	-	703	-	356	1,535	1,535	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
4b.1.2.1	ADT & Misc Ventilation	-	22	1	1	26	3	-	10	63	63	-	-	153	9	-	-	-	6,803	325	-
4b.1.2.2	Aux Bldg Normal Ventilation	-	62	2	6	116	13	-	37	237	237	-	-	692	39	-	-	-	30,595	906	-
4b.1.2.3	Aux Bldg Special Ventilation	-	12	0	1	12	2	-	5	32	32	-	-	70	6	-	-	-	3,234	176	-
4b.1.2.4	Battery Rm Special Ventilation	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	24	-
4b.1.2.5	Boron Recycle	-	3	0	0	0	3	-	2	9	9	-	-	3	9	-	-	-	700	45	-
4b.1.2.6	Chemical & Volume Control	-	858	62	57	394	677	-	458	2,507	2,507	-	-	2,356	1,977	-	-	-	223,753	11,575	-
4b.1.2.7	Cold Chemical Lab Ventilation	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-

Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4b.1.2.8	Component Cooling - RCA	-	647	25	88	2,007	-	-	479	3,246	3,246	-	-	11,996	-	-	-	-	487,169	8,583	-
4b.1.2.9	Containment Cooling	-	35	-	-	-	-	-	5	40	-	-	40	-	-	-	-	-	-	502	-
4b.1.2.10	Containment Cooling - RCA	-	302	6	20	459	-	-	148	934	934	-	-	2,743	-	-	-	-	111,390	3,949	-
4b.1.2.11	Containment Hydrogen Control - RCA	-	36	0	1	24	-	-	13	74	74	-	-	141	-	-	-	-	5,742	494	-
4b.1.2.12	Containment Spray - RCA	-	194	3	11	243	-	-	87	538	538	-	-	1,453	-	-	-	-	59,019	2,617	-
4b.1.2.13	Containment Ventilation	-	211	23	49	790	243	-	242	1,558	1,558	-	-	4,721	722	-	-	-	237,643	3,016	-
4b.1.2.14	Control/Relay/Cmptr Rm Vent	-	28	1	2	44	7	-	16	98	98	-	-	260	20	-	-	-	11,878	406	-
4b.1.2.15	Cooling Water	-	159	-	-	-	-	-	24	183	-	-	183	-	-	-	-	-	-	2,344	-
4b.1.2.16	Cooling Water - RCA	-	476	17	62	1,412	-	-	342	2,310	2,310	-	-	8,442	-	-	-	-	342,822	6,311	-
4b.1.2.17	Cranes/Hoists/Elevators - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
4b.1.2.18	D3 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-
4b.1.2.19	D4 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-
4b.1.2.20	D5 Emergency Diesel	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
4b.1.2.21	Electrical - Clean	-	1,714	-	-	-	-	-	257	1,972	-	-	1,972	-	-	-	-	-	-	24,276	-
4b.1.2.22	Electrical - Contaminated	-	430	5	16	334	25	-	167	978	978	-	-	1,997	75	-	-	-	85,887	5,813	-
4b.1.2.23	Electrical - Contaminated - Fuel Pool	-	184	2	7	145	11	-	72	421	421	-	-	864	33	-	-	-	37,167	2,488	-
4b.1.2.24	Electrical - Decontaminated	-	2,955	38	138	3,138	-	-	1,234	7,503	7,503	-	-	18,753	-	-	-	-	761,569	38,423	-
4b.1.2.25	Electrical - Decontaminated - Fuel Pool	-	1,269	17	59	1,350	-	-	530	3,225	3,225	-	-	8,069	-	-	-	-	327,668	16,495	-
4b.1.2.26	Filter Rm Ventilation	-	4	0	0	4	0	-	2	10	10	-	-	24	1	-	-	-	1,017	61	-
4b.1.2.27	Fire Protection & Detection	-	204	-	-	-	-	-	31	235	-	-	235	-	-	-	-	-	-	3,009	-
4b.1.2.28	Fire Protection & Detection - RCA	-	246	4	13	306	-	-	110	679	679	-	-	1,828	-	-	-	-	74,245	3,134	-
4b.1.2.29	Fire Protection & Detection - RCA Fuel P	-	37	1	2	48	-	-	17	105	105	-	-	286	-	-	-	-	11,622	476	-
4b.1.2.30	Fuel Handling	-	66	1	2	34	17	-	26	146	146	-	-	200	49	-	-	-	11,273	983	-
4b.1.2.31	Fuel Oil	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
4b.1.2.32	HVAC - Clean	-	151	-	-	-	-	-	23	174	-	-	174	-	-	-	-	-	-	2,373	-
4b.1.2.33	HVAC - Contaminated	-	1,112	29	87	1,798	136	-	598	3,759	3,759	-	-	10,745	405	-	-	-	462,103	14,282	-
4b.1.2.34	HVAC - Contaminated - Fuel Pool	-	499	13	39	808	61	-	268	1,689	1,689	-	-	4,828	182	-	-	-	207,612	6,417	-
4b.1.2.35	Heating	-	322	-	-	-	-	-	48	370	-	-	370	-	-	-	-	-	-	4,804	-
4b.1.2.36	Heating - RCA	-	337	4	14	319	-	-	135	809	809	-	-	1,907	-	-	-	-	77,458	4,086	-
4b.1.2.37	Hot Lab & Sample Rm Ventilation	-	17	0	1	18	1	-	8	46	46	-	-	107	4	-	-	-	4,622	255	-
4b.1.2.38	Incore Instrumentation	-	27	1	2	10	20	-	13	73	73	-	-	60	58	-	-	-	6,143	412	-
4b.1.2.39	Misc Drains & Vents	-	213	12	12	77	145	-	104	563	563	-	-	458	426	-	-	-	46,079	2,841	-
4b.1.2.40	Misc Lab & Service Areas Vent	-	118	8	8	62	84	-	62	342	342	-	-	370	244	-	-	-	30,899	1,537	-
4b.1.2.41	Miscellaneous Gas	-	72	-	-	-	-	-	11	83	-	-	83	-	-	-	-	-	-	1,073	-
4b.1.2.42	Miscellaneous Gas - RCA	-	134	1	4	100	-	-	49	289	289	-	-	600	-	-	-	-	24,378	1,636	-
4b.1.2.43	Radiation Monitoring	-	7	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	111	-
4b.1.2.44	Radiation Monitoring - RCA	-	65	1	2	53	-	-	25	145	145	-	-	316	-	-	-	-	12,826	782	-
4b.1.2.45	Reactor Coolant	-	216	20	16	38	249	-	126	666	666	-	-	229	730	-	-	-	56,440	2,891	-
4b.1.2.46	Reactor Hot Sampling	-	116	11	7	9	108	-	60	311	311	-	-	54	312	-	-	-	22,678	1,499	-
4b.1.2.47	Reactor Makeup	-	41	-	-	-	-	-	6	47	-	-	47	-	-	-	-	-	-	583	-
4b.1.2.48	Reactor Makeup - RCA	-	4	0	0	5	-	-	2	11	11	-	-	28	-	-	-	-	1,148	47	-
4b.1.2.49	Reactor Vessel	-	16	1	0	4	5	-	6	32	32	-	-	22	14	-	-	-	1,816	225	-
4b.1.2.50	Residual Heat Removal	-	354	84	86	477	1,102	-	457	2,562	2,562	-	-	2,853	3,244	-	-	-	324,232	5,039	-
4b.1.2.51	Safeguards Chilled Water	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
4b.1.2.52	Safeguards Chilled Water - RCA	-	5	0	0	4	-	-	2	11	11	-	-	26	-	-	-	-	1,045	51	-
4b.1.2.53	Safety Injection	-	793	42	72	1,117	395	-	479	2,898	2,898	-	-	6,676	1,161	-	-	-	345,708	11,029	-
4b.1.2.54	Sampling	-	48	3	2	6	32	-	22	113	113	-	-	37	93	-	-	-	7,628	645	-
4b.1.2.55	Service Bldg & New Cmptr Vent	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	6	-
4b.1.2.56	Shield Bldg Ventilation	-	108	13	25	339	163	-	124	771	771	-	-	2,028	484	-	-	-	113,139	1,555	-
4b.1.2.57	Spent Fuel Pool Cooling	-	33	3	2	6	37	-	19	101	101	-	-	39	107	-	-	-	8,481	427	-
4b.1.2.58	Spent Fuel Pool Normal Ventilation	-	24	1	2	44	4	-	14	90	90	-	-	265	12	-	-	-	11,505	352	-
4b.1.2.59	Station & Instrument Air	-	161	-	-	-	-	-	24	185	-	-	185	-	-	-	-	-	-	2,424	-
4b.1.2.60	Station & Instrument Air - RCA	-	299	3	12	272	-	-	118	704	704	-	-	1,625	-	-	-	-	65,986	3,638	-
4b.1.2.61	Turbine Bldg Traps & Drains	-	30	-	-	-	-	-	5	35	-	-	35	-	-	-	-	-	-	462	-
4b.1.2.62	Turbine Bldg Traps & Drains - RCA	-	30	0	1	30	-	-	12	73	73	-	-	180	-	-	-	-	7,321	344	-
4b.1.2.63	Turbine Bldg Ventilation	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	655	-
4b.1.2.64	Unit Coolers	-	23	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	332	-
4b.1.2.65	Unit Coolers - RCA	-	56	0	2	39	-	-	20	117	117	-	-	232	-	-	-	-	9,413	690	-
4b.1.2.66	Waste Gas Disposal	-	438	43	45	410	464	-	298	1,699	1,699	-	-	2,453	1,358	-	-	-	187,339	5,879	-
4b.1.2.67	Waste Liquid Disposal	-	1,642	116	100	612	1,234	-	837	4,541	4,541	-	-	3,655	3,594	-	-	-	381,754	22,011	-
4b.1.2.68	Waste Solid Disposal	-	132	12	11	65	134	-	79	433	433	-	-	389	393	-	-	-	41,177	1,781	-
4b.1.2	Totals	-	17,877	633	1,092	17,625	5,377	-	8,385	50,989	47,545	-	3,444	105,339	15,761	-	-	-	5,294,310	240,033	-
4b.1.3	Scaffolding in support of decommissioning	-	4,297	33	15	281	45	-	1,133	5,804	5,804	-	-	1,518	134	-	-	-	76,824	35,578	-

Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Decontamination of Site Buildings																					
4b.1.4.1	Reactor	1,096	2,528	240	1,236	373	7,080	-	3,215	15,768	15,768	-	-	2,230	67,331	-	-	-	3,286,725	45,740	-
4b.1.4.2	Auxiliary	1,168	375	23	117	177	648	-	886	3,395	3,395	-	-	1,060	6,118	-	-	-	332,495	21,235	-
4b.1.4.3	Backwash Waste Receiving Tank	-	25	3	17	-	97	-	33	175	175	-	-	-	929	-	-	-	43,896	266	-
4b.1.4.4	Drum Transfer & Truck Loading Enclosure	16	8	1	3	3	14	-	15	59	59	-	-	19	135	-	-	-	7,118	328	-
4b.1.4.5	LLRW Storage Enclosure	111	48	3	17	6	96	-	95	377	377	-	-	38	920	-	-	-	44,971	2,151	-
4b.1.4.6	Radwaste	50	21	1	8	7	43	-	43	174	174	-	-	42	412	-	-	-	21,136	964	-
4b.1.4.7	Resin Disposal	15	11	1	3	14	14	-	16	72	72	-	-	83	124	-	-	-	9,271	340	-
4b.1.4.8	Fuel Handling of Aux Building	924	1,015	13	45	404	195	-	833	3,430	3,430	-	-	2,417	1,652	-	-	-	177,755	27,145	-
4b.1.4	Totals	3,380	4,031	285	1,445	985	8,187	-	5,137	23,450	23,450	-	-	5,889	77,619	-	-	-	3,923,368	98,170	-
4b.1.5	Prepare/submit License Termination Plan	-	-	-	-	-	-	225	34	259	259	-	-	-	-	-	-	-	-	-	1,751
4b.1.6	Receive NRC approval of termination plan									a											
4b.1	Subtotal Period 4b Activity Costs	3,693	26,240	1,036	2,594	18,892	14,312	225	15,045	82,037	78,593	-	3,444	112,746	95,607	-	-	-	9,427,420	374,358	1,751
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
4b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
4b.2.3	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
4b.2.4	License Termination ISFSI	-	24	81	435	-	2,532	1,375	1,112	5,560	5,560	-	-	-	9,355	-	-	-	1,123,457	3,762	5,460
4b.2	Subtotal Period 4b Additional Costs	-	1,199	93	471	606	2,532	2,638	1,848	9,387	9,387	-	-	5,880	9,355	-	-	-	1,270,457	11,189	11,700
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	7	-	12	21	-	48	-	20	107	107	-	-	-	109	-	-	-	6,547	21	-
4b.3.3	Small tool allowance	-	443	-	-	-	-	-	66	509	509	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
4b.3	Subtotal Period 4b Collateral Costs	7	443	142	88	1,112	225	1	320	2,338	2,338	-	-	6,000	638	-	-	-	310,155	168	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,449	-	-	-	-	-	-	362	1,811	1,811	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	862	86	949	949	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	3,404	340	3,745	3,745	-	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	3,232	-	-	-	-	-	808	4,041	4,041	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,577	-	-	-	-	-	687	5,263	5,263	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	116	47	-	482	-	139	784	784	-	-	-	5,849	-	-	-	116,984	191	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,165	325	2,490	2,490	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC Fees	-	-	-	-	-	-	562	56	618	618	-	-	-	-	-	-	-	-	-	-
4b.4.9	Fixed Overhead	-	-	-	-	-	-	2,118	318	2,436	2,436	-	-	-	-	-	-	-	-	-	-
4b.4.10	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	757	113	870	870	-	-	-	-	-	-	-	-	-	-
4b.4.11	Railroad Track Maintenance	-	-	-	-	-	-	111	17	128	128	-	-	-	-	-	-	-	-	-	-
4b.4.12	Remedial Actions Surveys	-	-	-	-	-	-	1,995	299	2,294	2,294	-	-	-	-	-	-	-	-	-	-
4b.4.13	Security Staff Cost	-	-	-	-	-	-	7,811	1,172	8,983	8,983	-	-	-	-	-	-	-	-	-	115,753
4b.4.14	DOC Staff Cost	-	-	-	-	-	-	22,641	3,396	26,038	26,038	-	-	-	-	-	-	-	-	-	248,175
4b.4.15	Utility Staff Cost	-	-	-	-	-	-	27,954	4,193	32,147	32,147	-	-	-	-	-	-	-	-	-	437,085
4b.4	Subtotal Period 4b Period-Dependent Costs	1,449	7,809	116	47	-	482	70,383	12,312	92,598	92,598	-	-	-	5,849	-	-	-	116,984	191	801,014
4b.0	TOTAL PERIOD 4b COST	5,149	35,691	1,386	3,201	20,610	17,552	73,246	29,526	186,361	182,916	-	3,444	124,626	111,449	-	-	-	11,125,020	385,906	814,465
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-

Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 4f Period-Dependent Costs																					
4f.4.2	Property taxes	-	-	-	-	-	-	1,335	133	1,468	1,468	-	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	709	-	-	-	-	-	177	886	886	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	7	3	-	27	-	8	45	45	-	-	-	332	-	-	-	6,649	11	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC Fees	-	-	-	-	-	-	263	26	290	290	-	-	-	-	-	-	-	-	-	-
4f.4.7	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
4f.4.8	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
4f.4.9	Security Staff Cost	-	-	-	-	-	-	805	121	926	926	-	-	-	-	-	-	-	-	-	11,668
4f.4.10	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
4f.4.11	Utility Staff Cost	-	-	-	-	-	-	3,772	566	4,338	4,338	-	-	-	-	-	-	-	-	-	56,395
4f.4	Subtotal Period 4f Period-Dependent Costs	-	709	7	3	-	27	11,593	1,844	14,182	14,182	-	-	-	332	-	-	-	6,649	11	114,346
4f.0	TOTAL PERIOD 4f COST	-	709	7	3	-	27	20,064	4,196	25,006	25,006	-	-	-	332	-	-	-	6,649	100,906	117,466
PERIOD 4 TOTALS		5,395	66,681	17,237	6,768	27,115	45,248	146,144	68,152	382,741	376,336	-	6,405	166,102	145,174	125	673	1,773	15,537,650	677,209	1,529,086
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor	-	4,645	-	-	-	-	-	697	5,342	-	-	5,342	-	-	-	-	-	44,679	-	-
5b.1.1.2	Auxiliary	-	1,993	-	-	-	-	-	299	2,291	-	-	2,291	-	-	-	-	-	11,902	-	-
5b.1.1.3	Condensate Storage Tank Foundation	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	33	-	-
5b.1.1.4	Construction Warehouse & Fab Shop	-	130	-	-	-	-	-	19	149	-	-	149	-	-	-	-	-	1,405	-	-
5b.1.1.5	D3/D4 Emergency Generator	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	84	-	-
5b.1.1.6	Drum Transfer & Truck Loading Enclosure	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	221	-	-
5b.1.1.7	Hydrogen House	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	47	-	-
5b.1.1.8	LLRW Storage Enclosure	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	853	-	-
5b.1.1.9	Misc Structures 2017	-	2,617	-	-	-	-	-	393	3,009	-	-	3,009	-	-	-	-	-	22,582	-	-
5b.1.1.10	Radwaste	-	176	-	-	-	-	-	26	202	-	-	202	-	-	-	-	-	1,400	-	-
5b.1.1.11	Resin Disposal	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	120	-	-
5b.1.1.12	Structures below 3' below grade	-	1,785	-	-	-	-	-	268	2,052	-	-	2,052	-	-	-	-	-	9,238	-	-
5b.1.1.13	Sulfuric Acid Tank Enclosure	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	35	-	-
5b.1.1.14	Turbine	-	2,140	-	-	-	-	-	321	2,461	-	-	2,461	-	-	-	-	-	21,997	-	-
5b.1.1.15	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	1,857	-	-
5b.1.1.16	Warehouse #2	-	24	-	-	-	-	-	4	27	-	-	27	-	-	-	-	-	213	-	-
5b.1.1.17	Waste Neutralizing Tank House	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	56	-	-
5b.1.1.18	Waste Oil Storage	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	70	-	-
5b.1.1.19	Water Treatment	-	324	-	-	-	-	-	49	373	-	-	373	-	-	-	-	-	2,690	-	-
5b.1.1.20	Fuel Handling of Aux Building	-	1,095	-	-	-	-	-	164	1,259	-	-	1,259	-	-	-	-	-	8,240	-	-
5b.1.1	Totals	-	15,501	-	-	-	-	-	2,325	17,826	-	-	17,826	-	-	-	-	-	127,723	-	-
Site Closeout Activities																					
5b.1.2	Remove Rubble	-	1,517	-	-	-	-	-	228	1,745	-	-	1,745	-	-	-	-	-	7,408	-	-
5b.1.3	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	921	-	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	86	13	99	99	-	-	-	-	-	-	-	-	-	667
5b.1	Subtotal Period 5b Activity Costs	-	17,466	-	-	-	-	86	2,633	20,185	99	-	20,086	-	-	-	-	-	136,051	-	667
Period 5b Additional Costs																					
5b.2.1	Clean Concrete Disposal	-	4,912	-	-	-	-	10	738	5,660	-	-	5,660	-	-	-	-	-	18,372	-	-
5b.2.2	Intake Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	3,552	-	-
5b.2.3	Construction Debris	-	-	-	-	-	-	2,150	323	2,473	-	-	2,473	-	-	-	-	-	-	-	-
5b.2.4	Backfill	-	9,257	-	-	-	-	-	1,388	10,645	-	-	10,645	-	-	-	-	-	9,327	-	-
5b.2.5	Demolition and Site Restoration of ISFSI	-	515	-	-	-	-	68	87	670	-	-	670	-	-	-	-	-	2,219	-	80
5b.2	Subtotal Period 5b Additional Costs	-	15,125	-	-	-	-	2,227	2,603	19,955	-	-	19,955	-	-	-	-	-	33,470	-	80
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	216	-	-	-	-	-	32	249	-	-	249	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	216	-	-	-	-	-	32	249	-	-	249	-	-	-	-	-	-	-	-

Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 5b Period-Dependent Costs																					
5b.4.2	Property taxes	-	-	-	-	-	-	3,481	348	3,829	-	-	3,829	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	-	395	-	-	-	-	-	-	-	-
5b.4.5	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	-	-	1,178	-	-	-	-	-	-	-	-
5b.4.6	Railroad Track Maintenance	-	-	-	-	-	-	133	20	152	-	-	152	-	-	-	-	-	-	-	-
5b.4.7	Security Staff Cost	-	-	-	-	-	-	2,055	308	2,363	-	-	2,363	-	-	-	-	-	-	-	29,221
5b.4.8	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
5b.4.9	Utility Staff Cost	-	-	-	-	-	-	3,831	575	4,406	-	-	4,406	-	-	-	-	-	-	-	57,340
5b.4	Subtotal Period 5b Period-Dependent Costs	-	7,144	-	-	-	-	21,789	4,166	33,099	-	-	33,099	-	-	-	-	-	-	-	203,445
5b.0	TOTAL PERIOD 5b COST	-	39,951	-	-	-	-	24,102	9,434	73,487	99	-	73,389	-	-	-	-	-	-	169,521	204,192
PERIOD 5 TOTALS		-	39,951	-	-	-	-	24,102	9,434	73,487	99	-	73,389	-	-	-	-	-	-	169,521	204,192
TOTAL COST TO DECOMMISSION		12,732	121,684	17,878	7,311	27,293	47,788	911,654	176,962	1,323,304	952,576	290,238	80,490	172,234	166,987	125	673	1,773	16,284,880	947,658	5,801,223

TOTAL COST TO DECOMMISSION WITH 15.44% CONTINGENCY:	**$1,323,304**	**thousands of 2020 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 71.98% OR:	**$952,576**	**thousands of 2020 dollars**
SPENT FUEL MANAGEMENT COST IS 21.93% OR:	**$290,238**	**thousands of 2020 dollars**
NON-NUCLEAR DEMOLITION COST IS 6.08% OR:	**$80,490**	**thousands of 2020 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**167,785**	**Cubic Feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**
TOTAL SCRAP METAL REMOVED:	**42,406**	**Tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**947,658**	**Man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX I

DETAILED COST ANALYSIS

SCENARIO 7: SAFSTOR with 100 Year DFS

Page

Prairie Island Nuclear Generating Plant, Unit 1 ..... I-2

Prairie Island Nuclear Generating Plant, Unit 2 ..... I-14

Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	415	124	539	539	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	193	29	222	222	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.16	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.17	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.18.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	632	95	727	727	-	-	-	-	-	-	-	-	-	4,920
1a.1.18.2	Plant systems	-	-	-	-	-	-	536	80	616	616	-	-	-	-	-	-	-	-	-	4,167
1a.1.18.3	Plant structures and buildings	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
1a.1.18.4	Waste management	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.18.5	Facility and site dormancy	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.18	Total	-	-	-	-	-	-	2,083	312	2,395	2,395	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.19.1	Plant systems	-	-	-	-	-	-	152	23	175	175	-	-	-	-	-	-	-	-	-	1,183
1a.1.19.2	Facility closeout & dormancy	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1a.1.19	Total	-	-	-	-	-	-	306	46	352	352	-	-	-	-	-	-	-	-	-	2,383
1a.1.20	Procure vacuum drying system	-	-	-	-	-	-	13	2	15	15	-	-	-	-	-	-	-	-	-	100
1a.1.21	Drain/de-energize non-cont. systems									a											
1a.1.22	Drain & dry NSSS									a											
1a.1.23	Drain/de-energize contaminated systems									a											
1a.1.24	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	6,120	980	7,100	7,100	-	-	-	-	-	-	-	-	-	44,390
Period 1a Collateral Costs																					
1a.3.1	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	50	-	14	82	82	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	892	89	981	981	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	26,931	4,040	30,971	30,971	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	5	-	50	47,211	6,945	55,590	52,648	2,942	-	-	610	-	-	-	12,190	20	544,960
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	5	-	50	54,580	7,925	63,939	59,748	4,191	-	-	610	-	-	-	12,190	20	589,350

Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
1b.1.1	Totals	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
1b.1	Subtotal Period 1b Activity Costs	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	79	-	52	94	-	212	-	112	549	549	-	-	-	487	-	-	-	29,193	95	-
1b.3.4	Small tool allowance	-	20	-	-	-	-	-	3	23	23	-	-	-	-	-	-	-	-	-	-
1b.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,134	20	52	94	-	212	311	273	2,097	1,785	311	-	-	487	-	-	-	29,193	95	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	449	-	-	-	-	-	-	112	561	561	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	903	90	994	994	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	250	-	-	-	-	-	63	313	313	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	6	3	-	27	-	8	43	43	-	-	-	324	-	-	-	6,486	11	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1b.4	Subtotal Period 1b Period-Dependent Costs	449	438	6	3	-	27	11,709	1,866	14,498	13,764	733	-	-	324	-	-	-	6,486	11	135,867
1b.0	TOTAL PERIOD 1b COST	2,781	458	59	97	-	239	24,696	4,640	32,969	31,924	1,045	-	-	811	-	-	-	35,678	17,108	135,867
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	527	-	-	-	-	-	79	606	606	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	54	-	-	-	-	-	8	62	62	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	12,801	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	75	11	86	86	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	581	-	-	-	-	808	318	1,707	1,707	-	-	-	-	-	-	-	-	16,501	583
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	91	-	60	109	-	245	-	129	634	634	-	-	-	561	-	-	-	33,685	109	-
1c.3.3	Small tool allowance	-	5	-	-	-	-	-	1	6	6	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	163	25	188	-	188	-	-	-	-	-	-	-	-	-
1c.3.5	Retention and Severance	-	-	-	-	-	-	1,032	155	1,187	1,187	-	-	-	-	-	-	-	-	-	-
1c.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	91	5	60	109	-	245	1,507	309	2,325	1,826	499	-	-	561	-	-	-	33,685	109	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	903	90	994	994	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	248	-	-	-	-	-	62	309	309	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	1	-	13	-	4	20	20	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-

Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1c Period-Dependent Costs (continued)																					
1c.4.7	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1c.4.9	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1c.4.13	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1c.4.14	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1c.4	Subtotal Period 1c Period-Dependent Costs	-	435	3	1	-	13	11,709	1,749	13,910	13,177	733	-	-	152	-	-	-	3,039	5	135,867
1c.0	TOTAL PERIOD 1c COST	91	1,021	63	110	-	257	14,024	2,376	17,943	16,710	1,233	-	-	713	-	-	-	36,724	16,615	136,450
PERIOD 1 TOTALS		2,873	2,846	134	212	-	546	93,299	14,941	114,851	108,382	6,468	-	-	2,134	-	-	-	84,593	33,743	861,667
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	54	8	62	62	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	520	130	650	650	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	574	138	712	712	-	-	-	-	-	-	-	-	-	-
Period 2a Additional Costs																					
2a.2.1	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	66,237	9,936	76,173	-	76,173	-	-	-	-	-	-	-	-	-
2a.3.2	Retention and Severance	-	-	-	-	-	-	22,434	3,365	25,799	25,799	-	-	-	-	-	-	-	-	-	-
2a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	4,654	-	4,654	-	4,654	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	93,325	13,301	106,626	25,799	80,827	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,804	180	1,985	1,985	-	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	13,489	1,349	14,838	14,838	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	801	-	-	-	-	-	200	1,001	1,001	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	14	6	-	59	-	17	96	96	-	-	-	714	-	-	-	14,273	23	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	1,208	181	1,389	1,389	-	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	908	91	999	999	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	6,924	692	7,616	-	7,616	-	-	-	-	-	-	-	-	-
2a.4.8	Fixed Overhead	-	-	-	-	-	-	4,432	665	5,097	5,097	-	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	1,573	236	1,809	-	1,809	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	209	31	240	-	240	-	-	-	-	-	-	-	-	-
2a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	462	69	531	531	-	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	29,334	4,400	33,734	24,289	9,446	-	-	-	-	-	-	-	-	431,215
2a.4.13	Utility Staff Cost	-	-	-	-	-	-	3,645	547	4,192	3,517	675	-	-	-	-	-	-	-	-	58,126
2a.4	Subtotal Period 2a Period-Dependent Costs	-	801	14	6	-	59	63,988	8,659	73,527	53,741	19,786	-	-	714	-	-	-	14,273	23	489,341
2a.0	TOTAL PERIOD 2a COST	-	801	14	6	-	59	162,235	22,750	185,865	85,251	100,614	-	-	714	-	-	-	14,273	23	489,341
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	704	106	810	810	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	6,792	1,698	8,490	8,490	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	7,496	1,804	9,300	9,300	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	122,995	18,449	141,444	-	141,444	-	-	-	-	-	-	-	-	-
2b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	60,797	-	60,797	-	60,797	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	183,792	18,449	202,241	-	202,241	-	-	-	-	-	-	-	-	-

Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	23,569	2,357	25,926	25,926	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	176,207	17,621	193,828	193,828	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	5,528	-	-	-	-	-	1,382	6,910	6,910	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	100	40	-	414	-	120	674	674	-	-	-	5,027	-	-	-	100,550	164	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	7,891	1,184	9,075	9,075	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	11,071	1,107	12,178	12,178	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	3,608	361	3,969	-	3,969	-	-	-	-	-	-	-	-	-
2b.4.8	Fixed Overhead	-	-	-	-	-	-	7,930	1,190	9,120	9,120	-	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	2,724	409	3,132	-	3,132	-	-	-	-	-	-	-	-	-
2b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	3,043	456	3,499	3,499	-	-	-	-	-	-	-	-	-	-
2b.4.11	Security Staff Cost	-	-	-	-	-	-	135,841	20,376	156,217	34,368	121,849	-	-	-	-	-	-	-	-	1,822,251
2b.4.12	Utility Staff Cost	-	-	-	-	-	-	66,470	9,970	76,440	48,005	28,436	-	-	-	-	-	-	-	-	1,012,362
2b.4	Subtotal Period 2b Period-Dependent Costs	-	5,528	100	40	-	414	438,354	56,532	500,968	343,582	157,386	-	-	5,027	-	-	-	100,550	164	2,834,613
2b.0	TOTAL PERIOD 2b COST	-	5,528	100	40	-	414	629,642	76,785	712,510	352,882	359,628	-	-	5,027	-	-	-	100,550	164	2,834,613
PERIOD 2 TOTALS		-	6,329	114	46	-	473	791,877	99,535	898,374	438,133	460,241	-	-	5,741	-	-	-	114,823	187	3,323,954
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
3a.1.9.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	947	142	1,089	980	-	109	-	-	-	-	-	-	-	7,370
3a.1.9.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
3a.1.9.3	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
3a.1.9.4	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
3a.1.9.5	Biological shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
3a.1.9.6	Steam generators	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
3a.1.9.7	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
3a.1.9.8	Main Turbine	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
3a.1.9.9	Main Condensers	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
3a.1.9.10	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
3a.1.9.11	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.9.12	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
3a.1.9	Total	-	-	-	-	-	-	5,112	767	5,879	5,175	-	704	-	-	-	-	-	-	-	39,777
Planning & Site Preparations																					
3a.1.10	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
3a.1.11	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
3a.1.12	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
3a.1.13	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
3a.1.14	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	14,717	2,208	16,925	16,221	-	704	-	-	-	-	-	-	-	68,607
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	3,520	1,056	4,576	4,576	-	-	-	-	-	-	-	-	21,020	8,332
3a.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
3a.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
3a.2	Subtotal Period 3a Additional Costs	-	2,526	356	244	178	1,369	3,520	2,129	10,321	10,321	-	-	6,132	12,843	-	-	-	518,936	44,275	8,332
Period 3a Collateral Costs																					
3a.3.1	Small tool allowance	-	34	-	-	-	-	-	5	39	39	-	-	-	-	-	-	-	-	-	-
3a.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	24,367	3,655	28,022	-	28,022	-	-	-	-	-	-	-	-	-
3a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
3a.3	Subtotal Period 3a Collateral Costs	-	34	-	-	-	-	25,616	3,660	29,310	39	29,271	-	-	-	-	-	-	-	-	-

Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	484	48	533	307	225	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	3,618	362	3,980	2,551	1,429	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	670	-	-	-	-	-	167	837	837	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	4	-	42	-	12	69	69	-	-	-	516	-	-	-	10,311	17	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC ISFSI Fees	-	-	-	-	-	-	120	12	132	-	132	-	-	-	-	-	-	-	-	-
3a.4.8	NRC Fees	-	-	-	-	-	-	335	33	368	368	-	-	-	-	-	-	-	-	-	-
3a.4.9	Emergency Planning Fees	-	-	-	-	-	-	74	7	82	-	82	-	-	-	-	-	-	-	-	-
3a.4.10	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
3a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
3a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
3a.4.13	Security Staff Cost	-	-	-	-	-	-	4,632	695	5,327	5,044	282	-	-	-	-	-	-	-	-	69,160
3a.4.14	Utility Staff Cost	-	-	-	-	-	-	16,599	2,490	19,089	18,421	668	-	-	-	-	-	-	-	-	260,000
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,423	10	4	-	42	29,042	4,417	34,939	32,057	2,882	-	-	516	-	-	-	10,311	17	329,160
3a.0	TOTAL PERIOD 3a COST	-	3,983	366	248	178	1,412	72,895	12,414	91,495	58,638	32,153	704	6,132	13,359	-	-	-	529,247	44,292	406,099
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	321	48	369	369	-	-	-	-	-	-	-	-	-	2,500
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD cooling assembly	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	CRD housings & ICI tubes	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
3b.1.1.9	Missile shields	-	-	-	-	-	-	58	9	67	67	-	-	-	-	-	-	-	-	-	450
3b.1.1.10	Biological shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.11	Steam generators	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3b.1.1.12	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
3b.1.1.13	Main Turbine	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
3b.1.1.14	Main Condensers	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
3b.1.1.15	Auxiliary building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1.16	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	4,144	622	4,765	3,841	-	924	-	-	-	-	-	-	-	32,243
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	4,144	622	4,765	3,841	-	924	-	-	-	-	-	-	-	32,243
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
3b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	26,241	3,936	30,177	-	30,177	-	-	-	-	-	-	-	-	-
3b.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	623	-	623	-	623	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	1,055	1,200	-	-	-	-	28,128	4,464	34,846	4,047	30,800	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	241	24	266	266	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	1,802	180	1,982	1,270	711	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	295	-	-	-	-	-	74	369	369	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	6	2	-	24	-	7	39	39	-	-	-	291	-	-	-	5,814	9	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	808	121	930	930	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC ISFSI Fees	-	-	-	-	-	-	60	6	66	-	66	-	-	-	-	-	-	-	-	-
3b.4.9	NRC Fees	-	-	-	-	-	-	167	17	183	183	-	-	-	-	-	-	-	-	-	-
3b.4.10	Emergency Planning Fees	-	-	-	-	-	-	37	4	41	-	41	-	-	-	-	-	-	-	-	-
3b.4.11	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
3b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
3b.4.14	Security Staff Cost	-	-	-	-	-	-	2,310	346	2,656	2,515	141	-	-	-	-	-	-	-	-	34,485
3b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,344	802	6,146	6,146	-	-	-	-	-	-	-	-	-	58,080
3b.4.16	Utility Staff Cost	-	-	-	-	-	-	8,277	1,242	9,518	9,185	333	-	-	-	-	-	-	-	-	129,644

Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
3b.4	Subtotal Period 3b Period-Dependent Costs	38	671	6	2	-	24	19,823	3,005	23,568	22,244	1,324	-	-	291	-	-	-	5,814	9	222,210
3b.0	TOTAL PERIOD 3b COST	1,092	1,871	6	2	-	24	52,094	8,090	63,180	30,132	32,124	924	-	291	-	-	-	5,814	9	254,453
PERIOD 3 TOTALS		1,092	5,853	372	251	178	1,436	124,989	20,504	154,675	88,770	64,276	1,628	6,132	13,649	-	-	-	535,061	44,301	660,551
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Reactor Coolant Piping	11	42	10	11	66	94	-	52	285	285	-	-	240	254	-	-	-	33,680	778	-
4a.1.1.2	Pressurizer Relief Tank	5	19	6	7	44	62	-	31	174	174	-	-	160	169	-	-	-	22,441	352	-
4a.1.1.3	Reactor Coolant Pumps & Motors	13	60	46	85	-	463	-	155	822	822	-	-	-	2,332	-	-	-	295,800	1,226	80
4a.1.1.4	Pressurizer	-	77	382	91	-	776	-	265	1,591	1,591	-	-	-	2,196	-	-	-	158,199	1,346	750
4a.1.1.5	Steam Generators	-	3,307	1,690	1,743	2,409	3,885	-	2,590	15,625	15,625	-	-	18,672	10,990	-	-	-	1,581,180	10,253	2,250
4a.1.1.6	CRDMs/ICIs/Service Structure Removal	63	248	205	44	326	454	-	283	1,623	1,623	-	-	2,138	2,146	-	-	-	165,025	4,449	-
4a.1.1.7	Reactor Vessel Internals	53	4,650	13,334	828	-	8,610	278	11,401	39,153	39,153	-	-	-	1,174	-	742	-	167,605	22,373	1,053
4a.1.1.8	Reactor Vessel	-	5,835	1,653	442	-	3,268	278	6,576	18,053	18,053	-	-	-	9,245	-	-	-	579,324	22,373	1,053
4a.1.1	Totals	146	14,237	17,327	3,250	2,845	17,613	556	21,352	77,327	77,327	-	-	21,210	28,505	-	742	-	3,003,254	63,151	5,187
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	292	116	35	555	-	-	173	1,170	1,170	-	-	2,243	-	-	-	-	134,601	4,116	-
4a.1.3	Main Condensers	-	2,510	79	33	742	-	-	752	4,115	4,115	-	-	4,000	-	-	-	-	180,000	34,978	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
4a.1.4	Totals	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
Disposal of Plant Systems																					
4a.1.5.1	Air Removal	-	31	-	-	-	-	-	5	36	-	-	36	-	-	-	-	-	-	452	-
4a.1.5.2	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	670	-
4a.1.5.3	Auxiliary Feedwater - RCA	-	47	0	2	36	-	-	17	102	102	-	-	215	-	-	-	-	8,722	601	-
4a.1.5.4	Bleed Steam	-	90	-	-	-	-	-	14	104	-	-	104	-	-	-	-	-	-	1,335	-
4a.1.5.5	Caustic Addition - RCA	-	38	0	2	39	-	-	16	95	95	-	-	233	-	-	-	-	9,453	444	-
4a.1.5.6	Chemical Feed	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	304	-
4a.1.5.7	Chemical Feed - RCA	-	1	0	0	1	-	-	0	3	3	-	-	6	-	-	-	-	243	12	-
4a.1.5.8	Circulating Water	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	619	-
4a.1.5.9	Condensate	-	474	-	-	-	-	-	71	545	-	-	545	-	-	-	-	-	-	6,837	-
4a.1.5.10	Condensate Polishing	-	235	-	-	-	-	-	35	271	-	-	271	-	-	-	-	-	-	3,420	-
4a.1.5.11	Condensate Polishing - RCA	-	183	4	15	348	-	-	101	651	651	-	-	2,078	-	-	-	-	84,395	2,329	-
4a.1.5.12	Electro-hydraulic	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	127	-
4a.1.5.13	Feedwater	-	153	-	-	-	-	-	23	175	-	-	175	-	-	-	-	-	-	2,215	-
4a.1.5.14	Feedwater - RCA	-	195	7	24	537	-	-	133	895	895	-	-	3,208	-	-	-	-	130,294	2,651	-
4a.1.5.15	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	505	-
4a.1.5.16	Heater Drain	-	400	-	-	-	-	-	60	460	-	-	460	-	-	-	-	-	-	5,881	-
4a.1.5.17	Internal Circ Water & CDSR	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	389	-
4a.1.5.18	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
4a.1.5.19	Main Steam	-	115	-	-	-	-	-	17	133	-	-	133	-	-	-	-	-	-	1,690	-
4a.1.5.20	Main Steam - RCA	-	366	10	37	844	-	-	225	1,482	1,482	-	-	5,044	-	-	-	-	204,825	4,956	-
4a.1.5.21	Steam Generator Blowdown	-	434	22	29	340	234	-	224	1,282	1,282	-	-	2,031	686	-	-	-	126,640	5,974	-
4a.1.5.22	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
4a.1.5.23	Turbine & Moisture Separators	-	386	-	-	-	-	-	58	444	-	-	444	-	-	-	-	-	-	5,609	-
4a.1.5.24	Turbine Oil Purification	-	70	-	-	-	-	-	11	81	-	-	81	-	-	-	-	-	-	1,003	-
4a.1.5	Totals	-	3,401	44	108	2,144	234	-	1,037	6,967	4,510	-	2,458	12,815	686	-	-	-	564,572	48,101	-
4a.1.6	Scaffolding in support of decommissioning	-	909	3	1	26	4	-	233	1,176	1,176	-	-	138	12	-	-	-	6,985	6,020	-
4a.1	Subtotal Period 4a Activity Costs	146	22,144	17,570	3,426	6,311	17,850	556	23,666	91,669	89,211	-	2,458	40,406	29,203	-	742	-	3,889,412	163,954	5,187
Period 4a Additional Costs																					
4a.2.1	Retired RPV upper internals package	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
4a.2	Subtotal Period 4a Additional Costs	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	2	-	4	8	-	17	-	7	38	38	-	-	-	39	-	-	-	2,337	8	-
4a.3.2	Process decommissioning chemical flush waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a.3.3	Small tool allowance	-	213	-	-	-	-	-	32	245	220	-	24	-	-	-	-	-	-	-	-

Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 4a Collateral Costs (continued)																					
4a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,163	324	2,487	-	2,487	-	-	-	-	-	-	-	-	-
4a.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,660	-	1,660	-	1,660	-	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	2	213	4	8	-	17	3,823	363	4,430	258	4,147	24	-	39	-	-	-	2,337	8	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	100	-	-	-	-	-	-	25	125	125	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	643	64	708	708	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	4,441	444	4,886	2,985	1,901	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,744	-	-	-	-	-	436	2,181	2,181	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	3,325	-	-	-	-	-	499	3,824	3,824	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	59	24	-	245	-	71	398	398	-	-	-	2,972	-	-	-	59,446	97	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	2,047	307	2,354	2,354	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC ISFSI Fees	-	-	-	-	-	-	159	16	175	-	175	-	-	-	-	-	-	-	-	-
4a.4.9	NRC Fees	-	-	-	-	-	-	643	64	707	707	-	-	-	-	-	-	-	-	-	-
4a.4.10	Emergency Planning Fees	-	-	-	-	-	-	99	10	108	-	108	-	-	-	-	-	-	-	-	-
4a.4.11	Fixed Overhead	-	-	-	-	-	-	1,581	237	1,818	1,818	-	-	-	-	-	-	-	-	-	-
4a.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	565	85	649	649	-	-	-	-	-	-	-	-	-	-
4a.4.13	ISFSI Operating Costs	-	-	-	-	-	-	74	11	86	-	86	-	-	-	-	-	-	-	-	-
4a.4.14	Railroad Track Maintenance	-	-	-	-	-	-	83	12	96	96	-	-	-	-	-	-	-	-	-	-
4a.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,489	223	1,712	1,712	-	-	-	-	-	-	-	-	-	-
4a.4.16	Security Staff Cost	-	-	-	-	-	-	6,863	1,029	7,892	5,943	1,949	-	-	-	-	-	-	-	-	105,553
4a.4.17	DOC Staff Cost	-	-	-	-	-	-	17,190	2,579	19,769	19,769	-	-	-	-	-	-	-	-	-	189,964
4a.4.18	Utility Staff Cost	-	-	-	-	-	-	21,887	3,283	25,170	24,389	780	-	-	-	-	-	-	-	-	343,058
4a.4	Subtotal Period 4a Period-Dependent Costs	100	5,069	59	24	-	245	57,763	9,396	72,656	67,657	4,999	-	-	2,972	-	-	-	59,446	97	638,574
4a.0	TOTAL PERIOD 4a COST	248	27,554	17,799	3,516	6,311	19,695	62,142	34,369	171,634	160,006	9,146	2,482	40,406	32,786	125	742	-	4,000,995	165,725	643,828
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	314	35	86	41	-	703	-	356	1,535	1,535	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
4b.1.2.1	Aux Bldg Normal Ventilation	-	2	0	0	1	-	-	1	3	3	-	-	3	-	-	-	-	140	26	-
4b.1.2.3	Buildings Maintenance	-	5	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	65	-
4b.1.2.4	Chemical & Volume Control	-	1,263	89	90	753	973	-	694	3,861	3,861	-	-	4,498	2,846	-	-	-	366,565	17,235	-
4b.1.2.5	Component Cooling - RCA	-	858	25	91	2,079	-	-	543	3,597	3,597	-	-	12,427	-	-	-	-	504,675	11,242	-
4b.1.2.6	Containment Cooling	-	74	-	-	-	-	-	11	85	-	-	85	-	-	-	-	-	-	1,086	-
4b.1.2.7	Containment Cooling - RCA	-	304	7	25	569	-	-	166	1,070	1,070	-	-	3,400	-	-	-	-	138,090	3,971	-
4b.1.2.8	Containment Hydrogen Control - RCA	-	30	0	1	18	-	-	10	59	59	-	-	105	-	-	-	-	4,278	401	-
4b.1.2.9	Containment Spray - RCA	-	93	2	6	145	-	-	46	293	293	-	-	868	-	-	-	-	35,249	1,217	-
4b.1.2.10	Containment Ventilation	-	229	24	51	828	248	-	254	1,635	1,635	-	-	4,951	737	-	-	-	247,952	3,278	-
4b.1.2.11	Cooling Water	-	163	-	-	-	-	-	24	187	-	-	187	-	-	-	-	-	-	2,396	-
4b.1.2.12	Cooling Water - RCA	-	658	16	57	1,293	-	-	368	2,392	2,392	-	-	7,728	-	-	-	-	313,832	8,594	-
4b.1.2.13	D1 Emergency Diesel	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	730	-
4b.1.2.14	D2 Emergency Diesel	-	36	-	-	-	-	-	5	41	-	-	41	-	-	-	-	-	-	522	-
4b.1.2.15	Diesel Rooms Ventilation	-	9	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	135	-
4b.1.2.16	Electrical - Clean	-	1,905	-	-	-	-	-	286	2,191	-	-	2,191	-	-	-	-	-	-	26,981	-
4b.1.2.17	Electrical - Contaminated	-	553	7	20	423	32	-	213	1,248	1,248	-	-	2,527	95	-	-	-	108,690	7,488	-
4b.1.2.18	Electrical - Contaminated - Fuel Pool	-	137	2	5	103	8	-	53	307	307	-	-	615	23	-	-	-	26,449	1,857	-
4b.1.2.19	Electrical - Decontaminated	-	3,787	48	173	3,940	-	-	1,569	9,518	9,518	-	-	23,551	-	-	-	-	956,401	49,378	-
4b.1.2.20	Electrical - Decontaminated - Fuel Pool	-	947	12	43	986	-	-	392	2,380	2,380	-	-	5,893	-	-	-	-	239,327	12,340	-
4b.1.2.21	Fuel Handling	-	108	6	11	152	73	-	70	421	421	-	-	908	218	-	-	-	50,723	1,595	-
4b.1.2.22	Fuel Oil	-	121	-	-	-	-	-	18	140	-	-	140	-	-	-	-	-	-	1,697	-
4b.1.2.23	HVAC - Clean	-	120	-	-	-	-	-	18	138	-	-	138	-	-	-	-	-	-	1,891	-
4b.1.2.24	HVAC - Contaminated	-	337	9	26	546	41	-	181	1,141	1,141	-	-	3,261	123	-	-	-	140,257	4,335	-
4b.1.2.25	HVAC - Contaminated - Fuel Pool	-	145	4	11	234	18	-	78	489	489	-	-	1,398	53	-	-	-	60,110	1,858	-
4b.1.2.26	Incore Instrumentation	-	25	1	2	10	19	-	13	70	70	-	-	60	57	-	-	-	6,058	382	-
4b.1.2.27	Misc Drains & Vents	-	212	15	13	65	176	-	110	592	592	-	-	390	514	-	-	-	49,062	2,764	-
4b.1.2.28	Reactor Coolant	-	283	21	18	58	265	-	150	796	796	-	-	344	777	-	-	-	64,085	3,865	-
4b.1.2.29	Reactor Hot Sampling	-	125	12	7	11	118	-	65	339	339	-	-	66	342	-	-	-	25,063	1,611	-
4b.1.2.30	Reactor Makeup	-	73	-	-	-	-	-	11	84	-	-	84	-	-	-	-	-	-	1,042	-
4b.1.2.31	Reactor Vessel	-	19	1	0	4	5	-	7	36	36	-	-	26	14	-	-	-	2,000	260	-
4b.1.2.32	Residual Heat Removal	-	378	85	86	484	1,105	-	465	2,603	2,603	-	-	2,895	3,252	-	-	-	326,425	5,374	-
4b.1.2.33	Safeguards Chilled Water	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	259	-
4b.1.2.34	Safeguards Chilled Water - RCA	-	85	1	4	83	-	-	34	207	207	-	-	495	-	-	-	-	20,100	1,019	-
4b.1.2.35	Safety Injection	-	809	42	73	1,136	393	-	486	2,939	2,939	-	-	6,788	1,156	-	-	-	349,908	11,276	-

Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4b.1.2.36	Sampling	-	54	4	3	10	37	-	25	133	133	-	-	59	107	-	-	-	9,420	731	-
4b.1.2.37	Shield Bldg Ventilation	-	125	14	26	360	165	-	132	821	821	-	-	2,152	491	-	-	-	118,583	1,811	-
4b.1.2.38	Spent Fuel Pool Cooling	-	324	34	32	135	450	-	222	1,198	1,198	-	-	806	1,325	-	-	-	117,816	4,400	-
4b.1.2.39	Station & Instrument Air	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	300	-
4b.1.2.40	Station & Instrument Air - RCA	-	81	1	2	56	-	-	29	169	169	-	-	332	-	-	-	-	13,496	1,053	-
4b.1.2.41	Station & Instrument Air - RCA Fuel Pool	-	20	0	1	14	-	-	7	42	42	-	-	83	-	-	-	-	3,374	263	-
4b.1.2.42	Turbine Bldg Traps & Drains	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	767	-
4b.1.2.43	Unit Coolers	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	611	-
4b.1.2.44	Unit Coolers - RCA	-	55	0	2	39	-	-	20	115	115	-	-	230	-	-	-	-	9,348	683	-
4b.1.2	Totals	-	14,735	481	883	14,533	4,126	-	6,807	41,565	38,474	-	3,091	86,861	12,129	-	-	-	4,307,475	198,796	-
4b.1.3	Scaffolding in support of decommissioning	-	1,363	4	2	38	6	-	349	1,763	1,763	-	-	207	18	-	-	-	10,477	9,030	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor	1,096	2,527	240	1,236	373	7,080	-	3,215	15,766	15,766	-	-	2,230	67,325	-	-	-	3,286,372	45,729	-
4b.1.4.2	Backwash Waste Receiving Tank	-	25	3	17	-	97	-	33	175	175	-	-	-	929	-	-	-	43,896	266	-
4b.1.4	Totals	1,096	2,552	243	1,253	373	7,177	-	3,248	15,941	15,941	-	-	2,230	68,254	-	-	-	3,330,268	45,995	-
4b.1.5	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
4b.1.6	Receive NRC approval of termination plan									a											
4b.1	Subtotal Period 4b Activity Costs	1,410	18,685	814	2,179	14,945	12,012	526	10,839	61,410	58,319	-	3,091	89,298	82,494	-	-	-	7,781,139	254,398	4,096
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
4b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
4b.2.3	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
4b.2	Subtotal Period 4b Additional Costs	-	1,175	11	36	606	-	1,262	736	3,827	3,827	-	-	5,880	-	-	-	-	147,000	7,427	6,240
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	5	-	9	16	-	37	-	15	83	83	-	-	-	85	-	-	-	5,092	17	-
4b.3.3	Small tool allowance	-	307	-	-	-	-	-	46	353	353	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
4b.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,225	-	2,225	-	2,225	-	-	-	-	-	-	-	-	-
4b.3	Subtotal Period 4b Collateral Costs	5	307	139	84	1,112	215	2,225	296	4,382	2,158	2,225	-	6,000	614	-	-	-	308,700	163	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	564	-	-	-	-	-	-	141	705	705	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	862	86	949	949	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	5,819	582	6,401	3,853	2,548	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	2,435	-	-	-	-	-	609	3,043	3,043	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,577	-	-	-	-	-	687	5,263	5,263	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	77	31	-	322	-	93	523	523	-	-	-	3,905	-	-	-	78,097	127	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,165	325	2,490	2,490	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC ISFSI Fees	-	-	-	-	-	-	213	21	234	-	234	-	-	-	-	-	-	-	-	-
4b.4.9	NRC Fees	-	-	-	-	-	-	862	86	948	948	-	-	-	-	-	-	-	-	-	-
4b.4.10	Emergency Planning Fees	-	-	-	-	-	-	132	13	145	-	145	-	-	-	-	-	-	-	-	-
4b.4.11	Fixed Overhead	-	-	-	-	-	-	2,118	318	2,436	2,436	-	-	-	-	-	-	-	-	-	-
4b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	757	113	870	870	-	-	-	-	-	-	-	-	-	-
4b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	100	15	115	-	115	-	-	-	-	-	-	-	-	-
4b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	111	17	128	128	-	-	-	-	-	-	-	-	-	-
4b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,995	299	2,294	2,294	-	-	-	-	-	-	-	-	-	-
4b.4.16	Security Staff Cost	-	-	-	-	-	-	1,202	180	1,383	462	921	-	-	-	-	-	-	-	-	20,373
4b.4.17	DOC Staff Cost	-	-	-	-	-	-	15,039	2,256	17,294	17,294	-	-	-	-	-	-	-	-	-	174,093
4b.4.18	Utility Staff Cost	-	-	-	-	-	-	18,793	2,819	21,612	20,790	821	-	-	-	-	-	-	-	-	311,145
4b.4	Subtotal Period 4b Period-Dependent Costs	564	7,011	77	31	-	322	50,169	8,660	66,835	62,051	4,784	-	-	3,905	-	-	-	78,097	127	505,611
4b.0	TOTAL PERIOD 4b COST	1,979	27,178	1,042	2,330	16,663	12,549	54,182	20,531	136,453	126,354	7,009	3,091	101,178	87,013	-	-	-	8,314,936	262,116	515,947
PERIOD 4e - Delay before License Termination																					
Period 4e Direct Decommissioning Activities																					
Period 4e Collateral Costs																					
4e.3.1	Prairie Island Indian Community Payments	-	-	-	-	-	-	986	-	986	-	986	-	-	-	-	-	-	-	-	-
4e.3	Subtotal Period 4e Collateral Costs	-	-	-	-	-	-	986	-	986	-	986	-	-	-	-	-	-	-	-	-

Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 4e Period-Dependent Costs																					
4e.4.1	Insurance	-	-	-	-	-	-	382	38	420	-	420	-	-	-	-	-	-	-	-	-
4e.4.2	Property taxes	-	-	-	-	-	-	2,498	250	2,748	1,624	1,124	-	-	-	-	-	-	-	-	-
4e.4.3	Health physics supplies	-	87	-	-	-	-	-	22	109	109	-	-	-	-	-	-	-	-	-	-
4e.4.4	Disposal of DAW generated	-	-	2	1	-	6	-	2	11	11	-	-	-	79	-	-	-	1,573	3	-
4e.4.6	NRC ISFSI Fees	-	-	-	-	-	-	94	9	104	-	104	-	-	-	-	-	-	-	-	-
4e.4.7	NRC Fees	-	-	-	-	-	-	162	16	178	178	-	-	-	-	-	-	-	-	-	-
4e.4.8	Emergency Planning Fees	-	-	-	-	-	-	58	6	64	-	64	-	-	-	-	-	-	-	-	-
4e.4.9	Fixed Overhead	-	-	-	-	-	-	939	141	1,079	1,079	-	-	-	-	-	-	-	-	-	-
4e.4.10	ISFSI Operating Costs	-	-	-	-	-	-	44	7	51	-	51	-	-	-	-	-	-	-	-	-
4e.4.11	Railroad Track Maintenance	-	-	-	-	-	-	49	7	57	57	-	-	-	-	-	-	-	-	-	-
4e.4.12	Utility Staff Cost	-	-	-	-	-	-	696	104	801	742	58	-	-	-	-	-	-	-	-	11,488
4e.4	Subtotal Period 4e Period-Dependent Costs	-	87	2	1	-	6	4,923	602	5,622	3,800	1,822	-	-	79	-	-	-	1,573	3	11,488
4e.0	TOTAL PERIOD 4e COST	-	87	2	1	-	6	5,909	602	6,607	3,800	2,807	-	-	79	-	-	-	1,573	3	11,488
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
4f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	218	33	250	-	250	-	-	-	-	-	-	-	-	-
4f.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	934	-	934	-	934	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	2,416	222	2,638	1,454	1,185	-	-	-	-	-	-	-	-	-
Period 4f Period-Dependent Costs																					
4f.4.1	Insurance	-	-	-	-	-	-	362	36	398	-	398	-	-	-	-	-	-	-	-	-
4f.4.2	Property taxes	-	-	-	-	-	-	2,306	231	2,537	1,469	1,068	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	501	-	-	-	-	-	125	626	626	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	7	3	-	28	-	8	45	45	-	-	-	334	-	-	-	6,685	11	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC ISFSI Fees	-	-	-	-	-	-	90	9	98	-	98	-	-	-	-	-	-	-	-	-
4f.4.7	NRC Fees	-	-	-	-	-	-	422	42	465	465	-	-	-	-	-	-	-	-	-	-
4f.4.8	Emergency Planning Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
4f.4.9	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
4f.4.10	ISFSI Operating Costs	-	-	-	-	-	-	42	6	48	-	48	-	-	-	-	-	-	-	-	-
4f.4.11	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
4f.4.12	Security Staff Cost	-	-	-	-	-	-	1,835	275	2,111	927	1,184	-	-	-	-	-	-	-	-	27,614
4f.4.13	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
4f.4.14	Utility Staff Cost	-	-	-	-	-	-	4,011	602	4,613	4,175	438	-	-	-	-	-	-	-	-	59,507
4f.4	Subtotal Period 4f Period-Dependent Costs	-	501	7	3	-	28	14,541	2,153	17,232	13,936	3,296	-	-	334	-	-	-	6,685	11	133,404
4f.0	TOTAL PERIOD 4f COST	-	501	7	3	-	28	20,322	3,384	24,245	19,764	4,481	-	-	334	-	-	-	6,685	40,542	136,524
PERIOD 4 TOTALS		2,227	55,320	18,849	5,850	22,974	32,278	142,555	58,887	338,939	309,924	23,443	5,573	141,584	120,212	125	742	-	12,324,190	468,386	1,307,787
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor	-	4,644	-	-	-	-	-	697	5,341	-	-	5,341	-	-	-	-	-	-	44,669	-
5b.1.1.2	Condensate Storage Tank Foundation	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	16	-
5b.1.1.3	Structures below 3' below grade	-	1,785	-	-	-	-	-	268	2,052	-	-	2,052	-	-	-	-	-	-	9,238	-
5b.1.1.4	Turbine	-	2,139	-	-	-	-	-	321	2,460	-	-	2,460	-	-	-	-	-	-	21,985	-
5b.1.1.5	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
5b.1.1	Totals	-	8,936	-	-	-	-	-	1,340	10,276	-	-	10,276	-	-	-	-	-	-	77,765	-

Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Site Closeout Activities																					
5b.1.2	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
5b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	9,384	-	-	-	-	200	1,438	11,022	231	-	10,792	-	-	-	-	-	-	78,686	1,560
Period 5b Additional Costs																					
5b.2.1	Clean Concrete Disposal	-	2,242	-	-	-	-	5	337	2,583	-	-	2,583	-	-	-	-	-	-	8,386	-
5b.2.2	Intake Structure Cofferdam	-	623	-	-	-	-	-	93	716	-	-	716	-	-	-	-	-	-	5,168	-
5b.2.3	Construction Debris	-	-	-	-	-	-	10	2	12	-	-	12	-	-	-	-	-	-	-	-
5b.2.4	Backfill	-	3,011	-	-	-	-	-	452	3,462	-	-	3,462	-	-	-	-	-	-	2,904	-
5b.2.5	Disposition of Original Casks	-	24	80	418	-	2,390	-	728	3,640	3,640	-	-	-	8,929	-	-	-	1,059,612	146	-
5b.2	Subtotal Period 5b Additional Costs	-	5,899	80	418	-	2,390	15	1,611	10,413	3,640	-	6,773	-	8,929	-	-	-	1,059,612	16,604	-
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	122	-	-	-	-	-	18	140	-	-	140	-	-	-	-	-	-	-	-
5b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	5,519	828	6,347	-	6,347	-	-	-	-	-	-	-	-	-
5b.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,649	-	2,649	-	2,649	-	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	122	-	-	-	-	8,168	846	9,136	-	8,996	140	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	513	51	565	-	565	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	5,904	590	6,494	-	2,663	3,831	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	395	-	-	-	-	-	-	-	-	-
5b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	326	33	359	-	359	-	-	-	-	-	-	-	-	-
5b.4.6	Emergency Planning Fees	-	-	-	-	-	-	157	16	173	-	173	-	-	-	-	-	-	-	-	-
5b.4.7	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	-	781	397	-	-	-	-	-	-	-	-
5b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	119	18	136	-	136	-	-	-	-	-	-	-	-	-
5b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	133	20	152	(0)	97	56	-	-	-	-	-	-	-	-
5b.4.10	Security Staff Cost	-	-	-	-	-	-	4,976	746	5,722	0	5,310	412	-	-	-	-	-	-	-	74,431
5b.4.11	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
5b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,170	776	5,946	-	1,278	4,668	-	-	-	-	-	-	-	76,637
5b.4	Subtotal Period 5b Period-Dependent Costs	-	7,144	-	-	-	-	29,587	5,165	41,895	0	11,757	30,139	-	-	-	-	-	-	-	267,952
5b.0	TOTAL PERIOD 5b COST	-	22,548	80	418	-	2,390	37,970	9,060	72,467	3,871	20,753	47,843	-	8,929	-	-	-	1,059,612	95,290	269,512
PERIOD 5c - Fuel Storage Operations/Shipping																					
Period 5c Direct Decommissioning Activities																					
Period 5c Collateral Costs																					
5c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	89,253	13,388	102,641	-	102,641	-	-	-	-	-	-	-	-	-
5c.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	27,796	-	27,796	-	27,796	-	-	-	-	-	-	-	-	-
5c.3	Subtotal Period 5c Collateral Costs	-	-	-	-	-	-	117,049	13,388	130,437	-	130,437	-	-	-	-	-	-	-	-	-
Period 5c Period-Dependent Costs																					
5c.4.1	Insurance	-	-	-	-	-	-	5,388	539	5,927	-	5,927	-	-	-	-	-	-	-	-	-
5c.4.2	Property taxes	-	-	-	-	-	-	31,074	3,107	34,181	-	34,181	-	-	-	-	-	-	-	-	-
5c.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	3,422	342	3,764	-	3,764	-	-	-	-	-	-	-	-	-
5c.4.5	Emergency Planning Fees	-	-	-	-	-	-	1,650	165	1,815	-	1,815	-	-	-	-	-	-	-	-	-
5c.4.6	Fixed Overhead	-	-	-	-	-	-	3,626	544	4,170	-	4,170	-	-	-	-	-	-	-	-	-
5c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	1,245	187	1,432	-	1,432	-	-	-	-	-	-	-	-	-
5c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	1,391	209	1,600	-	1,600	-	-	-	-	-	-	-	-	-
5c.4.9	Security Staff Cost	-	-	-	-	-	-	42,996	6,449	49,446	-	49,446	-	-	-	-	-	-	-	-	624,838
5c.4.10	DOC Staff Cost	-	-	-	-	-	-	3,411	512	3,922	-	3,922	-	-	-	-	-	-	-	-	23,142
5c.4.11	Utility Staff Cost	-	-	-	-	-	-	21,001	3,150	24,151	-	24,151	-	-	-	-	-	-	-	-	306,633
5c.4	Subtotal Period 5c Period-Dependent Costs	-	-	-	-	-	-	115,204	15,204	130,408	-	130,408	-	-	-	-	-	-	-	-	954,613
5c.0	TOTAL PERIOD 5c COST	-	-	-	-	-	-	232,252	28,592	260,844	-	260,844	-	-	-	-	-	-	-	-	954,613

Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 5d - GTCC shipping																					
Period 5d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
5d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
5d.1.1	Totals	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
5d.1	Subtotal Period 5d Activity Costs	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
Period 5d Collateral Costs																					
5d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
5d.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-
5d.3	Subtotal Period 5d Collateral Costs	-	-	-	-	-	-	76	4	80	-	80	-	-	-	-	-	-	-	-	-
Period 5d Period-Dependent Costs																					
5d.4.1	Insurance	-	-	-	-	-	-	9	1	10	10	-	-	-	-	-	-	-	-	-	-
5d.4.2	Property taxes	-	-	-	-	-	-	53	5	58	58	-	-	-	-	-	-	-	-	-	-
5d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	4	0	4	-	4	-	-	-	-	-	-	-	-	-
5d.4.5	Emergency Planning Fees	-	-	-	-	-	-	3	0	3	-	3	-	-	-	-	-	-	-	-	-
5d.4.6	Fixed Overhead	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
5d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	2	0	3	3	-	-	-	-	-	-	-	-	-	-
5d.4.8	Security Staff Cost	-	-	-	-	-	-	74	11	85	85	-	-	-	-	-	-	-	-	-	1,077
5d.4.9	Utility Staff Cost	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	269
5d.4	Subtotal Period 5d Period-Dependent Costs	-	-	-	-	-	-	171	22	194	186	7	-	-	-	-	-	-	-	-	1,346
5d.0	TOTAL PERIOD 5d COST	-	-	1,444	-	-	8,680	247	1,689	12,060	11,973	87	-	-	-	-	-	1,773	344,823	-	1,346
PERIOD 5e - ISFSI Decontamination																					
Period 5e Direct Decommissioning Activities																					
Period 5e Additional Costs																					
5e.2.1	License Termination ISFSI	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161
5e.2	Subtotal Period 5e Additional Costs	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161
Period 5e Period-Dependent Costs																					
5e.4.1	Insurance	-	-	-	-	-	-	93	23	116	116	-	-	-	-	-	-	-	-	-	-
5e.4.2	Property taxes	-	-	-	-	-	-	56	14	69	69	-	-	-	-	-	-	-	-	-	-
5e.4.3	Plant energy budget	-	-	-	-	-	-	11	3	13	13	-	-	-	-	-	-	-	-	-	-
5e.4.4	Fixed Overhead	-	-	-	-	-	-	54	14	68	68	-	-	-	-	-	-	-	-	-	-
5e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	21	5	26	26	-	-	-	-	-	-	-	-	-	-
5e.4.6	Security Staff Cost	-	-	-	-	-	-	174	43	217	217	-	-	-	-	-	-	-	-	-	2,500
5e.4.7	Utility Staff Cost	-	-	-	-	-	-	129	32	161	161	-	-	-	-	-	-	-	-	-	1,896
5e.4	Subtotal Period 5e Period-Dependent Costs	-	-	-	-	-	-	536	134	670	670	-	-	-	-	-	-	-	-	-	4,396
5e.0	TOTAL PERIOD 5e COST	-	0	2	17	-	142	1,733	473	2,367	2,367	-	-	-	424	-	-	-	65,754	5,882	5,556
PERIOD 5f - ISFSI Site Restoration																					
Period 5f Direct Decommissioning Activities																					
Period 5f Additional Costs																					
5f.2.1	Demolition and Site Restoration of ISFSI	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
5f.2	Subtotal Period 5f Additional Costs	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
Period 5f Collateral Costs																					
5f.3.1	Small tool allowance	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
5f.3	Subtotal Period 5f Collateral Costs	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-

Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 5f Period-Dependent Costs																					
5f.4.2	Property taxes	-	-	-	-	-	-	28	3	31	-	-	31	-	-	-	-	-	-	-	-
5f.4.3	Heavy equipment rental	-	59	-	-	-	-	-	9	68	-	-	68	-	-	-	-	-	-	-	-
5f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	6	-	-	6	-	-	-	-	-	-	-	-
5f.4.5	Fixed Overhead	-	-	-	-	-	-	28	4	32	-	-	32	-	-	-	-	-	-	-	-
5f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	11	2	12	-	-	12	-	-	-	-	-	-	-	-
5f.4.7	Security Staff Cost	-	-	-	-	-	-	89	13	102	-	-	102	-	-	-	-	-	-	-	1,281
5f.4.8	Utility Staff Cost	-	-	-	-	-	-	55	8	63	-	-	63	-	-	-	-	-	-	-	795
5f.4	Subtotal Period 5f Period-Dependent Costs	-	59	-	-	-	-	216	40	315	-	-	315	-	-	-	-	-	-	-	2,076
5f.0	TOTAL PERIOD 5f COST	-	1,187	-	-	-	-	377	233	1,798	-	-	1,798	-	-	-	-	-	-	4,846	2,156
PERIOD 5 TOTALS		-	23,736	1,525	435	-	11,212	272,580	40,048	349,536	18,210	281,684	49,641	-	9,353	-	-	1,773	1,470,189	106,017	1,233,184
TOTAL COST TO DECOMMISSION		6,192	94,084	20,994	6,793	23,152	45,944	1,425,301	233,914	1,856,374	963,420	836,113	56,842	147,716	151,089	125	742	1,773	14,528,860	652,634	7,387,143

TOTAL COST TO DECOMMISSION WITH 14.42% CONTINGENCY:	**$1,856,374**	**thousands of 2020 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 51.9% OR:	**$963,420**	**thousands of 2020 dollars**
SPENT FUEL MANAGEMENT COST IS 45.04% OR:	**$836,113**	**thousands of 2020 dollars**
NON-NUCLEAR DEMOLITION COST IS 3.06% OR:	**$56,842**	**thousands of 2020 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**151,957**	**Cubic Feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**
TOTAL SCRAP METAL REMOVED:	**33,003**	**Tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**652,634**	**Man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	415	124	539	539	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.11	End product description	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	82	12	95	95	-	-	-	-	-	-	-	-	-	641
1a.1.13	Define major work sequence	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.14	Perform SER and EA	-	-	-	-	-	-	170	26	196	196	-	-	-	-	-	-	-	-	-	1,326
1a.1.15	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
1a.1.16	Perform Site-Specific Cost Study	-	-	-	-	-	-	275	41	316	316	-	-	-	-	-	-	-	-	-	2,138
1a.1.17	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
Activity Specifications																					
1a.1.18.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	270	41	311	311	-	-	-	-	-	-	-	-	-	2,104
1a.1.18.2	Plant systems	-	-	-	-	-	-	229	34	263	263	-	-	-	-	-	-	-	-	-	1,782
1a.1.18.3	Plant structures and buildings	-	-	-	-	-	-	171	26	197	197	-	-	-	-	-	-	-	-	-	1,334
1a.1.18.4	Waste management	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.18.5	Facility and site dormancy	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.18	Total	-	-	-	-	-	-	891	134	1,024	1,024	-	-	-	-	-	-	-	-	-	6,930
Detailed Work Procedures																					
1a.1.19.1	Plant systems	-	-	-	-	-	-	65	10	75	75	-	-	-	-	-	-	-	-	-	506
1a.1.19.2	Facility closeout & dormancy	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	513
1a.1.19	Total	-	-	-	-	-	-	131	20	151	151	-	-	-	-	-	-	-	-	-	1,019
1a.1.20	Procure vacuum drying system	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	43
1a.1.21	Drain/de-energize non-cont. systems									a											
1a.1.22	Drain & dry NSSS									a											
1a.1.23	Drain/de-energize contaminated systems									a											
1a.1.24	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	2,854	490	3,345	3,345	-	-	-	-	-	-	-	-	-	18,981
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,330	199	1,529	-	1,529	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	8,394	1,259	9,653	9,653	-	-	-	-	-	-	-	-	-	-
1a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	10,973	1,459	12,432	9,653	2,779	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	604	-	-	-	-	-	151	755	755	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	49	-	14	80	80	-	-	-	597	-	-	-	11,944	19	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	516	52	567	567	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	25,478	3,822	29,300	29,300	-	-	-	-	-	-	-	-	-	400,944
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,357	12	5	-	49	45,381	6,687	53,491	50,549	2,942	-	-	597	-	-	-	11,944	19	523,664
1a.0	TOTAL PERIOD 1a COST	-	1,357	12	5	-	49	59,209	8,636	69,267	63,547	5,720	-	-	597	-	-	-	11,944	19	542,645

Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
1b.1.1.2	Auxiliary	1,244	-	-	-	-	-	-	622	1,866	1,866	-	-	-	-	-	-	-	-	17,950	-
1b.1.1.3	Drum Transfer & Truck Loading Enclosure	17	-	-	-	-	-	-	8	25	25	-	-	-	-	-	-	-	-	244	-
1b.1.1.4	LLRW Storage Enclosure	105	-	-	-	-	-	-	52	157	157	-	-	-	-	-	-	-	-	1,487	-
1b.1.1.5	Radwaste	47	-	-	-	-	-	-	23	70	70	-	-	-	-	-	-	-	-	669	-
1b.1.1.6	Resin Disposal	14	-	-	-	-	-	-	7	21	21	-	-	-	-	-	-	-	-	198	-
1b.1.1.7	Fuel Handling of Aux Building	911	-	-	-	-	-	-	455	1,366	1,366	-	-	-	-	-	-	-	-	12,414	-
1b.1.1	Totals	3,536	-	-	-	-	-	-	1,768	5,304	5,304	-	-	-	-	-	-	-	-	49,966	-
1b.1	Subtotal Period 1b Activity Costs	3,536	-	-	-	-	-	-	1,768	5,304	5,304	-	-	-	-	-	-	-	-	49,966	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	107	-	71	128	-	288	-	152	746	746	-	-	-	661	-	-	-	39,639	129	-
1b.3.3	Process decommissioning chemical flush waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1b.3.4	Small tool allowance	-	59	-	-	-	-	-	9	68	68	-	-	-	-	-	-	-	-	-	-
1b.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	309	46	356	-	356	-	-	-	-	-	-	-	-	-
1b.3.6	Retention and Severance	-	-	-	-	-	-	2,296	344	2,640	2,640	-	-	-	-	-	-	-	-	-	-
1b.3.7	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,162	59	71	128	-	288	2,917	710	5,334	4,667	667	-	-	661	-	-	-	39,639	129	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,334	-	-	-	-	-	-	333	1,667	1,667	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	902	90	993	993	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	438	-	-	-	-	-	109	547	547	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	13	5	-	52	-	15	85	85	-	-	-	634	-	-	-	12,677	21	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	98	10	108	108	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1b.4	Subtotal Period 1b Period-Dependent Costs	1,334	626	13	5	-	52	11,645	2,135	15,809	15,076	733	-	-	634	-	-	-	12,677	21	135,867
1b.0	TOTAL PERIOD 1b COST	6,032	684	84	133	-	340	23,012	5,880	36,165	34,764	1,401	-	-	1,295	-	-	-	52,317	50,115	135,867
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	527	-	-	-	-	-	79	606	606	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	54	-	-	-	-	-	8	62	62	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	12,801	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	32	5	37	37	-	-	-	-	-	-	-	-	-	249
1c.1	Subtotal Period 1c Activity Costs	-	581	-	-	-	-	765	312	1,658	1,658	-	-	-	-	-	-	-	-	16,501	249
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	91	-	60	109	-	245	-	129	634	634	-	-	-	561	-	-	-	33,685	109	-
1c.3.3	Small tool allowance	-	5	-	-	-	-	-	1	6	6	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	90	13	103	-	103	-	-	-	-	-	-	-	-	-
1c.3.5	Retention and Severance	-	-	-	-	-	-	1,722	258	1,980	1,980	-	-	-	-	-	-	-	-	-	-
1c.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-

Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
1c.3	Subtotal Period 1c Collateral Costs	91	5	60	109	-	245	2,123	401	3,034	2,619	415	-	-	561	-	-	-	33,685	109	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	901	90	991	991	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	248	-	-	-	-	-	62	309	309	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	1	-	13	-	4	20	20	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	98	10	108	108	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1c.4.9	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1c.4.13	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1c.4.14	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1c.4	Subtotal Period 1c Period-Dependent Costs	-	435	3	1	-	13	11,643	1,742	13,838	13,104	733	-	-	152	-	-	-	3,039	5	135,867
1c.0	TOTAL PERIOD 1c COST	91	1,021	63	110	-	257	14,531	2,456	18,530	17,382	1,148	-	-	713	-	-	-	36,724	16,615	136,116
PERIOD 1 TOTALS		6,123	3,062	159	248	-	646	96,752	16,972	123,961	115,692	8,269	-	-	2,605	-	-	-	100,985	66,750	814,628
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	223	33	256	256	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	349	87	437	437	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	572	121	693	693	-	-	-	-	-	-	-	-	-	-
Period 2a Additional Costs																					
2a.2.1	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	64,672	9,701	74,373	-	74,373	-	-	-	-	-	-	-	-	-
2a.3.2	Retention and Severance	-	-	-	-	-	-	11,054	1,658	12,712	12,712	-	-	-	-	-	-	-	-	-	-
2a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	3,128	-	3,128	-	3,128	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	78,854	11,359	90,213	12,712	77,501	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,213	121	1,334	1,334	-	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	9,065	907	9,972	9,972	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	617	-	-	-	-	-	154	771	771	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	11	5	-	47	-	14	77	77	-	-	-	576	-	-	-	11,523	19	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	812	122	934	934	-	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	536	54	590	590	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	4,653	465	5,119	-	5,119	-	-	-	-	-	-	-	-	-
2a.4.8	Fixed Overhead	-	-	-	-	-	-	2,979	447	3,426	3,426	-	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	1,057	159	1,216	-	1,216	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	140	21	161	-	161	-	-	-	-	-	-	-	-	-
2a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	385	58	443	443	-	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	19,158	2,874	22,032	15,863	6,169	-	-	-	-	-	-	-	-	281,262
2a.4.13	Utility Staff Cost	-	-	-	-	-	-	13,370	2,006	15,376	12,900	2,476	-	-	-	-	-	-	-	-	205,738
2a.4	Subtotal Period 2a Period-Dependent Costs	-	617	11	5	-	47	53,370	7,400	61,450	46,309	15,140	-	-	576	-	-	-	11,523	19	486,999
2a.0	TOTAL PERIOD 2a COST	-	617	11	5	-	47	137,143	19,532	157,355	64,714	92,641	-	-	576	-	-	-	11,523	19	486,999
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	4,402	660	5,063	5,063	-	-	-	-	-	-	-	-	-	-

Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2b Direct Decommissioning Activities (continued)																					
2b.1.5	Maintenance supplies	-	-	-	-	-	-	6,902	1,726	8,628	8,628	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	11,305	2,386	13,691	13,691	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	136,259	20,439	156,698	-	156,698	-	-	-	-	-	-	-	-	-
2b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	61,783	-	61,783	-	61,783	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	198,042	20,439	218,481	-	218,481	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	23,951	2,395	26,346	26,346	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	179,063	17,906	196,969	196,969	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	5,618	-	-	-	-	-	1,404	7,022	7,022	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	101	41	-	421	-	122	685	685	-	-	-	5,109	-	-	-	102,180	167	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	8,019	1,203	9,222	9,222	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	10,191	1,019	11,211	11,211	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	3,667	367	4,033	-	4,033	-	-	-	-	-	-	-	-	-
2b.4.8	Fixed Overhead	-	-	-	-	-	-	8,059	1,209	9,268	9,268	-	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	2,768	415	3,183	-	3,183	-	-	-	-	-	-	-	-	-
2b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	3,092	464	3,556	3,556	-	-	-	-	-	-	-	-	-	-
2b.4.11	Security Staff Cost	-	-	-	-	-	-	138,043	20,706	158,749	34,925	123,825	-	-	-	-	-	-	-	-	1,851,793
2b.4.12	Utility Staff Cost	-	-	-	-	-	-	67,547	10,132	77,680	48,783	28,897	-	-	-	-	-	-	-	-	1,028,774
2b.4	Subtotal Period 2b Period-Dependent Costs	-	5,618	101	41	-	421	444,401	57,343	507,924	347,987	159,938	-	-	5,109	-	-	-	102,180	167	2,880,567
2b.0	TOTAL PERIOD 2b COST	-	5,618	101	41	-	421	653,748	80,167	740,096	361,678	378,419	-	-	5,109	-	-	-	102,180	167	2,880,567
PERIOD 2 TOTALS		-	6,235	113	46	-	468	790,891	99,699	897,452	426,392	471,060	-	-	5,685	-	-	-	113,703	185	3,367,566
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
3a.1.6	Define major work sequence	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
3a.1.7	Perform SER and EA	-	-	-	-	-	-	170	26	196	196	-	-	-	-	-	-	-	-	-	1,326
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	275	41	316	316	-	-	-	-	-	-	-	-	-	2,138
Activity Specifications																					
3a.1.9.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	405	61	466	419	-	47	-	-	-	-	-	-	-	3,151
3a.1.9.2	Plant systems	-	-	-	-	-	-	229	34	263	237	-	26	-	-	-	-	-	-	-	1,782
3a.1.9.3	Reactor internals	-	-	-	-	-	-	390	59	449	449	-	-	-	-	-	-	-	-	-	3,036
3a.1.9.4	Reactor vessel	-	-	-	-	-	-	357	54	411	411	-	-	-	-	-	-	-	-	-	2,779
3a.1.9.5	Biological shield	-	-	-	-	-	-	27	4	32	32	-	-	-	-	-	-	-	-	-	214
3a.1.9.6	Steam generators	-	-	-	-	-	-	171	26	197	197	-	-	-	-	-	-	-	-	-	1,334
3a.1.9.7	Reinforced concrete	-	-	-	-	-	-	88	13	101	51	-	51	-	-	-	-	-	-	-	684
3a.1.9.8	Main Turbine	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
3a.1.9.9	Main Condensers	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
3a.1.9.10	Plant structures & buildings	-	-	-	-	-	-	171	26	197	99	-	99	-	-	-	-	-	-	-	1,334
3a.1.9.11	Waste management	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
3a.1.9.12	Facility & site closeout	-	-	-	-	-	-	49	7	57	28	-	28	-	-	-	-	-	-	-	385
3a.1.9	Total	-	-	-	-	-	-	2,186	328	2,514	2,213	-	301	-	-	-	-	-	-	-	17,009
Planning & Site Preparations																					
3a.1.10	Prepare dismantling sequence	-	-	-	-	-	-	132	20	152	152	-	-	-	-	-	-	-	-	-	1,026
3a.1.11	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
3a.1.12	Design water clean-up system	-	-	-	-	-	-	77	12	88	88	-	-	-	-	-	-	-	-	-	599
3a.1.13	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
3a.1.14	Procure casks/liners & containers	-	-	-	-	-	-	68	10	78	78	-	-	-	-	-	-	-	-	-	526
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	9,670	1,451	11,121	10,820	-	301	-	-	-	-	-	-	-	29,336
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	1,505	451	1,956	1,956	-	-	-	-	-	-	-	-	8,988	3,563
3a.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
3a.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
3a.2	Subtotal Period 3a Additional Costs	-	2,526	356	244	178	1,369	1,505	1,524	7,702	7,702	-	-	6,132	12,843	-	-	-	518,936	32,243	3,563

Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3a Collateral Costs																					
3a.3.1	Small tool allowance	-	34	-	-	-	-	-	5	39	39	-	-	-	-	-	-	-	-	-	-
3a.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	39,506	5,926	45,431	-	45,431	-	-	-	-	-	-	-	-	-
3a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
3a.3	Subtotal Period 3a Collateral Costs	-	34	-	-	-	-	40,755	5,931	46,720	39	46,680	-	-	-	-	-	-	-	-	-
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	484	48	533	307	225	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	3,546	355	3,900	2,500	1,400	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	641	-	-	-	-	-	160	802	802	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	4	-	40	-	11	64	64	-	-	-	481	-	-	-	9,613	16	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC ISFSI Fees	-	-	-	-	-	-	120	12	132	-	132	-	-	-	-	-	-	-	-	-
3a.4.8	NRC Fees	-	-	-	-	-	-	260	26	286	286	-	-	-	-	-	-	-	-	-	-
3a.4.9	Emergency Planning Fees	-	-	-	-	-	-	74	7	82	-	82	-	-	-	-	-	-	-	-	-
3a.4.10	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
3a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
3a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
3a.4.13	Security Staff Cost	-	-	-	-	-	-	368	55	424	424	-	-	-	-	-	-	-	-	-	6,240
3a.4.14	Utility Staff Cost	-	-	-	-	-	-	12,056	1,808	13,864	13,379	485	-	-	-	-	-	-	-	-	199,680
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,394	10	4	-	40	20,088	3,074	24,609	22,220	2,388	-	-	481	-	-	-	9,613	16	205,920
3a.0	TOTAL PERIOD 3a COST	-	3,954	366	248	178	1,409	72,018	11,979	90,151	40,781	49,069	301	6,132	13,324	-	-	-	528,549	32,259	238,819
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	260	39	299	269	-	30	-	-	-	-	-	-	-	2,024
3b.1.1.2	Reactor internals	-	-	-	-	-	-	137	21	158	158	-	-	-	-	-	-	-	-	-	1,069
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	74	11	85	21	-	64	-	-	-	-	-	-	-	577
3b.1.1.4	CRD cooling assembly	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3b.1.1.5	CRD housings & ICI tubes	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3b.1.1.6	Incore instrumentation	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	199	30	229	229	-	-	-	-	-	-	-	-	-	1,552
3b.1.1.8	Facility closeout	-	-	-	-	-	-	66	10	76	38	-	38	-	-	-	-	-	-	-	513
3b.1.1.9	Missile shields	-	-	-	-	-	-	25	4	28	28	-	-	-	-	-	-	-	-	-	192
3b.1.1.10	Biological shield	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	513
3b.1.1.11	Steam generators	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
3b.1.1.12	Reinforced concrete	-	-	-	-	-	-	55	8	63	32	-	32	-	-	-	-	-	-	-	428
3b.1.1.13	Main Turbine	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
3b.1.1.14	Main Condensers	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
3b.1.1.15	Auxiliary building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
3b.1.1.16	Reactor building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
3b.1.1	Total	-	-	-	-	-	-	1,772	266	2,038	1,643	-	395	-	-	-	-	-	-	-	13,787
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	1,772	266	2,038	1,643	-	395	-	-	-	-	-	-	-	13,787
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
3b.3.4	Prairie Island Indian Community Payments	-	-	-	-	-	-	623	-	623	-	623	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	1,055	1,200	-	-	-	-	1,887	528	4,669	4,047	623	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	241	24	266	266	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	1,667	167	1,834	1,175	658	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	274	-	-	-	-	-	68	342	342	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	5	2	-	22	-	6	35	35	-	-	-	264	-	-	-	5,286	9	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	808	121	930	930	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC ISFSI Fees	-	-	-	-	-	-	60	6	66	-	66	-	-	-	-	-	-	-	-	-
3b.4.9	NRC Fees	-	-	-	-	-	-	129	13	142	142	-	-	-	-	-	-	-	-	-	-
3b.4.10	Emergency Planning Fees	-	-	-	-	-	-	37	4	41	-	41	-	-	-	-	-	-	-	-	-
3b.4.11	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-

Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3b Period-Dependent Costs (continued)																					
3b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
3b.4.14	Security Staff Cost	-	-	-	-	-	-	184	28	211	211	-	-	-	-	-	-	-	-	-	3,111
3b.4.15	DOC Staff Cost	-	-	-	-	-	-	3,727	559	4,287	4,287	-	-	-	-	-	-	-	-	-	42,523
3b.4.16	Utility Staff Cost	-	-	-	-	-	-	6,011	902	6,913	6,671	242	-	-	-	-	-	-	-	-	99,566
3b.4	Subtotal Period 3b Period-Dependent Costs	38	649	5	2	-	22	13,643	2,080	16,439	15,400	1,039	-	-	264	-	-	-	5,286	9	145,201
3b.0	TOTAL PERIOD 3b COST	1,092	1,849	5	2	-	22	17,301	2,874	23,146	21,089	1,661	395	-	264	-	-	-	5,286	9	158,988
PERIOD 3 TOTALS		1,092	5,803	371	250	178	1,430	89,319	14,853	113,297	61,871	50,730	696	6,132	13,588	-	-	-	533,835	32,267	397,807
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Reactor Coolant Piping	11	42	10	11	66	94	-	52	285	285	-	-	240	254	-	-	-	33,680	778	-
4a.1.1.2	Pressurizer Relief Tank	5	19	6	7	44	62	-	31	174	174	-	-	160	169	-	-	-	22,441	352	-
4a.1.1.3	Reactor Coolant Pumps & Motors	13	60	46	85	-	463	-	155	822	822	-	-	-	2,332	-	-	-	295,800	1,226	80
4a.1.1.4	Pressurizer	-	77	382	91	-	776	-	265	1,591	1,591	-	-	-	2,196	-	-	-	158,199	1,346	750
4a.1.1.5	Steam Generators	-	3,307	1,690	1,743	2,409	3,885	-	2,590	15,625	15,625	-	-	18,672	10,990	-	-	-	1,581,180	10,253	2,250
4a.1.1.6	CRDMs/ICIs/Service Structure Removal	63	248	205	44	326	454	-	283	1,623	1,623	-	-	2,138	2,146	-	-	-	165,025	4,449	-
4a.1.1.7	Reactor Vessel Internals	51	4,650	13,353	862	-	7,848	278	11,032	38,074	38,074	-	-	-	1,174	-	673	-	167,337	22,373	1,053
4a.1.1.8	Reactor Vessel	-	5,835	1,653	442	-	3,268	278	6,576	18,053	18,053	-	-	-	9,245	-	-	-	579,324	22,373	1,053
4a.1.1	Totals	144	14,237	17,346	3,284	2,845	16,851	556	20,984	76,247	76,247	-	-	21,210	28,505	-	673	-	3,002,986	63,151	5,187
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	292	116	35	555	-	-	173	1,170	1,170	-	-	2,243	-	-	-	-	134,601	4,116	-
4a.1.3	Main Condensers	-	2,510	79	33	742	-	-	752	4,115	4,115	-	-	4,000	-	-	-	-	180,000	34,978	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
4a.1.4.2	Auxiliary	-	221	-	-	-	-	-	33	254	254	-	-	-	-	-	-	-	-	1,309	-
4a.1.4.3	Radwaste	-	9	-	-	-	-	-	1	10	10	-	-	-	-	-	-	-	-	65	-
4a.1.4	Totals	-	1,023	-	-	-	-	-	154	1,177	1,177	-	-	-	-	-	-	-	-	8,963	-
Disposal of Plant Systems																					
4a.1.5.1	Admin Bldg Ventilation	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	90	-
4a.1.5.2	Air Removal	-	29	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	422	-
4a.1.5.3	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	676	-
4a.1.5.4	Auxiliary Feedwater - RCA	-	38	0	1	30	-	-	14	84	84	-	-	178	-	-	-	-	7,214	486	-
4a.1.5.5	Bleed Steam	-	90	-	-	-	-	-	13	103	-	-	103	-	-	-	-	-	-	1,331	-
4a.1.5.6	Caustic Addition - RCA	-	40	0	2	40	-	-	16	99	99	-	-	240	-	-	-	-	9,761	468	-
4a.1.5.7	Chemical Feed	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	261	-
4a.1.5.8	Chemical Feed - RCA	-	3	0	0	3	-	-	1	7	7	-	-	16	-	-	-	-	634	31	-
4a.1.5.9	Circulating Water	-	27	-	-	-	-	-	4	32	-	-	32	-	-	-	-	-	-	401	-
4a.1.5.10	Condensate	-	525	-	-	-	-	-	79	603	-	-	603	-	-	-	-	-	-	7,537	-
4a.1.5.11	Condensate Polishing	-	208	-	-	-	-	-	31	239	-	-	239	-	-	-	-	-	-	2,987	-
4a.1.5.12	Condensate Polishing - RCA	-	38	1	4	81	-	-	22	145	145	-	-	483	-	-	-	-	19,616	493	-
4a.1.5.13	Electro-Hydraulic	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	143	-
4a.1.5.14	External Circulating Water	-	26	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	385	-
4a.1.5.15	External Circulating Water - RCA	-	72	1	5	121	-	-	37	237	237	-	-	721	-	-	-	-	29,284	938	-
4a.1.5.16	Feedwater	-	127	-	-	-	-	-	19	146	-	-	146	-	-	-	-	-	-	1,840	-
4a.1.5.17	Feedwater - RCA	-	248	8	31	694	-	-	171	1,152	1,152	-	-	4,147	-	-	-	-	168,414	3,377	-
4a.1.5.18	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	504	-
4a.1.5.19	Heater Drain	-	384	-	-	-	-	-	58	441	-	-	441	-	-	-	-	-	-	5,638	-
4a.1.5.20	Hypobromous Acid Feed	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	86	-
4a.1.5.21	Hypobromous Acid Feed - RCA	-	1	0	0	0	-	-	0	2	2	-	-	2	-	-	-	-	100	12	-
4a.1.5.22	Internal Circ Water & CDSR	-	25	-	-	-	-	-	4	29	-	-	29	-	-	-	-	-	-	366	-
4a.1.5.23	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
4a.1.5.24	Main Steam	-	101	-	-	-	-	-	15	116	-	-	116	-	-	-	-	-	-	1,482	-
4a.1.5.25	Main Steam - RCA	-	380	11	38	864	-	-	231	1,525	1,525	-	-	5,166	-	-	-	-	209,799	5,146	-
4a.1.5.26	Repairable Spare Snubbers	-	6	0	0	2	-	-	2	10	10	-	-	12	-	-	-	-	490	82	-
4a.1.5.27	Steam Exclusion	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	32	-
4a.1.5.28	Steam Exclusion - RCA	-	4	0	0	4	-	-	2	10	10	-	-	24	-	-	-	-	966	47	-
4a.1.5.29	Steam Generator Blowdown	-	378	21	27	319	215	-	202	1,162	1,162	-	-	1,906	631	-	-	-	118,130	5,179	-
4a.1.5.30	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-

Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4a.1.5.31	Turbine & Moisture Separators	-	377	-	-	-	-	-	57	434	-	-	434	-	-	-	-	-	-	5,472	-
4a.1.5.32	Turbine Oil Purification	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	757	-
4a.1.5.33	Water Treatment	-	453	-	-	-	-	-	68	521	-	-	521	-	-	-	-	-	-	6,677	-
4a.1.5.34	Water Treatment - RCA	-	20	0	1	19	-	-	8	49	49	-	-	115	-	-	-	-	4,652	252	-
4a.1.5	Totals	-	3,779	43	108	2,177	215	-	1,091	7,413	4,480	-	2,933	13,010	631	-	-	-	569,060	53,681	-
4a.1.6	Scaffolding in support of decommissioning	-	2,865	22	10	188	30	-	755	3,870	3,870	-	-	1,012	89	-	-	-	51,216	23,719	-
4a.1	Subtotal Period 4a Activity Costs	144	24,706	17,607	3,470	6,506	17,096	556	23,908	93,993	91,059	-	2,933	41,476	29,226	-	673	-	3,937,863	188,606	5,187
Period 4a Additional Costs																					
4a.2.1	Retired RPV Upper Internals Package	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
4a.2	Subtotal Period 4a Additional Costs	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	3	-	4	8	-	17	-	7	39	39	-	-	-	40	-	-	-	2,408	8	-
4a.3.3	Small tool allowance	-	241	-	-	-	-	-	36	277	249	-	28	-	-	-	-	-	-	-	-
4a.3.4	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,660	-	1,660	-	1,660	-	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	3	241	4	8	-	17	1,660	43	1,976	288	1,660	28	-	40	-	-	-	2,408	8	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	100	-	-	-	-	-	-	25	125	125	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	643	64	708	708	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	4,395	439	4,834	2,954	1,881	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,882	-	-	-	-	-	470	2,352	2,352	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	3,325	-	-	-	-	-	499	3,824	3,824	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	70	29	-	293	-	85	477	477	-	-	-	3,556	-	-	-	71,113	116	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	2,047	307	2,354	2,354	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC ISFSI Fees	-	-	-	-	-	-	159	16	175	-	175	-	-	-	-	-	-	-	-	-
4a.4.9	NRC Fees	-	-	-	-	-	-	420	42	461	461	-	-	-	-	-	-	-	-	-	-
4a.4.10	Emergency Planning Fees	-	-	-	-	-	-	99	10	108	-	108	-	-	-	-	-	-	-	-	-
4a.4.11	Fixed Overhead	-	-	-	-	-	-	1,581	237	1,818	1,818	-	-	-	-	-	-	-	-	-	-
4a.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	565	85	649	649	-	-	-	-	-	-	-	-	-	-
4a.4.13	ISFSI Operating Costs	-	-	-	-	-	-	74	11	86	-	86	-	-	-	-	-	-	-	-	-
4a.4.14	Railroad Track Maintenance	-	-	-	-	-	-	83	12	96	96	-	-	-	-	-	-	-	-	-	-
4a.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,489	223	1,712	1,712	-	-	-	-	-	-	-	-	-	-
4a.4.16	Security Staff Cost	-	-	-	-	-	-	5,911	887	6,798	5,159	1,638	-	-	-	-	-	-	-	-	91,140
4a.4.17	DOC Staff Cost	-	-	-	-	-	-	17,103	2,565	19,668	19,668	-	-	-	-	-	-	-	-	-	189,200
4a.4.18	Utility Staff Cost	-	-	-	-	-	-	21,408	3,211	24,619	23,856	763	-	-	-	-	-	-	-	-	337,712
4a.4	Subtotal Period 4a Period-Dependent Costs	100	5,207	70	29	-	293	55,975	9,189	70,863	66,212	4,651	-	-	3,556	-	-	-	71,113	116	618,052
4a.0	TOTAL PERIOD 4a COST	246	30,282	17,847	3,564	6,506	18,989	58,190	34,084	169,711	160,439	6,311	2,961	41,476	33,394	125	673	-	4,061,184	190,397	623,305
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	314	35	86	41	-	703	-	356	1,535	1,535	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
4b.1.2.1	ADT & Misc Ventilation	-	22	1	1	26	3	-	10	63	63	-	-	153	9	-	-	-	6,803	325	-
4b.1.2.2	Aux Bldg Normal Ventilation	-	62	2	6	116	13	-	37	237	237	-	-	692	39	-	-	-	30,595	906	-
4b.1.2.3	Aux Bldg Special Ventilation	-	12	0	1	12	2	-	5	32	32	-	-	70	6	-	-	-	3,234	176	-
4b.1.2.4	Battery Rm Special Ventilation	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	24	-
4b.1.2.5	Boron Recycle	-	3	0	0	0	3	-	2	9	9	-	-	3	9	-	-	-	700	45	-
4b.1.2.6	Chemical & Volume Control	-	858	62	57	394	677	-	458	2,507	2,507	-	-	2,356	1,977	-	-	-	223,753	11,575	-
4b.1.2.7	Cold Chemical Lab Ventilation	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
4b.1.2.8	Component Cooling - RCA	-	647	25	88	2,007	-	-	479	3,246	3,246	-	-	11,996	-	-	-	-	487,169	8,583	-
4b.1.2.9	Containment Cooling	-	35	-	-	-	-	-	5	40	-	-	40	-	-	-	-	-	-	502	-
4b.1.2.10	Containment Cooling - RCA	-	302	6	20	459	-	-	148	934	934	-	-	2,743	-	-	-	-	111,390	3,949	-
4b.1.2.11	Containment Hydrogen Control - RCA	-	36	0	1	24	-	-	13	74	74	-	-	141	-	-	-	-	5,742	494	-
4b.1.2.12	Containment Spray - RCA	-	194	3	11	243	-	-	87	538	538	-	-	1,453	-	-	-	-	59,019	2,617	-
4b.1.2.13	Containment Ventilation	-	211	23	49	790	243	-	242	1,558	1,558	-	-	4,721	722	-	-	-	237,643	3,016	-
4b.1.2.14	Control/Relay/Cmptr Rm Vent	-	28	1	2	44	7	-	16	98	98	-	-	260	20	-	-	-	11,878	406	-
4b.1.2.15	Cooling Water	-	159	-	-	-	-	-	24	183	-	-	183	-	-	-	-	-	-	2,344	-
4b.1.2.16	Cooling Water - RCA	-	476	17	62	1,412	-	-	342	2,310	2,310	-	-	8,442	-	-	-	-	342,822	6,311	-
4b.1.2.17	Cranes/Hoists/Elevators - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
4b.1.2.18	D3 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-
4b.1.2.19	D4 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-

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Prairie Island SAFSTOR Unit 2
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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4b.1.2.20	D5 Emergency Diesel	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
4b.1.2.21	Electrical - Clean	-	1,714	-	-	-	-	-	257	1,972	-	-	1,972	-	-	-	-	-	-	24,276	-
4b.1.2.22	Electrical - Contaminated	-	430	5	16	334	25	-	167	978	978	-	-	1,997	75	-	-	-	85,887	5,813	-
4b.1.2.23	Electrical - Contaminated - Fuel Pool	-	184	2	7	145	11	-	72	421	421	-	-	864	33	-	-	-	37,167	2,488	-
4b.1.2.24	Electrical - Decontaminated	-	2,955	38	138	3,138	-	-	1,234	7,503	7,503	-	-	18,753	-	-	-	-	761,569	38,423	-
4b.1.2.25	Electrical - Decontaminated - Fuel Pool	-	1,269	17	59	1,350	-	-	530	3,225	3,225	-	-	8,069	-	-	-	-	327,668	16,495	-
4b.1.2.26	Filter Rm Ventilation	-	4	0	0	4	0	-	2	10	10	-	-	24	1	-	-	-	1,017	61	-
4b.1.2.27	Fire Protection & Detection	-	204	-	-	-	-	-	31	235	-	-	235	-	-	-	-	-	-	3,009	-
4b.1.2.28	Fire Protection & Detection - RCA	-	246	4	13	306	-	-	110	679	679	-	-	1,828	-	-	-	-	74,245	3,134	-
4b.1.2.29	Fire Protection & Detection - RCA Fuel P	-	37	1	2	48	-	-	17	105	105	-	-	286	-	-	-	-	11,622	476	-
4b.1.2.30	Fuel Handling	-	66	1	2	34	17	-	26	146	146	-	-	200	49	-	-	-	11,273	983	-
4b.1.2.31	Fuel Oil	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
4b.1.2.32	HVAC - Clean	-	151	-	-	-	-	-	23	174	-	-	174	-	-	-	-	-	-	2,373	-
4b.1.2.33	HVAC - Contaminated	-	1,112	29	87	1,798	136	-	598	3,759	3,759	-	-	10,745	405	-	-	-	462,103	14,282	-
4b.1.2.34	HVAC - Contaminated - Fuel Pool	-	499	13	39	808	61	-	268	1,689	1,689	-	-	4,828	182	-	-	-	207,612	6,417	-
4b.1.2.35	Heating	-	322	-	-	-	-	-	48	370	-	-	370	-	-	-	-	-	-	4,804	-
4b.1.2.36	Heating - RCA	-	337	4	14	319	-	-	135	809	809	-	-	1,907	-	-	-	-	77,458	4,086	-
4b.1.2.37	Hot Lab & Sample Rm Ventilation	-	17	0	1	18	1	-	8	46	46	-	-	107	4	-	-	-	4,622	255	-
4b.1.2.38	Incore Instrumentation	-	27	1	2	10	20	-	13	73	73	-	-	60	58	-	-	-	6,143	412	-
4b.1.2.39	Misc Drains & Vents	-	213	12	12	77	145	-	104	563	563	-	-	458	426	-	-	-	46,079	2,841	-
4b.1.2.40	Misc Lab & Service Areas Vent	-	118	8	8	62	84	-	62	342	342	-	-	370	244	-	-	-	30,899	1,537	-
4b.1.2.41	Miscellaneous Gas	-	72	-	-	-	-	-	11	83	-	-	83	-	-	-	-	-	-	1,073	-
4b.1.2.42	Miscellaneous Gas - RCA	-	134	1	4	100	-	-	49	289	289	-	-	600	-	-	-	-	24,378	1,636	-
4b.1.2.43	Radiation Monitoring	-	7	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	111	-
4b.1.2.44	Radiation Monitoring - RCA	-	65	1	2	53	-	-	25	145	145	-	-	316	-	-	-	-	12,826	782	-
4b.1.2.45	Reactor Coolant	-	216	20	16	38	249	-	126	666	666	-	-	229	730	-	-	-	56,440	2,891	-
4b.1.2.46	Reactor Hot Sampling	-	116	11	7	9	108	-	60	311	311	-	-	54	312	-	-	-	22,678	1,499	-
4b.1.2.47	Reactor Makeup	-	41	-	-	-	-	-	6	47	-	-	47	-	-	-	-	-	-	583	-
4b.1.2.48	Reactor Makeup - RCA	-	4	0	0	5	-	-	2	11	11	-	-	28	-	-	-	-	1,148	47	-
4b.1.2.49	Reactor Vessel	-	16	1	0	4	5	-	6	32	32	-	-	22	14	-	-	-	1,816	225	-
4b.1.2.50	Residual Heat Removal	-	354	84	86	477	1,102	-	457	2,562	2,562	-	-	2,853	3,244	-	-	-	324,232	5,039	-
4b.1.2.51	Safeguards Chilled Water	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
4b.1.2.52	Safeguards Chilled Water - RCA	-	5	0	0	4	-	-	2	11	11	-	-	26	-	-	-	-	1,045	51	-
4b.1.2.53	Safety Injection	-	793	42	72	1,117	395	-	479	2,898	2,898	-	-	6,676	1,161	-	-	-	345,708	11,029	-
4b.1.2.54	Sampling	-	48	3	2	6	32	-	22	113	113	-	-	37	93	-	-	-	7,628	645	-
4b.1.2.55	Service Bldg & New Cmptr Vent	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	6	-
4b.1.2.56	Shield Bldg Ventilation	-	108	13	25	339	163	-	124	771	771	-	-	2,028	484	-	-	-	113,139	1,555	-
4b.1.2.57	Spent Fuel Pool Cooling	-	33	3	2	6	37	-	19	101	101	-	-	39	107	-	-	-	8,481	427	-
4b.1.2.58	Spent Fuel Pool Normal Ventilation	-	24	1	2	44	4	-	14	90	90	-	-	265	12	-	-	-	11,505	352	-
4b.1.2.59	Station & Instrument Air	-	161	-	-	-	-	-	24	185	-	-	185	-	-	-	-	-	-	2,424	-
4b.1.2.60	Station & Instrument Air - RCA	-	299	3	12	272	-	-	118	704	704	-	-	1,625	-	-	-	-	65,986	3,638	-
4b.1.2.61	Turbine Bldg Traps & Drains	-	30	-	-	-	-	-	5	35	-	-	35	-	-	-	-	-	-	462	-
4b.1.2.62	Turbine Bldg Traps & Drains - RCA	-	30	0	1	30	-	-	12	73	73	-	-	180	-	-	-	-	7,321	344	-
4b.1.2.63	Turbine Bldg Ventilation	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	655	-
4b.1.2.64	Unit Coolers	-	23	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	332	-
4b.1.2.65	Unit Coolers - RCA	-	56	0	2	39	-	-	20	117	117	-	-	232	-	-	-	-	9,413	690	-
4b.1.2.66	Waste Gas Disposal	-	438	43	45	410	464	-	298	1,699	1,699	-	-	2,453	1,358	-	-	-	187,339	5,879	-
4b.1.2.67	Waste Liquid Disposal	-	1,642	116	100	612	1,234	-	837	4,541	4,541	-	-	3,655	3,594	-	-	-	381,754	22,011	-
4b.1.2.68	Waste Solid Disposal	-	132	12	11	65	134	-	79	433	433	-	-	389	393	-	-	-	41,177	1,781	-
4b.1.2	Totals	-	17,877	633	1,092	17,625	5,377	-	8,385	50,989	47,545	-	3,444	105,339	15,761	-	-	-	5,294,310	240,033	-
4b.1.3	Scaffolding in support of decommissioning	-	4,297	33	15	281	45	-	1,133	5,804	5,804	-	-	1,518	134	-	-	-	76,824	35,578	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor	1,096	2,528	240	1,236	373	7,080	-	3,215	15,768	15,768	-	-	2,230	67,331	-	-	-	3,286,725	45,740	-
4b.1.4.2	Auxiliary	1,168	375	23	117	177	648	-	886	3,395	3,395	-	-	1,060	6,118	-	-	-	332,495	21,235	-
4b.1.4.3	Backwash Waste Receiving Tank	-	25	3	17	-	97	-	33	175	175	-	-	-	929	-	-	-	43,896	266	-
4b.1.4.4	Drum Transfer & Truck Loading Enclosure	16	8	1	3	3	14	-	15	59	59	-	-	19	135	-	-	-	7,118	328	-
4b.1.4.5	LLRW Storage Enclosure	111	48	3	17	6	96	-	95	377	377	-	-	38	920	-	-	-	44,971	2,151	-
4b.1.4.6	Radwaste	50	21	1	8	7	43	-	43	174	174	-	-	42	412	-	-	-	21,136	964	-
4b.1.4.7	Resin Disposal	15	11	1	3	14	14	-	16	72	72	-	-	83	124	-	-	-	9,271	340	-
4b.1.4.8	Fuel Handling of Aux Building	924	1,015	13	45	404	195	-	833	3,430	3,430	-	-	2,417	1,652	-	-	-	177,755	27,145	-
4b.1.4	Totals	3,380	4,031	285	1,445	985	8,187	-	5,137	23,450	23,450	-	-	5,889	77,619	-	-	-	3,923,368	98,170	-
4b.1.5	Prepare/submit License Termination Plan	-	-	-	-	-	-	225	34	259	259	-	-	-	-	-	-	-	-	-	1,751
4b.1.6	Receive NRC approval of termination plan									a											

Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
4b.1	Subtotal Period 4b Activity Costs	3,693	26,240	1,036	2,594	18,892	14,312	225	15,045	82,037	78,593	-	3,444	112,746	95,607	-	-	-	9,427,420	374,358	1,751
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
4b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
4b.2.3	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
4b.2	Subtotal Period 4b Additional Costs	-	1,175	11	36	606	-	1,262	736	3,827	3,827	-	-	5,880	-	-	-	-	147,000	7,427	6,240
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	7	-	12	21	-	48	-	20	107	107	-	-	-	109	-	-	-	6,547	21	-
4b.3.3	Small tool allowance	-	443	-	-	-	-	-	66	509	509	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
4b.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,225	-	2,225	-	2,225	-	-	-	-	-	-	-	-	-
4b.3	Subtotal Period 4b Collateral Costs	7	443	142	88	1,112	225	2,225	320	4,563	2,338	2,225	-	6,000	638	-	-	-	310,155	168	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,449	-	-	-	-	-	-	362	1,811	1,811	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	862	86	949	949	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	5,715	572	6,287	3,785	2,502	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	3,213	-	-	-	-	-	803	4,016	4,016	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,577	-	-	-	-	-	687	5,263	5,263	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	116	47	-	482	-	139	784	784	-	-	-	5,851	-	-	-	117,027	191	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,165	325	2,490	2,490	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC ISFSI Fees	-	-	-	-	-	-	213	21	234	-	234	-	-	-	-	-	-	-	-	-
4b.4.9	NRC Fees	-	-	-	-	-	-	562	56	618	618	-	-	-	-	-	-	-	-	-	-
4b.4.10	Emergency Planning Fees	-	-	-	-	-	-	132	13	145	-	145	-	-	-	-	-	-	-	-	-
4b.4.11	Fixed Overhead	-	-	-	-	-	-	2,118	318	2,436	2,436	-	-	-	-	-	-	-	-	-	-
4b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	757	113	870	870	-	-	-	-	-	-	-	-	-	-
4b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	100	15	115	-	115	-	-	-	-	-	-	-	-	-
4b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	111	17	128	128	-	-	-	-	-	-	-	-	-	-
4b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,995	299	2,294	2,294	-	-	-	-	-	-	-	-	-	-
4b.4.16	Security Staff Cost	-	-	-	-	-	-	10,435	1,565	12,000	8,988	3,012	-	-	-	-	-	-	-	-	160,203
4b.4.17	DOC Staff Cost	-	-	-	-	-	-	22,641	3,396	26,038	26,038	-	-	-	-	-	-	-	-	-	248,175
4b.4.18	Utility Staff Cost	-	-	-	-	-	-	28,347	4,252	32,600	31,361	1,239	-	-	-	-	-	-	-	-	440,789
4b.4	Subtotal Period 4b Period-Dependent Costs	1,449	7,790	116	47	-	482	76,155	13,040	99,079	91,832	7,247	-	-	5,851	-	-	-	117,027	191	849,167
4b.0	TOTAL PERIOD 4b COST	5,149	35,647	1,305	2,766	20,610	15,020	79,868	29,142	189,506	176,590	9,472	3,444	124,626	102,096	-	-	-	10,001,600	382,144	857,159
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
4f.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	218	33	250	-	250	-	-	-	-	-	-	-	-	-
4f.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	934	-	934	-	934	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	2,416	222	2,638	1,454	1,185	-	-	-	-	-	-	-	-	-
Period 4f Period-Dependent Costs																					
4f.4.1	Insurance	-	-	-	-	-	-	362	36	398	-	398	-	-	-	-	-	-	-	-	-
4f.4.2	Property taxes	-	-	-	-	-	-	2,306	231	2,537	1,469	1,068	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	710	-	-	-	-	-	178	888	888	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	7	3	-	28	-	8	45	45	-	-	-	334	-	-	-	6,685	11	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC ISFSI Fees	-	-	-	-	-	-	90	9	98	-	98	-	-	-	-	-	-	-	-	-
4f.4.7	NRC Fees	-	-	-	-	-	-	263	26	290	290	-	-	-	-	-	-	-	-	-	-
4f.4.8	Emergency Planning Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
4f.4.9	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
4f.4.10	ISFSI Operating Costs	-	-	-	-	-	-	42	6	48	-	48	-	-	-	-	-	-	-	-	-

Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 4f Period-Dependent Costs (continued)																					
4f.4.11	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
4f.4.12	Security Staff Cost	-	-	-	-	-	-	1,835	275	2,111	927	1,184	-	-	-	-	-	-	-	-	27,614
4f.4.13	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
4f.4.14	Utility Staff Cost	-	-	-	-	-	-	4,011	602	4,613	4,175	438	-	-	-	-	-	-	-	-	59,507
4f.4	Subtotal Period 4f Period-Dependent Costs	-	710	7	3	-	28	14,382	2,189	17,319	14,022	3,296	-	-	334	-	-	-	6,685	11	133,404
4f.0	TOTAL PERIOD 4f COST	-	710	7	3	-	28	24,006	4,574	29,327	24,846	4,481	-	-	334	-	-	-	6,685	100,906	136,524
PERIOD 4 TOTALS		5,395	66,639	19,159	6,333	27,115	34,036	162,064	67,800	388,543	361,874	20,263	6,405	166,102	135,824	125	673	-	14,069,470	673,447	1,616,988
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor	-	4,645	-	-	-	-	-	697	5,342	-	-	5,342	-	-	-	-	-	-	44,679	-
5b.1.1.2	Auxiliary	-	1,993	-	-	-	-	-	299	2,291	-	-	2,291	-	-	-	-	-	-	11,902	-
5b.1.1.3	Condensate Storage Tank Foundation	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	33	-
5b.1.1.4	Construction Warehouse & Fab Shop	-	130	-	-	-	-	-	19	149	-	-	149	-	-	-	-	-	-	1,405	-
5b.1.1.5	D3/D4 Emergency Generator	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	84	-
5b.1.1.6	Drum Transfer & Truck Loading Enclosure	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	221	-
5b.1.1.7	Hydrogen House	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	47	-
5b.1.1.8	LLRW Storage Enclosure	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	853	-
5b.1.1.9	Misc Structures 2017	-	2,617	-	-	-	-	-	393	3,009	-	-	3,009	-	-	-	-	-	-	22,582	-
5b.1.1.10	Radwaste	-	176	-	-	-	-	-	26	202	-	-	202	-	-	-	-	-	-	1,400	-
5b.1.1.11	Resin Disposal	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	120	-
5b.1.1.12	Structures below 3' below grade	-	1,785	-	-	-	-	-	268	2,052	-	-	2,052	-	-	-	-	-	-	9,238	-
5b.1.1.13	Sulfuric Acid Tank Enclosure	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	35	-
5b.1.1.14	Turbine	-	2,140	-	-	-	-	-	321	2,461	-	-	2,461	-	-	-	-	-	-	21,997	-
5b.1.1.15	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
5b.1.1.16	Warehouse #2	-	24	-	-	-	-	-	4	27	-	-	27	-	-	-	-	-	-	213	-
5b.1.1.17	Waste Neutralizing Tank House	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	56	-
5b.1.1.18	Waste Oil Storage	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	70	-
5b.1.1.19	Water Treatment	-	324	-	-	-	-	-	49	373	-	-	373	-	-	-	-	-	-	2,690	-
5b.1.1.20	Fuel Handling of Aux Building	-	1,095	-	-	-	-	-	164	1,259	-	-	1,259	-	-	-	-	-	-	8,240	-
5b.1.1	Totals	-	15,501	-	-	-	-	-	2,325	17,826	-	-	17,826	-	-	-	-	-	-	127,723	-
Site Closeout Activities																					
5b.1.2	Remove Rubble	-	1,517	-	-	-	-	-	228	1,745	-	-	1,745	-	-	-	-	-	-	7,408	-
5b.1.3	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	86	13	99	99	-	-	-	-	-	-	-	-	-	667
5b.1	Subtotal Period 5b Activity Costs	-	17,466	-	-	-	-	86	2,633	20,185	99	-	20,086	-	-	-	-	-	-	136,051	667
Period 5b Additional Costs																					
5b.2.1	Clean Concrete Disposal	-	4,912	-	-	-	-	10	738	5,660	-	-	5,660	-	-	-	-	-	-	18,372	-
5b.2.2	Intake Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
5b.2.3	Construction Debris	-	-	-	-	-	-	2,150	323	2,473	-	-	2,473	-	-	-	-	-	-	-	-
5b.2.4	Backfill	-	9,257	-	-	-	-	-	1,388	10,645	-	-	10,645	-	-	-	-	-	-	9,327	-
5b.2.5	Disposition of Original Casks	-	24	80	418	-	2,390	-	728	3,640	3,640	-	-	-	8,929	-	-	-	1,059,612	146	-
5b.2	Subtotal Period 5b Additional Costs	-	14,634	80	418	-	2,390	2,160	3,244	22,926	3,640	-	19,286	-	8,929	-	-	-	1,059,612	31,397	-
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	213	-	-	-	-	-	32	245	-	-	245	-	-	-	-	-	-	-	-
5b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	5,519	828	6,347	-	6,347	-	-	-	-	-	-	-	-	-
5b.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,649	-	2,649	-	2,649	-	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	213	-	-	-	-	8,168	860	9,241	-	8,996	245	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	513	51	565	-	565	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	5,904	590	6,494	-	2,663	3,831	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	395	-	-	-	-	-	-	-	-	-
5b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	326	33	359	-	359	-	-	-	-	-	-	-	-	-
5b.4.6	Emergency Planning Fees	-	-	-	-	-	-	157	16	173	-	173	-	-	-	-	-	-	-	-	-
5b.4.7	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	-	781	397	-	-	-	-	-	-	-	-
5b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	119	18	136	-	136	-	-	-	-	-	-	-	-	-

Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 5b Period-Dependent Costs (continued)																					
5b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	133	20	152	(0)	97	56	-	-	-	-	-	-	-	-
5b.4.10	Security Staff Cost	-	-	-	-	-	-	4,976	746	5,722	0	5,310	412	-	-	-	-	-	-	-	74,431
5b.4.11	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
5b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,170	776	5,946	-	1,278	4,668	-	-	-	-	-	-	-	76,637
5b.4	Subtotal Period 5b Period-Dependent Costs	-	7,144	-	-	-	-	29,587	5,165	41,895	0	11,757	30,139	-	-	-	-	-	-	-	267,952
5b.0	TOTAL PERIOD 5b COST	-	39,457	80	418	-	2,390	40,001	11,901	94,247	3,739	20,753	69,756	-	8,929	-	-	-	1,059,612	167,448	268,620
PERIOD 5c - Fuel Storage Operations/Shipping																					
Period 5c Direct Decommissioning Activities																					
Period 5c Collateral Costs																					
5c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	89,253	13,388	102,641	-	102,641	-	-	-	-	-	-	-	-	-
5c.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	27,796	-	27,796	-	27,796	-	-	-	-	-	-	-	-	-
5c.3	Subtotal Period 5c Collateral Costs	-	-	-	-	-	-	117,049	13,388	130,437	-	130,437	-	-	-	-	-	-	-	-	-
Period 5c Period-Dependent Costs																					
5c.4.1	Insurance	-	-	-	-	-	-	5,388	539	5,927	-	5,927	-	-	-	-	-	-	-	-	-
5c.4.2	Property taxes	-	-	-	-	-	-	31,074	3,107	34,181	-	34,181	-	-	-	-	-	-	-	-	-
5c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	3,422	342	3,764	-	3,764	-	-	-	-	-	-	-	-	-
5c.4.5	Emergency Planning Fees	-	-	-	-	-	-	1,650	165	1,815	-	1,815	-	-	-	-	-	-	-	-	-
5c.4.6	Fixed Overhead	-	-	-	-	-	-	3,626	544	4,170	-	4,170	-	-	-	-	-	-	-	-	-
5c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	1,245	187	1,432	-	1,432	-	-	-	-	-	-	-	-	-
5c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	1,391	209	1,600	-	1,600	-	-	-	-	-	-	-	-	-
5c.4.9	Security Staff Cost	-	-	-	-	-	-	42,996	6,449	49,446	-	49,446	-	-	-	-	-	-	-	-	624,838
5c.4.10	DOC Staff Cost	-	-	-	-	-	-	3,411	512	3,922	-	3,922	-	-	-	-	-	-	-	-	23,142
5c.4.11	Utility Staff Cost	-	-	-	-	-	-	21,001	3,150	24,151	-	24,151	-	-	-	-	-	-	-	-	306,633
5c.4	Subtotal Period 5c Period-Dependent Costs	-	-	-	-	-	-	115,204	15,204	130,408	-	130,408	-	-	-	-	-	-	-	-	954,613
5c.0	TOTAL PERIOD 5c COST	-	-	-	-	-	-	232,252	28,592	260,844	-	260,844	-	-	-	-	-	-	-	-	954,613
PERIOD 5d - GTCC shipping																					
Period 5d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
5d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
5d.1.1	Totals	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
5d.1	Subtotal Period 5d Activity Costs	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
Period 5d Collateral Costs																					
5d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
5d.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-
5d.3	Subtotal Period 5d Collateral Costs	-	-	-	-	-	-	76	4	80	-	80	-	-	-	-	-	-	-	-	-
Period 5d Period-Dependent Costs																					
5d.4.1	Insurance	-	-	-	-	-	-	9	1	10	10	-	-	-	-	-	-	-	-	-	-
5d.4.2	Property taxes	-	-	-	-	-	-	53	5	58	58	-	-	-	-	-	-	-	-	-	-
5d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	4	0	4	-	4	-	-	-	-	-	-	-	-	-
5d.4.5	Emergency Planning Fees	-	-	-	-	-	-	3	0	3	-	3	-	-	-	-	-	-	-	-	-
5d.4.6	Fixed Overhead	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
5d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	2	0	3	3	-	-	-	-	-	-	-	-	-	-
5d.4.8	Security Staff Cost	-	-	-	-	-	-	74	11	85	85	-	-	-	-	-	-	-	-	-	1,077
5d.4.9	Utility Staff Cost	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	269
5d.4	Subtotal Period 5d Period-Dependent Costs	-	-	-	-	-	-	171	22	194	186	7	-	-	-	-	-	-	-	-	1,346
5d.0	TOTAL PERIOD 5d COST	-	-	1,444	-	-	8,680	247	1,689	12,060	11,973	87	-	-	-	-	-	1,773	344,823	-	1,346
PERIOD 5e - ISFSI Decontamination																					
Period 5e Direct Decommissioning Activities																					
Period 5e Additional Costs																					
5e.2.1	License Termination ISFSI	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161
5e.2	Subtotal Period 5e Additional Costs	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161

Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 5e Period-Dependent Costs																					
5e.4.1	Insurance	-	-	-	-	-	-	93	23	116	116	-	-	-	-	-	-	-	-	-	-
5e.4.2	Property taxes	-	-	-	-	-	-	56	14	69	69	-	-	-	-	-	-	-	-	-	-
5e.4.3	Plant energy budget	-	-	-	-	-	-	11	3	13	13	-	-	-	-	-	-	-	-	-	-
5e.4.4	Fixed Overhead	-	-	-	-	-	-	54	14	68	68	-	-	-	-	-	-	-	-	-	-
5e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	21	5	26	26	-	-	-	-	-	-	-	-	-	-
5e.4.6	Security Staff Cost	-	-	-	-	-	-	174	43	217	217	-	-	-	-	-	-	-	-	-	2,500
5e.4.7	Utility Staff Cost	-	-	-	-	-	-	129	32	161	161	-	-	-	-	-	-	-	-	-	1,896
5e.4	Subtotal Period 5e Period-Dependent Costs	-	-	-	-	-	-	536	134	670	670	-	-	-	-	-	-	-	-	-	4,396
5e.0	TOTAL PERIOD 5e COST	-	0	2	17	-	142	1,733	473	2,367	2,367	-	-	-	424	-	-	-	65,754	5,882	5,556
PERIOD 5f - ISFSI Site Restoration																					
Period 5f Direct Decommissioning Activities																					
Period 5f Additional Costs																					
5f.2.1	Demolition and Site Restoration of ISFSI	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
5f.2	Subtotal Period 5f Additional Costs	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
Period 5f Collateral Costs																					
5f.3.1	Small tool allowance	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
5f.3	Subtotal Period 5f Collateral Costs	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
Period 5f Period-Dependent Costs																					
5f.4.2	Property taxes	-	-	-	-	-	-	28	3	31	-	-	31	-	-	-	-	-	-	-	-
5f.4.3	Heavy equipment rental	-	59	-	-	-	-	-	9	68	-	-	68	-	-	-	-	-	-	-	-
5f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	6	-	-	6	-	-	-	-	-	-	-	-
5f.4.5	Fixed Overhead	-	-	-	-	-	-	28	4	32	-	-	32	-	-	-	-	-	-	-	-
5f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	11	2	12	-	-	12	-	-	-	-	-	-	-	-
5f.4.7	Security Staff Cost	-	-	-	-	-	-	89	13	102	-	-	102	-	-	-	-	-	-	-	1,281
5f.4.8	Utility Staff Cost	-	-	-	-	-	-	55	8	63	-	-	63	-	-	-	-	-	-	-	795
5f.4	Subtotal Period 5f Period-Dependent Costs	-	59	-	-	-	-	216	40	315	-	-	315	-	-	-	-	-	-	-	2,076
5f.0	TOTAL PERIOD 5f COST	-	1,187	-	-	-	-	377	233	1,798	-	-	1,798	-	-	-	-	-	-	4,846	2,156
PERIOD 5 TOTALS		-	40,644	1,525	435	-	11,212	274,611	42,889	371,316	18,078	281,684	71,553	-	9,353	-	-	1,773	1,470,189	178,175	1,232,291
TOTAL COST TO DECOMMISSION		12,610	122,384	21,327	7,312	27,293	47,794	1,413,637	242,212	1,894,569	983,908	832,007	78,655	172,234	167,056	125	673	1,773	16,288,180	950,825	7,429,280

TOTAL COST TO DECOMMISSION WITH 14.66% CONTINGENCY:	**$1,894,569**	**thousands of 2020 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 51.93% OR:	**$983,908**	**thousands of 2020 dollars**
SPENT FUEL MANAGEMENT COST IS 43.92% OR:	**$832,007**	**thousands of 2020 dollars**
NON-NUCLEAR DEMOLITION COST IS 4.15% OR:	**$78,655**	**thousands of 2020 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**167,854**	**Cubic Feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**
TOTAL SCRAP METAL REMOVED:	**42,406**	**Tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**950,825**	**Man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX J

DETAILED COST ANALYSIS

SCENARIO 8: SAFSTOR with 200 Year DFS

Page

Prairie Island Nuclear Generating Plant, Unit 1 .....J-2

Prairie Island Nuclear Generating Plant, Unit 2 .....J-14

Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	415	124	539	539	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.11	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	193	29	222	222	-	-	-	-	-	-	-	-	-	1,500
1a.1.13	Define major work sequence	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
1a.1.14	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
1a.1.15	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
1a.1.16	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
1a.1.17	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
Activity Specifications																					
1a.1.18.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	632	95	727	727	-	-	-	-	-	-	-	-	-	4,920
1a.1.18.2	Plant systems	-	-	-	-	-	-	536	80	616	616	-	-	-	-	-	-	-	-	-	4,167
1a.1.18.3	Plant structures and buildings	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
1a.1.18.4	Waste management	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.18.5	Facility and site dormancy	-	-	-	-	-	-	257	39	296	296	-	-	-	-	-	-	-	-	-	2,000
1a.1.18	Total	-	-	-	-	-	-	2,083	312	2,395	2,395	-	-	-	-	-	-	-	-	-	16,207
Detailed Work Procedures																					
1a.1.19.1	Plant systems	-	-	-	-	-	-	152	23	175	175	-	-	-	-	-	-	-	-	-	1,183
1a.1.19.2	Facility closeout & dormancy	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
1a.1.19	Total	-	-	-	-	-	-	306	46	352	352	-	-	-	-	-	-	-	-	-	2,383
1a.1.20	Procure vacuum drying system	-	-	-	-	-	-	13	2	15	15	-	-	-	-	-	-	-	-	-	100
1a.1.21	Drain/de-energize non-cont. systems									a											
1a.1.22	Drain & dry NSSS									a											
1a.1.23	Drain/de-energize contaminated systems									a											
1a.1.24	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	6,120	980	7,100	7,100	-	-	-	-	-	-	-	-	-	44,390
Period 1a Collateral Costs																					
1a.3.1	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	614	-	-	-	-	-	153	767	767	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	50	-	14	82	82	-	-	-	610	-	-	-	12,190	20	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	892	89	981	981	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	26,931	4,040	30,971	30,971	-	-	-	-	-	-	-	-	-	422,240
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,367	12	5	-	50	47,211	6,945	55,590	52,648	2,942	-	-	610	-	-	-	12,190	20	544,960
1a.0	TOTAL PERIOD 1a COST	-	1,367	12	5	-	50	54,580	7,925	63,939	59,748	4,191	-	-	610	-	-	-	12,190	20	589,350

Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
1b.1.1	Totals	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
1b.1	Subtotal Period 1b Activity Costs	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	12,675	1,901	14,576	14,576	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	79	-	52	94	-	212	-	112	549	549	-	-	-	487	-	-	-	29,193	95	-
1b.3.4	Small tool allowance	-	20	-	-	-	-	-	3	23	23	-	-	-	-	-	-	-	-	-	-
1b.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,134	20	52	94	-	212	311	273	2,097	1,785	311	-	-	487	-	-	-	29,193	95	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	449	-	-	-	-	-	-	112	561	561	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	903	90	994	994	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	250	-	-	-	-	-	63	313	313	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	6	3	-	27	-	8	43	43	-	-	-	324	-	-	-	6,486	11	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1b.4	Subtotal Period 1b Period-Dependent Costs	449	438	6	3	-	27	11,709	1,866	14,498	13,764	733	-	-	324	-	-	-	6,486	11	135,867
1b.0	TOTAL PERIOD 1b COST	2,781	458	59	97	-	239	24,696	4,640	32,969	31,924	1,045	-	-	811	-	-	-	35,678	17,108	135,867
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	527	-	-	-	-	-	79	606	606	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	54	-	-	-	-	-	8	62	62	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	12,801	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	75	11	86	86	-	-	-	-	-	-	-	-	-	583
1c.1	Subtotal Period 1c Activity Costs	-	581	-	-	-	-	808	318	1,707	1,707	-	-	-	-	-	-	-	-	16,501	583
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	91	-	60	109	-	245	-	129	634	634	-	-	-	561	-	-	-	33,685	109	-
1c.3.3	Small tool allowance	-	5	-	-	-	-	-	1	6	6	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	163	25	188	-	188	-	-	-	-	-	-	-	-	-
1c.3.5	Retention and Severance	-	-	-	-	-	-	1,032	155	1,187	1,187	-	-	-	-	-	-	-	-	-	-
1c.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	91	5	60	109	-	245	1,507	309	2,325	1,826	499	-	-	561	-	-	-	33,685	109	-
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	903	90	994	994	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	248	-	-	-	-	-	62	309	309	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	1	-	13	-	4	20	20	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-

Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1c Period-Dependent Costs (continued)																					
1c.4.7	NRC Fees	-	-	-	-	-	-	161	16	177	177	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1c.4.9	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1c.4.13	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1c.4.14	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1c.4	Subtotal Period 1c Period-Dependent Costs	-	435	3	1	-	13	11,709	1,749	13,910	13,177	733	-	-	152	-	-	-	3,039	5	135,867
1c.0	TOTAL PERIOD 1c COST	91	1,021	63	110	-	257	14,024	2,376	17,943	16,710	1,233	-	-	713	-	-	-	36,724	16,615	136,450
PERIOD 1 TOTALS		2,873	2,846	134	212	-	546	93,299	14,941	114,851	108,382	6,468	-	-	2,134	-	-	-	84,593	33,743	861,667
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	54	8	62	62	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	520	130	650	650	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	574	138	712	712	-	-	-	-	-	-	-	-	-	-
Period 2a Additional Costs																					
2a.2.1	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	66,237	9,936	76,173	-	76,173	-	-	-	-	-	-	-	-	-
2a.3.2	Retention and Severance	-	-	-	-	-	-	22,434	3,365	25,799	25,799	-	-	-	-	-	-	-	-	-	-
2a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	4,654	-	4,654	-	4,654	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	93,325	13,301	106,626	25,799	80,827	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,804	180	1,985	1,985	-	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	13,489	1,349	14,838	14,838	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	801	-	-	-	-	-	200	1,001	1,001	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	14	6	-	59	-	17	96	96	-	-	-	714	-	-	-	14,273	23	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	1,208	181	1,389	1,389	-	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	908	91	999	999	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	6,924	692	7,616	-	7,616	-	-	-	-	-	-	-	-	-
2a.4.8	Fixed Overhead	-	-	-	-	-	-	4,432	665	5,097	5,097	-	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	1,573	236	1,809	-	1,809	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	209	31	240	-	240	-	-	-	-	-	-	-	-	-
2a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	462	69	531	531	-	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	29,334	4,400	33,734	24,289	9,446	-	-	-	-	-	-	-	-	431,215
2a.4.13	Utility Staff Cost	-	-	-	-	-	-	3,645	547	4,192	3,517	675	-	-	-	-	-	-	-	-	58,126
2a.4	Subtotal Period 2a Period-Dependent Costs	-	801	14	6	-	59	63,988	8,659	73,527	53,741	19,786	-	-	714	-	-	-	14,273	23	489,341
2a.0	TOTAL PERIOD 2a COST	-	801	14	6	-	59	162,235	22,750	185,865	85,251	100,614	-	-	714	-	-	-	14,273	23	489,341
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	704	106	810	810	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	6,792	1,698	8,490	8,490	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	7,496	1,804	9,300	9,300	-	-	-	-	-	-	-	-	-	-
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	122,995	18,449	141,444	-	141,444	-	-	-	-	-	-	-	-	-
2b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	60,797	-	60,797	-	60,797	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	183,792	18,449	202,241	-	202,241	-	-	-	-	-	-	-	-	-

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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	23,569	2,357	25,926	25,926	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	176,207	17,621	193,828	193,828	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	5,528	-	-	-	-	-	1,382	6,910	6,910	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	100	40	-	414	-	120	674	674	-	-	-	5,027	-	-	-	100,550	164	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	7,891	1,184	9,075	9,075	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	11,071	1,107	12,178	12,178	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	3,608	361	3,969	-	3,969	-	-	-	-	-	-	-	-	-
2b.4.8	Fixed Overhead	-	-	-	-	-	-	7,930	1,190	9,120	9,120	-	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	2,724	409	3,132	-	3,132	-	-	-	-	-	-	-	-	-
2b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	3,043	456	3,499	3,499	-	-	-	-	-	-	-	-	-	-
2b.4.11	Security Staff Cost	-	-	-	-	-	-	135,841	20,376	156,217	34,368	121,849	-	-	-	-	-	-	-	-	1,822,251
2b.4.12	Utility Staff Cost	-	-	-	-	-	-	66,470	9,970	76,440	48,005	28,436	-	-	-	-	-	-	-	-	1,012,362
2b.4	Subtotal Period 2b Period-Dependent Costs	-	5,528	100	40	-	414	438,354	56,532	500,968	343,582	157,386	-	-	5,027	-	-	-	100,550	164	2,834,613
2b.0	TOTAL PERIOD 2b COST	-	5,528	100	40	-	414	629,642	76,785	712,510	352,882	359,628	-	-	5,027	-	-	-	100,550	164	2,834,613
PERIOD 2 TOTALS		-	6,329	114	46	-	473	791,877	99,535	898,374	438,133	460,241	-	-	5,741	-	-	-	114,823	187	3,323,954
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	167	25	192	192	-	-	-	-	-	-	-	-	-	1,300
3a.1.6	Define major work sequence	-	-	-	-	-	-	964	145	1,108	1,108	-	-	-	-	-	-	-	-	-	7,500
3a.1.7	Perform SER and EA	-	-	-	-	-	-	398	60	458	458	-	-	-	-	-	-	-	-	-	3,100
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	643	96	739	739	-	-	-	-	-	-	-	-	-	5,000
Activity Specifications																					
3a.1.9.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	947	142	1,089	980	-	109	-	-	-	-	-	-	-	7,370
3a.1.9.2	Plant systems	-	-	-	-	-	-	536	80	616	554	-	62	-	-	-	-	-	-	-	4,167
3a.1.9.3	Reactor internals	-	-	-	-	-	-	912	137	1,049	1,049	-	-	-	-	-	-	-	-	-	7,100
3a.1.9.4	Reactor vessel	-	-	-	-	-	-	835	125	961	961	-	-	-	-	-	-	-	-	-	6,500
3a.1.9.5	Biological shield	-	-	-	-	-	-	64	10	74	74	-	-	-	-	-	-	-	-	-	500
3a.1.9.6	Steam generators	-	-	-	-	-	-	401	60	461	461	-	-	-	-	-	-	-	-	-	3,120
3a.1.9.7	Reinforced concrete	-	-	-	-	-	-	206	31	236	118	-	118	-	-	-	-	-	-	-	1,600
3a.1.9.8	Main Turbine	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
3a.1.9.9	Main Condensers	-	-	-	-	-	-	51	8	59	-	-	59	-	-	-	-	-	-	-	400
3a.1.9.10	Plant structures & buildings	-	-	-	-	-	-	401	60	461	231	-	231	-	-	-	-	-	-	-	3,120
3a.1.9.11	Waste management	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3a.1.9.12	Facility & site closeout	-	-	-	-	-	-	116	17	133	67	-	67	-	-	-	-	-	-	-	900
3a.1.9	Total	-	-	-	-	-	-	5,112	767	5,879	5,175	-	704	-	-	-	-	-	-	-	39,777
Planning & Site Preparations																					
3a.1.10	Prepare dismantling sequence	-	-	-	-	-	-	308	46	355	355	-	-	-	-	-	-	-	-	-	2,400
3a.1.11	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
3a.1.12	Design water clean-up system	-	-	-	-	-	-	180	27	207	207	-	-	-	-	-	-	-	-	-	1,400
3a.1.13	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
3a.1.14	Procure casks/liners & containers	-	-	-	-	-	-	158	24	182	182	-	-	-	-	-	-	-	-	-	1,230
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	14,717	2,208	16,925	16,221	-	704	-	-	-	-	-	-	-	68,607
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	3,520	1,056	4,576	4,576	-	-	-	-	-	-	-	-	21,020	8,332
3a.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
3a.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
3a.2	Subtotal Period 3a Additional Costs	-	2,526	356	244	178	1,369	3,520	2,129	10,321	10,321	-	-	6,132	12,843	-	-	-	518,936	44,275	8,332
Period 3a Collateral Costs																					
3a.3.1	Small tool allowance	-	34	-	-	-	-	-	5	39	39	-	-	-	-	-	-	-	-	-	-
3a.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	24,367	3,655	28,022	-	28,022	-	-	-	-	-	-	-	-	-
3a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
3a.3	Subtotal Period 3a Collateral Costs	-	34	-	-	-	-	25,616	3,660	29,310	39	29,271	-	-	-	-	-	-	-	-	-

Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Burial Volumes Class B Cu. Feet	Burial Volumes Class C Cu. Feet	Burial Volumes GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	484	48	533	307	225	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	3,618	362	3,980	2,551	1,429	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	670	-	-	-	-	-	167	837	837	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	4	-	42	-	12	69	69	-	-	-	516	-	-	-	10,311	17	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC ISFSI Fees	-	-	-	-	-	-	42	4	46	-	46	-	-	-	-	-	-	-	-	-
3a.4.8	NRC Fees	-	-	-	-	-	-	335	33	368	368	-	-	-	-	-	-	-	-	-	-
3a.4.9	Emergency Planning Fees	-	-	-	-	-	-	74	7	82	-	82	-	-	-	-	-	-	-	-	-
3a.4.10	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
3a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
3a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
3a.4.13	Security Staff Cost	-	-	-	-	-	-	4,632	695	5,327	5,044	282	-	-	-	-	-	-	-	-	69,160
3a.4.14	Utility Staff Cost	-	-	-	-	-	-	16,599	2,490	19,089	18,421	668	-	-	-	-	-	-	-	-	260,000
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,423	10	4	-	42	28,964	4,410	34,853	32,057	2,796	-	-	516	-	-	-	10,311	17	329,160
3a.0	TOTAL PERIOD 3a COST	-	3,983	366	248	178	1,412	72,817	12,406	91,409	58,638	32,067	704	6,132	13,359	-	-	-	529,247	44,292	406,099
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	608	91	700	630	-	70	-	-	-	-	-	-	-	4,733
3b.1.1.2	Reactor internals	-	-	-	-	-	-	321	48	369	369	-	-	-	-	-	-	-	-	-	2,500
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	174	26	200	50	-	150	-	-	-	-	-	-	-	1,350
3b.1.1.4	CRD cooling assembly	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.5	CRD housings & ICI tubes	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.6	Incore instrumentation	-	-	-	-	-	-	129	19	148	148	-	-	-	-	-	-	-	-	-	1,000
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	467	70	537	537	-	-	-	-	-	-	-	-	-	3,630
3b.1.1.8	Facility closeout	-	-	-	-	-	-	154	23	177	89	-	89	-	-	-	-	-	-	-	1,200
3b.1.1.9	Missile shields	-	-	-	-	-	-	58	9	67	67	-	-	-	-	-	-	-	-	-	450
3b.1.1.10	Biological shield	-	-	-	-	-	-	154	23	177	177	-	-	-	-	-	-	-	-	-	1,200
3b.1.1.11	Steam generators	-	-	-	-	-	-	591	89	680	680	-	-	-	-	-	-	-	-	-	4,600
3b.1.1.12	Reinforced concrete	-	-	-	-	-	-	129	19	148	74	-	74	-	-	-	-	-	-	-	1,000
3b.1.1.13	Main Turbine	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
3b.1.1.14	Main Condensers	-	-	-	-	-	-	200	30	231	-	-	231	-	-	-	-	-	-	-	1,560
3b.1.1.15	Auxiliary building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1.16	Reactor building	-	-	-	-	-	-	351	53	403	363	-	40	-	-	-	-	-	-	-	2,730
3b.1.1	Total	-	-	-	-	-	-	4,144	622	4,765	3,841	-	924	-	-	-	-	-	-	-	32,243
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	4,144	622	4,765	3,841	-	924	-	-	-	-	-	-	-	32,243
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
3b.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	26,241	3,936	30,177	-	30,177	-	-	-	-	-	-	-	-	-
3b.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	623	-	623	-	623	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	1,055	1,200	-	-	-	-	28,128	4,464	34,846	4,047	30,800	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	241	24	266	266	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	1,802	180	1,982	1,270	711	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	295	-	-	-	-	-	74	369	369	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	6	2	-	24	-	7	39	39	-	-	-	291	-	-	-	5,814	9	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	808	121	930	930	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC ISFSI Fees	-	-	-	-	-	-	21	2	23	-	23	-	-	-	-	-	-	-	-	-
3b.4.9	NRC Fees	-	-	-	-	-	-	167	17	183	183	-	-	-	-	-	-	-	-	-	-
3b.4.10	Emergency Planning Fees	-	-	-	-	-	-	37	4	41	-	41	-	-	-	-	-	-	-	-	-
3b.4.11	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-
3b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
3b.4.14	Security Staff Cost	-	-	-	-	-	-	2,310	346	2,656	2,515	141	-	-	-	-	-	-	-	-	34,485
3b.4.15	DOC Staff Cost	-	-	-	-	-	-	5,344	802	6,146	6,146	-	-	-	-	-	-	-	-	-	58,080
3b.4.16	Utility Staff Cost	-	-	-	-	-	-	8,277	1,242	9,518	9,185	333	-	-	-	-	-	-	-	-	129,644

Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
3b.4	Subtotal Period 3b Period-Dependent Costs	38	671	6	2	-	24	19,784	3,001	23,525	22,244	1,281	-	-	291	-	-	-	5,814	9	222,210
3b.0	TOTAL PERIOD 3b COST	1,092	1,871	6	2	-	24	52,055	8,086	63,137	30,132	32,081	924	-	291	-	-	-	5,814	9	254,453
PERIOD 3 TOTALS		1,092	5,853	372	251	178	1,436	124,872	20,492	154,546	88,770	64,148	1,628	6,132	13,649	-	-	-	535,061	44,301	660,551
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Reactor Coolant Piping	11	42	10	11	66	94	-	52	285	285	-	-	240	254	-	-	-	33,680	778	-
4a.1.1.2	Pressurizer Relief Tank	5	19	6	7	44	62	-	31	174	174	-	-	160	169	-	-	-	22,441	352	-
4a.1.1.3	Reactor Coolant Pumps & Motors	13	60	46	85	-	463	-	155	822	822	-	-	-	2,332	-	-	-	295,800	1,226	80
4a.1.1.4	Pressurizer	-	77	382	91	-	776	-	265	1,591	1,591	-	-	-	2,196	-	-	-	158,199	1,346	750
4a.1.1.5	Steam Generators	-	3,307	1,690	1,743	2,409	3,885	-	2,590	15,625	15,625	-	-	18,672	10,990	-	-	-	1,581,180	10,253	2,250
4a.1.1.6	CRDMs/ICIs/Service Structure Removal	63	248	205	44	326	454	-	283	1,623	1,623	-	-	2,138	2,146	-	-	-	165,025	4,449	-
4a.1.1.7	Reactor Vessel Internals	53	4,650	13,334	828	-	8,610	278	11,401	39,153	39,153	-	-	-	1,174	-	742	-	167,605	22,373	1,053
4a.1.1.8	Reactor Vessel	-	5,835	1,653	442	-	3,268	278	6,576	18,053	18,053	-	-	-	9,245	-	-	-	579,324	22,373	1,053
4a.1.1	Totals	146	14,237	17,327	3,250	2,845	17,613	556	21,352	77,327	77,327	-	-	21,210	28,505	-	742	-	3,003,254	63,151	5,187
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	292	116	35	555	-	-	173	1,170	1,170	-	-	2,243	-	-	-	-	134,601	4,116	-
4a.1.3	Main Condensers	-	2,510	79	33	742	-	-	752	4,115	4,115	-	-	4,000	-	-	-	-	180,000	34,978	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
4a.1.4	Totals	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
Disposal of Plant Systems																					
4a.1.5.1	Air Removal	-	31	-	-	-	-	-	5	36	-	-	36	-	-	-	-	-	-	452	-
4a.1.5.2	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	670	-
4a.1.5.3	Auxiliary Feedwater - RCA	-	47	0	2	36	-	-	17	102	102	-	-	215	-	-	-	-	8,722	601	-
4a.1.5.4	Bleed Steam	-	90	-	-	-	-	-	14	104	-	-	104	-	-	-	-	-	-	1,335	-
4a.1.5.5	Caustic Addition - RCA	-	38	0	2	39	-	-	16	95	95	-	-	233	-	-	-	-	9,453	444	-
4a.1.5.6	Chemical Feed	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	304	-
4a.1.5.7	Chemical Feed - RCA	-	1	0	0	1	-	-	0	3	3	-	-	6	-	-	-	-	243	12	-
4a.1.5.8	Circulating Water	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	619	-
4a.1.5.9	Condensate	-	474	-	-	-	-	-	71	545	-	-	545	-	-	-	-	-	-	6,837	-
4a.1.5.10	Condensate Polishing	-	235	-	-	-	-	-	35	271	-	-	271	-	-	-	-	-	-	3,420	-
4a.1.5.11	Condensate Polishing - RCA	-	183	4	15	348	-	-	101	651	651	-	-	2,078	-	-	-	-	84,395	2,329	-
4a.1.5.12	Electro-hydraulic	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	127	-
4a.1.5.13	Feedwater	-	153	-	-	-	-	-	23	175	-	-	175	-	-	-	-	-	-	2,215	-
4a.1.5.14	Feedwater - RCA	-	195	7	24	537	-	-	133	895	895	-	-	3,208	-	-	-	-	130,294	2,651	-
4a.1.5.15	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	505	-
4a.1.5.16	Heater Drain	-	400	-	-	-	-	-	60	460	-	-	460	-	-	-	-	-	-	5,881	-
4a.1.5.17	Internal Circ Water & CDSR	-	27	-	-	-	-	-	4	31	-	-	31	-	-	-	-	-	-	389	-
4a.1.5.18	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
4a.1.5.19	Main Steam	-	115	-	-	-	-	-	17	133	-	-	133	-	-	-	-	-	-	1,690	-
4a.1.5.20	Main Steam - RCA	-	366	10	37	844	-	-	225	1,482	1,482	-	-	5,044	-	-	-	-	204,825	4,956	-
4a.1.5.21	Steam Generator Blowdown	-	434	22	29	340	234	-	224	1,282	1,282	-	-	2,031	686	-	-	-	126,640	5,974	-
4a.1.5.22	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
4a.1.5.23	Turbine & Moisture Separators	-	386	-	-	-	-	-	58	444	-	-	444	-	-	-	-	-	-	5,609	-
4a.1.5.24	Turbine Oil Purification	-	70	-	-	-	-	-	11	81	-	-	81	-	-	-	-	-	-	1,003	-
4a.1.5	Totals	-	3,401	44	108	2,144	234	-	1,037	6,967	4,510	-	2,458	12,815	686	-	-	-	564,572	48,101	-
4a.1.6	Scaffolding in support of decommissioning	-	909	3	1	26	4	-	233	1,176	1,176	-	-	138	12	-	-	-	6,985	6,020	-
4a.1	Subtotal Period 4a Activity Costs	146	22,144	17,570	3,426	6,311	17,850	556	23,666	91,669	89,211	-	2,458	40,406	29,203	-	742	-	3,889,412	163,954	5,187
Period 4a Additional Costs																					
4a.2.1	Retired RPV upper internals package	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
4a.2	Subtotal Period 4a Additional Costs	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67

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Prairie Island SAFSTOR Unit 1
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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	2	-	4	8	-	17	-	7	38	38	-	-	-	39	-	-	-	2,337	8	-
4a.3.3	Small tool allowance	-	213	-	-	-	-	-	32	245	220	-	24	-	-	-	-	-	-	-	-
4a.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	2,163	324	2,487	-	2,487	-	-	-	-	-	-	-	-	-
4a.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,660	-	1,660	-	1,660	-	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	2	213	4	8	-	17	3,823	363	4,430	258	4,147	24	-	39	-	-	-	2,337	8	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	100	-	-	-	-	-	-	25	125	125	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	643	64	708	708	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	4,441	444	4,886	2,985	1,901	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,744	-	-	-	-	-	436	2,181	2,181	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	3,325	-	-	-	-	-	499	3,824	3,824	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	59	24	-	245	-	71	398	398	-	-	-	2,972	-	-	-	59,446	97	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	2,047	307	2,354	2,354	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC ISFSI Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
4a.4.9	NRC Fees	-	-	-	-	-	-	643	64	707	707	-	-	-	-	-	-	-	-	-	-
4a.4.10	Emergency Planning Fees	-	-	-	-	-	-	99	10	108	-	108	-	-	-	-	-	-	-	-	-
4a.4.11	Fixed Overhead	-	-	-	-	-	-	1,581	237	1,818	1,818	-	-	-	-	-	-	-	-	-	-
4a.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	565	85	649	649	-	-	-	-	-	-	-	-	-	-
4a.4.13	ISFSI Operating Costs	-	-	-	-	-	-	74	11	86	-	86	-	-	-	-	-	-	-	-	-
4a.4.14	Railroad Track Maintenance	-	-	-	-	-	-	83	12	96	96	-	-	-	-	-	-	-	-	-	-
4a.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,489	223	1,712	1,712	-	-	-	-	-	-	-	-	-	-
4a.4.16	Security Staff Cost	-	-	-	-	-	-	6,863	1,029	7,892	5,943	1,949	-	-	-	-	-	-	-	-	105,553
4a.4.17	DOC Staff Cost	-	-	-	-	-	-	17,190	2,579	19,769	19,769	-	-	-	-	-	-	-	-	-	189,964
4a.4.18	Utility Staff Cost	-	-	-	-	-	-	21,887	3,283	25,170	24,389	780	-	-	-	-	-	-	-	-	343,058
4a.4	Subtotal Period 4a Period-Dependent Costs	100	5,069	59	24	-	245	57,659	9,385	72,542	67,657	4,885	-	-	2,972	-	-	-	59,446	97	638,574
4a.0	TOTAL PERIOD 4a COST	248	27,554	17,799	3,516	6,311	19,695	62,038	34,358	171,520	160,006	9,032	2,482	40,406	32,786	125	742	-	4,000,995	165,725	643,828
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	314	35	86	41	-	703	-	356	1,535	1,535	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
4b.1.2.1	Aux Bldg Normal Ventilation	-	2	0	0	1	-	-	1	3	3	-	-	3	-	-	-	-	140	26	-
4b.1.2.3	Buildings Maintenance	-	5	-	-	-	-	-	1	5	-	-	5	-	-	-	-	-	-	65	-
4b.1.2.4	Chemical & Volume Control	-	1,263	89	90	753	973	-	694	3,861	3,861	-	-	4,498	2,846	-	-	-	366,565	17,235	-
4b.1.2.5	Component Cooling - RCA	-	858	25	91	2,079	-	-	543	3,597	3,597	-	-	12,427	-	-	-	-	504,675	11,242	-
4b.1.2.6	Containment Cooling	-	74	-	-	-	-	-	11	85	-	-	85	-	-	-	-	-	-	1,086	-
4b.1.2.7	Containment Cooling - RCA	-	304	7	25	569	-	-	166	1,070	1,070	-	-	3,400	-	-	-	-	138,090	3,971	-
4b.1.2.8	Containment Hydrogen Control - RCA	-	30	0	1	18	-	-	10	59	59	-	-	105	-	-	-	-	4,278	401	-
4b.1.2.9	Containment Spray - RCA	-	93	2	6	145	-	-	46	293	293	-	-	868	-	-	-	-	35,249	1,217	-
4b.1.2.10	Containment Ventilation	-	229	24	51	828	248	-	254	1,635	1,635	-	-	4,951	737	-	-	-	247,952	3,278	-
4b.1.2.11	Cooling Water	-	163	-	-	-	-	-	24	187	-	-	187	-	-	-	-	-	-	2,396	-
4b.1.2.12	Cooling Water - RCA	-	658	16	57	1,293	-	-	368	2,392	2,392	-	-	7,728	-	-	-	-	313,832	8,594	-
4b.1.2.13	D1 Emergency Diesel	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	730	-
4b.1.2.14	D2 Emergency Diesel	-	36	-	-	-	-	-	5	41	-	-	41	-	-	-	-	-	-	522	-
4b.1.2.15	Diesel Rooms Ventilation	-	9	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	135	-
4b.1.2.16	Electrical - Clean	-	1,905	-	-	-	-	-	286	2,191	-	-	2,191	-	-	-	-	-	-	26,981	-
4b.1.2.17	Electrical - Contaminated	-	553	7	20	423	32	-	213	1,248	1,248	-	-	2,527	95	-	-	-	108,690	7,488	-
4b.1.2.18	Electrical - Contaminated - Fuel Pool	-	137	2	5	103	8	-	53	307	307	-	-	615	23	-	-	-	26,449	1,857	-
4b.1.2.19	Electrical - Decontaminated	-	3,787	48	173	3,940	-	-	1,569	9,518	9,518	-	-	23,551	-	-	-	-	956,401	49,378	-
4b.1.2.20	Electrical - Decontaminated - Fuel Pool	-	947	12	43	986	-	-	392	2,380	2,380	-	-	5,893	-	-	-	-	239,327	12,340	-
4b.1.2.21	Fuel Handling	-	108	6	11	152	73	-	70	421	421	-	-	908	218	-	-	-	50,723	1,595	-
4b.1.2.22	Fuel Oil	-	121	-	-	-	-	-	18	140	-	-	140	-	-	-	-	-	-	1,697	-
4b.1.2.23	HVAC - Clean	-	120	-	-	-	-	-	18	138	-	-	138	-	-	-	-	-	-	1,891	-
4b.1.2.24	HVAC - Contaminated	-	337	9	26	546	41	-	181	1,141	1,141	-	-	3,261	123	-	-	-	140,257	4,335	-
4b.1.2.25	HVAC - Contaminated - Fuel Pool	-	145	4	11	234	18	-	78	489	489	-	-	1,398	53	-	-	-	60,110	1,858	-
4b.1.2.26	Incore Instrumentation	-	25	1	2	10	19	-	13	70	70	-	-	60	57	-	-	-	6,058	382	-
4b.1.2.27	Misc Drains & Vents	-	212	15	13	65	176	-	110	592	592	-	-	390	514	-	-	-	49,062	2,764	-
4b.1.2.28	Reactor Coolant	-	283	21	18	58	265	-	150	796	796	-	-	344	777	-	-	-	64,085	3,865	-
4b.1.2.29	Reactor Hot Sampling	-	125	12	7	11	118	-	65	339	339	-	-	66	342	-	-	-	25,063	1,611	-
4b.1.2.30	Reactor Makeup	-	73	-	-	-	-	-	11	84	-	-	84	-	-	-	-	-	-	1,042	-
4b.1.2.31	Reactor Vessel	-	19	1	0	4	5	-	7	36	36	-	-	26	14	-	-	-	2,000	260	-
4b.1.2.32	Residual Heat Removal	-	378	85	86	484	1,105	-	465	2,603	2,603	-	-	2,895	3,252	-	-	-	326,425	5,374	-
4b.1.2.33	Safeguards Chilled Water	-	18	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	259	-

Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Disposal of Plant Systems (continued)																					
4b.1.2.34	Safeguards Chilled Water - RCA	-	85	1	4	83	-	-	34	207	207	-	-	495	-	-	-	-	20,100	1,019	-
4b.1.2.35	Safety Injection	-	809	42	73	1,136	393	-	486	2,939	2,939	-	-	6,788	1,156	-	-	-	349,908	11,276	-
4b.1.2.36	Sampling	-	54	4	3	10	37	-	25	133	133	-	-	59	107	-	-	-	9,420	731	-
4b.1.2.37	Shield Bldg Ventilation	-	125	14	26	360	165	-	132	821	821	-	-	2,152	491	-	-	-	118,583	1,811	-
4b.1.2.38	Spent Fuel Pool Cooling	-	324	34	32	135	450	-	222	1,198	1,198	-	-	806	1,325	-	-	-	117,816	4,400	-
4b.1.2.39	Station & Instrument Air	-	20	-	-	-	-	-	3	23	-	-	23	-	-	-	-	-	-	300	-
4b.1.2.40	Station & Instrument Air - RCA	-	81	1	2	56	-	-	29	169	169	-	-	332	-	-	-	-	13,496	1,053	-
4b.1.2.41	Station & Instrument Air - RCA Fuel Pool	-	20	0	1	14	-	-	7	42	42	-	-	83	-	-	-	-	3,374	263	-
4b.1.2.42	Turbine Bldg Traps & Drains	-	50	-	-	-	-	-	8	58	-	-	58	-	-	-	-	-	-	767	-
4b.1.2.43	Unit Coolers	-	42	-	-	-	-	-	6	49	-	-	49	-	-	-	-	-	-	611	-
4b.1.2.44	Unit Coolers - RCA	-	55	0	2	39	-	-	20	115	115	-	-	230	-	-	-	-	9,348	683	-
4b.1.2	Totals	-	14,735	481	883	14,533	4,126	-	6,807	41,565	38,474	-	3,091	86,861	12,129	-	-	-	4,307,475	198,796	-
4b.1.3	Scaffolding in support of decommissioning	-	1,363	4	2	38	6	-	349	1,763	1,763	-	-	207	18	-	-	-	10,477	9,030	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor	1,096	2,527	240	1,236	373	7,080	-	3,215	15,766	15,766	-	-	2,230	67,325	-	-	-	3,286,372	45,729	-
4b.1.4.2	Backwash Waste Receiving Tank	-	25	3	17	-	97	-	33	175	175	-	-	-	929	-	-	-	43,896	266	-
4b.1.4	Totals	1,096	2,552	243	1,253	373	7,177	-	3,248	15,941	15,941	-	-	2,230	68,254	-	-	-	3,330,268	45,995	-
4b.1.5	Prepare/submit License Termination Plan	-	-	-	-	-	-	526	79	605	605	-	-	-	-	-	-	-	-	-	4,096
4b.1.6	Receive NRC approval of termination plan									a											
4b.1	Subtotal Period 4b Activity Costs	1,410	18,685	814	2,179	14,945	12,012	526	10,839	61,410	58,319	-	3,091	89,298	82,494	-	-	-	7,781,139	254,398	4,096
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
4b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
4b.2.3	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
4b.2	Subtotal Period 4b Additional Costs	-	1,175	11	36	606	-	1,262	736	3,827	3,827	-	-	5,880	-	-	-	-	147,000	7,427	6,240
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	5	-	9	16	-	37	-	15	83	83	-	-	-	85	-	-	-	5,092	17	-
4b.3.3	Small tool allowance	-	307	-	-	-	-	-	46	353	353	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
4b.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,225	-	2,225	-	2,225	-	-	-	-	-	-	-	-	-
4b.3	Subtotal Period 4b Collateral Costs	5	307	139	84	1,112	215	2,225	296	4,382	2,158	2,225	-	6,000	614	-	-	-	308,700	163	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	564	-	-	-	-	-	-	141	705	705	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	862	86	949	949	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	5,819	582	6,401	3,853	2,548	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	2,435	-	-	-	-	-	609	3,043	3,043	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,577	-	-	-	-	-	687	5,263	5,263	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	77	31	-	322	-	93	523	523	-	-	-	3,905	-	-	-	78,097	127	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,165	325	2,490	2,490	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC ISFSI Fees	-	-	-	-	-	-	74	7	81	-	81	-	-	-	-	-	-	-	-	-
4b.4.9	NRC Fees	-	-	-	-	-	-	862	86	948	948	-	-	-	-	-	-	-	-	-	-
4b.4.10	Emergency Planning Fees	-	-	-	-	-	-	132	13	145	-	145	-	-	-	-	-	-	-	-	-
4b.4.11	Fixed Overhead	-	-	-	-	-	-	2,118	318	2,436	2,436	-	-	-	-	-	-	-	-	-	-
4b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	757	113	870	870	-	-	-	-	-	-	-	-	-	-
4b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	100	15	115	-	115	-	-	-	-	-	-	-	-	-
4b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	111	17	128	128	-	-	-	-	-	-	-	-	-	-
4b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,995	299	2,294	2,294	-	-	-	-	-	-	-	-	-	-
4b.4.16	Security Staff Cost	-	-	-	-	-	-	1,202	180	1,383	462	921	-	-	-	-	-	-	-	-	20,373
4b.4.17	DOC Staff Cost	-	-	-	-	-	-	15,039	2,256	17,294	17,294	-	-	-	-	-	-	-	-	-	174,093
4b.4.18	Utility Staff Cost	-	-	-	-	-	-	18,793	2,819	21,612	20,790	821	-	-	-	-	-	-	-	-	311,145
4b.4	Subtotal Period 4b Period-Dependent Costs	564	7,011	77	31	-	322	50,029	8,646	66,682	62,051	4,631	-	-	3,905	-	-	-	78,097	127	505,611
4b.0	TOTAL PERIOD 4b COST	1,979	27,178	1,042	2,330	16,663	12,549	54,043	20,517	136,300	126,354	6,856	3,091	101,178	87,013	-	-	-	8,314,936	262,116	515,947

Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 4e - Delay before License Termination																					
Period 4e Direct Decommissioning Activities																					
Period 4e Collateral Costs																					
4e.3.1	Prairie Island Indian Community Payments	-	-	-	-	-	-	986	-	986	-	986	-	-	-	-	-	-	-	-	-
4e.3	Subtotal Period 4e Collateral Costs	-	-	-	-	-	-	986	-	986	-	986	-	-	-	-	-	-	-	-	-
Period 4e Period-Dependent Costs																					
4e.4.1	Insurance	-	-	-	-	-	-	382	38	420	-	420	-	-	-	-	-	-	-	-	-
4e.4.2	Property taxes	-	-	-	-	-	-	2,498	250	2,748	1,624	1,124	-	-	-	-	-	-	-	-	-
4e.4.3	Health physics supplies	-	87	-	-	-	-	-	22	109	109	-	-	-	-	-	-	-	-	-	-
4e.4.4	Disposal of DAW generated	-	-	2	1	-	6	-	2	11	11	-	-	-	79	-	-	-	1,573	3	-
4e.4.6	NRC ISFSI Fees	-	-	-	-	-	-	33	3	36	-	36	-	-	-	-	-	-	-	-	-
4e.4.7	NRC Fees	-	-	-	-	-	-	162	16	178	178	-	-	-	-	-	-	-	-	-	-
4e.4.8	Emergency Planning Fees	-	-	-	-	-	-	58	6	64	-	64	-	-	-	-	-	-	-	-	-
4e.4.9	Fixed Overhead	-	-	-	-	-	-	939	141	1,079	1,079	-	-	-	-	-	-	-	-	-	-
4e.4.10	ISFSI Operating Costs	-	-	-	-	-	-	44	7	51	-	51	-	-	-	-	-	-	-	-	-
4e.4.11	Railroad Track Maintenance	-	-	-	-	-	-	49	7	57	57	-	-	-	-	-	-	-	-	-	-
4e.4.12	Utility Staff Cost	-	-	-	-	-	-	696	104	801	742	58	-	-	-	-	-	-	-	-	11,488
4e.4	Subtotal Period 4e Period-Dependent Costs	-	87	2	1	-	6	4,862	596	5,554	3,800	1,754	-	-	79	-	-	-	1,573	3	11,488
4e.0	TOTAL PERIOD 4e COST	-	87	2	1	-	6	5,847	596	6,540	3,800	2,740	-	-	79	-	-	-	1,573	3	11,488
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	3,199	960	4,159	4,159	-	-	-	-	-	-	-	-	40,531	3,120
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
4f.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	934	-	934	-	934	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	2,198	190	2,388	1,454	934	-	-	-	-	-	-	-	-	-
Period 4f Period-Dependent Costs																					
4f.4.1	Insurance	-	-	-	-	-	-	362	36	398	-	398	-	-	-	-	-	-	-	-	-
4f.4.2	Property taxes	-	-	-	-	-	-	2,306	231	2,537	1,469	1,068	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	501	-	-	-	-	-	125	626	626	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	7	3	-	28	-	8	45	45	-	-	-	334	-	-	-	6,685	11	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC ISFSI Fees	-	-	-	-	-	-	31	3	34	-	34	-	-	-	-	-	-	-	-	-
4f.4.7	NRC Fees	-	-	-	-	-	-	422	42	465	465	-	-	-	-	-	-	-	-	-	-
4f.4.8	Emergency Planning Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
4f.4.9	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
4f.4.10	ISFSI Operating Costs	-	-	-	-	-	-	42	6	48	-	48	-	-	-	-	-	-	-	-	-
4f.4.11	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
4f.4.12	Security Staff Cost	-	-	-	-	-	-	1,835	275	2,111	927	1,184	-	-	-	-	-	-	-	-	27,614
4f.4.13	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
4f.4.14	Utility Staff Cost	-	-	-	-	-	-	4,011	602	4,613	4,175	438	-	-	-	-	-	-	-	-	59,507
4f.4	Subtotal Period 4f Period-Dependent Costs	-	501	7	3	-	28	14,483	2,147	17,167	13,936	3,232	-	-	334	-	-	-	6,685	11	133,404
4f.0	TOTAL PERIOD 4f COST	-	501	7	3	-	28	20,046	3,346	23,930	19,764	4,166	-	-	334	-	-	-	6,685	40,542	136,524
PERIOD 4 TOTALS		2,227	55,320	18,849	5,850	22,974	32,278	141,974	58,818	338,289	309,924	22,793	5,573	141,584	120,212	125	742	-	12,324,190	468,386	1,307,787

Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor	-	4,644	-	-	-	-	-	697	5,341	-	-	5,341	-	-	-	-	-	-	44,669	-
5b.1.1.2	Condensate Storage Tank Foundation	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	16	-
5b.1.1.3	Structures below 3' below grade	-	1,785	-	-	-	-	-	268	2,052	-	-	2,052	-	-	-	-	-	-	9,238	-
5b.1.1.4	Turbine	-	2,139	-	-	-	-	-	321	2,460	-	-	2,460	-	-	-	-	-	-	21,985	-
5b.1.1.5	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
5b.1.1	Totals	-	8,936	-	-	-	-	-	1,340	10,276	-	-	10,276	-	-	-	-	-	-	77,765	-
Site Closeout Activities																					
5b.1.2	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
5b.1.3	Final report to NRC	-	-	-	-	-	-	200	30	231	231	-	-	-	-	-	-	-	-	-	1,560
5b.1	Subtotal Period 5b Activity Costs	-	9,384	-	-	-	-	200	1,438	11,022	231	-	10,792	-	-	-	-	-	-	78,686	1,560
Period 5b Additional Costs																					
5b.2.1	Clean Concrete Disposal	-	2,242	-	-	-	-	5	337	2,583	-	-	2,583	-	-	-	-	-	-	8,386	-
5b.2.2	Intake Structure Cofferdam	-	623	-	-	-	-	-	93	716	-	-	716	-	-	-	-	-	-	5,168	-
5b.2.3	Construction Debris	-	-	-	-	-	-	10	2	12	-	-	12	-	-	-	-	-	-	-	-
5b.2.4	Backfill	-	3,011	-	-	-	-	-	452	3,462	-	-	3,462	-	-	-	-	-	-	2,904	-
5b.2.5	Disposition of Original Casks	-	24	80	418	-	2,390	-	728	3,640	3,640	-	-	-	8,929	-	-	-	1,059,612	146	-
5b.2	Subtotal Period 5b Additional Costs	-	5,899	80	418	-	2,390	15	1,611	10,413	3,640	-	6,773	-	8,929	-	-	-	1,059,612	16,604	-
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	122	-	-	-	-	-	18	140	-	-	140	-	-	-	-	-	-	-	-
5b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	3,821	573	4,394	-	4,394	-	-	-	-	-	-	-	-	-
5b.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,649	-	2,649	-	2,649	-	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	122	-	-	-	-	6,470	591	7,183	-	7,043	140	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	513	51	565	-	565	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	5,904	590	6,494	-	2,663	3,831	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	395	-	-	-	-	-	-	-	-	-
5b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	243	24	268	-	268	-	-	-	-	-	-	-	-	-
5b.4.6	Emergency Planning Fees	-	-	-	-	-	-	157	16	173	-	173	-	-	-	-	-	-	-	-	-
5b.4.7	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	-	781	397	-	-	-	-	-	-	-	-
5b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	119	18	136	-	136	-	-	-	-	-	-	-	-	-
5b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	133	20	152	(0)	97	56	-	-	-	-	-	-	-	-
5b.4.10	Security Staff Cost	-	-	-	-	-	-	4,976	746	5,722	0	5,310	412	-	-	-	-	-	-	-	74,431
5b.4.11	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
5b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,170	776	5,946	-	1,278	4,668	-	-	-	-	-	-	-	76,637
5b.4	Subtotal Period 5b Period-Dependent Costs	-	7,144	-	-	-	-	29,504	5,156	41,804	0	11,666	30,139	-	-	-	-	-	-	-	267,952
5b.0	TOTAL PERIOD 5b COST	-	22,548	80	418	-	2,390	36,189	8,797	70,422	3,871	18,708	47,843	-	8,929	-	-	-	1,059,612	95,290	269,512
PERIOD 5c - Fuel Storage Operations/Shipping																					
Period 5c Direct Decommissioning Activities																					
Period 5c Collateral Costs																					
5c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	445,840	66,876	512,716	-	512,716	-	-	-	-	-	-	-	-	-
5c.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	152,793	-	152,793	-	152,793	-	-	-	-	-	-	-	-	-
5c.3	Subtotal Period 5c Collateral Costs	-	-	-	-	-	-	598,632	66,876	665,508	-	665,508	-	-	-	-	-	-	-	-	-
Period 5c Period-Dependent Costs																					
5c.4.1	Insurance	-	-	-	-	-	-	29,616	2,962	32,578	-	32,578	-	-	-	-	-	-	-	-	-
5c.4.2	Property taxes	-	-	-	-	-	-	169,412	16,941	186,354	-	186,354	-	-	-	-	-	-	-	-	-
5c.4.3	Plant energy budget	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	14,030	1,403	15,432	-	15,432	-	-	-	-	-	-	-	-	-
5c.4.5	Emergency Planning Fees	-	-	-	-	-	-	9,068	907	9,974	-	9,974	-	-	-	-	-	-	-	-	-
5c.4.6	Fixed Overhead	-	-	-	-	-	-	19,930	2,990	22,920	-	22,920	-	-	-	-	-	-	-	-	-
5c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	6,845	1,027	7,872	-	7,872	-	-	-	-	-	-	-	-	-

Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 5c Period-Dependent Costs (continued)																					
5c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	7,647	1,147	8,795	-	8,795	-	-	-	-	-	-	-	-	-
5c.4.9	Security Staff Cost	-	-	-	-	-	-	236,347	35,452	271,799	-	271,799	-	-	-	-	-	-	-	-	3,434,684
5c.4.10	DOC Staff Cost	-	-	-	-	-	-	18,749	2,812	21,561	-	21,561	-	-	-	-	-	-	-	-	127,211
5c.4.11	Utility Staff Cost	-	-	-	-	-	-	115,440	17,316	132,756	-	132,756	-	-	-	-	-	-	-	-	1,685,540
5c.4	Subtotal Period 5c Period-Dependent Costs	-	-	-	-	-	-	627,085	82,956	710,041	-	710,041	-	-	-	-	-	-	-	-	5,247,434
5c.0	TOTAL PERIOD 5c COST	-	-	-	-	-	-	1,225,717	149,832	1,375,549	-	1,375,549	-	-	-	-	-	-	-	-	5,247,434
PERIOD 5d - GTCC shipping																					
Period 5d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
5d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
5d.1.1	Totals	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
5d.1	Subtotal Period 5d Activity Costs	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
Period 5d Collateral Costs																					
5d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
5d.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-
5d.3	Subtotal Period 5d Collateral Costs	-	-	-	-	-	-	76	4	80	-	80	-	-	-	-	-	-	-	-	-
Period 5d Period-Dependent Costs																					
5d.4.1	Insurance	-	-	-	-	-	-	9	1	10	10	-	-	-	-	-	-	-	-	-	-
5d.4.2	Property taxes	-	-	-	-	-	-	53	5	58	58	-	-	-	-	-	-	-	-	-	-
5d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	4	0	4	-	4	-	-	-	-	-	-	-	-	-
5d.4.5	Emergency Planning Fees	-	-	-	-	-	-	3	0	3	-	3	-	-	-	-	-	-	-	-	-
5d.4.6	Fixed Overhead	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
5d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	2	0	3	3	-	-	-	-	-	-	-	-	-	-
5d.4.8	Security Staff Cost	-	-	-	-	-	-	74	11	85	85	-	-	-	-	-	-	-	-	-	1,077
5d.4.9	Utility Staff Cost	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	269
5d.4	Subtotal Period 5d Period-Dependent Costs	-	-	-	-	-	-	171	22	194	186	7	-	-	-	-	-	-	-	-	1,346
5d.0	TOTAL PERIOD 5d COST	-	-	1,444	-	-	8,680	247	1,689	12,060	11,973	87	-	-	-	-	-	1,773	344,823	-	1,346
PERIOD 5e - ISFSI Decontamination																					
Period 5e Direct Decommissioning Activities																					
Period 5e Additional Costs																					
5e.2.1	License Termination ISFSI	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161
5e.2	Subtotal Period 5e Additional Costs	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161
Period 5e Period-Dependent Costs																					
5e.4.1	Insurance	-	-	-	-	-	-	93	23	116	116	-	-	-	-	-	-	-	-	-	-
5e.4.2	Property taxes	-	-	-	-	-	-	56	14	69	69	-	-	-	-	-	-	-	-	-	-
5e.4.3	Plant energy budget	-	-	-	-	-	-	11	3	13	13	-	-	-	-	-	-	-	-	-	-
5e.4.4	Fixed Overhead	-	-	-	-	-	-	54	14	68	68	-	-	-	-	-	-	-	-	-	-
5e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	21	5	26	26	-	-	-	-	-	-	-	-	-	-
5e.4.6	Security Staff Cost	-	-	-	-	-	-	174	43	217	217	-	-	-	-	-	-	-	-	-	2,500
5e.4.7	Utility Staff Cost	-	-	-	-	-	-	129	32	161	161	-	-	-	-	-	-	-	-	-	1,896
5e.4	Subtotal Period 5e Period-Dependent Costs	-	-	-	-	-	-	536	134	670	670	-	-	-	-	-	-	-	-	-	4,396
5e.0	TOTAL PERIOD 5e COST	-	0	2	17	-	142	1,733	473	2,367	2,367	-	-	-	424	-	-	-	65,754	5,882	5,556
PERIOD 5f - ISFSI Site Restoration																					
Period 5f Direct Decommissioning Activities																					
Period 5f Additional Costs																					
5f.2.1	Demolition and Site Restoration of ISFSI	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
5f.2	Subtotal Period 5f Additional Costs	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80

Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 5f Collateral Costs																					
5f.3.1	Small tool allowance	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
5f.3	Subtotal Period 5f Collateral Costs	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
Period 5f Period-Dependent Costs																					
5f.4.2	Property taxes	-	-	-	-	-	-	28	3	31	-	-	31	-	-	-	-	-	-	-	-
5f.4.3	Heavy equipment rental	-	59	-	-	-	-	-	9	68	-	-	68	-	-	-	-	-	-	-	-
5f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	6	-	-	6	-	-	-	-	-	-	-	-
5f.4.5	Fixed Overhead	-	-	-	-	-	-	28	4	32	-	-	32	-	-	-	-	-	-	-	-
5f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	11	2	12	-	-	12	-	-	-	-	-	-	-	-
5f.4.7	Security Staff Cost	-	-	-	-	-	-	89	13	102	-	-	102	-	-	-	-	-	-	-	1,281
5f.4.8	Utility Staff Cost	-	-	-	-	-	-	55	8	63	-	-	63	-	-	-	-	-	-	-	795
5f.4	Subtotal Period 5f Period-Dependent Costs	-	59	-	-	-	-	216	40	315	-	-	315	-	-	-	-	-	-	-	2,076
5f.0	TOTAL PERIOD 5f COST	-	1,187	-	-	-	-	377	233	1,798	-	-	1,798	-	-	-	-	-	-	4,846	2,156
PERIOD 5 TOTALS		-	23,736	1,525	435	-	11,212	1,264,263	161,025	1,462,196	18,210	1,394,345	49,641	-	9,353	-	-	1,773	1,470,189	106,017	5,526,005
TOTAL COST TO DECOMMISSION		6,192	94,084	20,994	6,793	23,152	45,944	2,416,286	354,811	2,968,256	963,420	1,947,995	56,842	147,716	151,089	125	742	1,773	14,528,860	652,634	11,679,960

TOTAL COST TO DECOMMISSION WITH 13.58% CONTINGENCY:	**$2,968,256**	**thousands of 2020 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 32.46% OR:	**$963,420**	**thousands of 2020 dollars**
SPENT FUEL MANAGEMENT COST IS 65.63% OR:	**$1,947,995**	**thousands of 2020 dollars**
NON-NUCLEAR DEMOLITION COST IS 1.91% OR:	**$56,842**	**thousands of 2020 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**151,957**	**Cubic Feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**
TOTAL SCRAP METAL REMOVED:	**33,003**	**Tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**652,634**	**Man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 1a - Shutdown through Transition																					
Period 1a Direct Decommissioning Activities																					
1a.1.1	SAFSTOR site characterization survey	-	-	-	-	-	-	415	124	539	539	-	-	-	-	-	-	-	-	-	-
1a.1.2	Prepare preliminary decommissioning cost	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.3	Notification of Cessation of Operations									a											
1a.1.4	Remove fuel & source material									n/a											
1a.1.5	Notification of Permanent Defueling									a											
1a.1.6	Deactivate plant systems & process waste									a											
1a.1.7	Prepare and submit PSDAR	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.8	Review plant dwgs & specs.	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
1a.1.9	Perform detailed rad survey									a											
1a.1.10	Estimate by-product inventory	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.11	End product description	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.12	Detailed by-product inventory	-	-	-	-	-	-	82	12	95	95	-	-	-	-	-	-	-	-	-	641
1a.1.13	Define major work sequence	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
1a.1.14	Perform SER and EA	-	-	-	-	-	-	170	26	196	196	-	-	-	-	-	-	-	-	-	1,326
1a.1.15	Prepare/submit Defueled Technical Specifications	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
1a.1.16	Perform Site-Specific Cost Study	-	-	-	-	-	-	275	41	316	316	-	-	-	-	-	-	-	-	-	2,138
1a.1.17	Prepare/submit Irradiated Fuel Management Plan	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
Activity Specifications																					
1a.1.18.1	Prepare plant and facilities for SAFSTOR	-	-	-	-	-	-	270	41	311	311	-	-	-	-	-	-	-	-	-	2,104
1a.1.18.2	Plant systems	-	-	-	-	-	-	229	34	263	263	-	-	-	-	-	-	-	-	-	1,782
1a.1.18.3	Plant structures and buildings	-	-	-	-	-	-	171	26	197	197	-	-	-	-	-	-	-	-	-	1,334
1a.1.18.4	Waste management	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.18.5	Facility and site dormancy	-	-	-	-	-	-	110	16	126	126	-	-	-	-	-	-	-	-	-	855
1a.1.18	Total	-	-	-	-	-	-	891	134	1,024	1,024	-	-	-	-	-	-	-	-	-	6,930
Detailed Work Procedures																					
1a.1.19.1	Plant systems	-	-	-	-	-	-	65	10	75	75	-	-	-	-	-	-	-	-	-	506
1a.1.19.2	Facility closeout & dormancy	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	513
1a.1.19	Total	-	-	-	-	-	-	131	20	151	151	-	-	-	-	-	-	-	-	-	1,019
1a.1.20	Procure vacuum drying system	-	-	-	-	-	-	5	1	6	6	-	-	-	-	-	-	-	-	-	43
1a.1.21	Drain/de-energize non-cont. systems									a											
1a.1.22	Drain & dry NSSS									a											
1a.1.23	Drain/de-energize contaminated systems									a											
1a.1.24	Decon/secure contaminated systems									a											
1a.1	Subtotal Period 1a Activity Costs	-	-	-	-	-	-	2,854	490	3,345	3,345	-	-	-	-	-	-	-	-	-	18,981
Period 1a Collateral Costs																					
1a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	1,330	199	1,529	-	1,529	-	-	-	-	-	-	-	-	-
1a.3.2	Retention and Severance	-	-	-	-	-	-	8,394	1,259	9,653	9,653	-	-	-	-	-	-	-	-	-	-
1a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
1a.3	Subtotal Period 1a Collateral Costs	-	-	-	-	-	-	10,973	1,459	12,432	9,653	2,779	-	-	-	-	-	-	-	-	-
Period 1a Period-Dependent Costs																					
1a.4.1	Insurance	-	-	-	-	-	-	1,660	166	1,826	1,826	-	-	-	-	-	-	-	-	-	-
1a.4.2	Property taxes	-	-	-	-	-	-	3,623	362	3,985	3,985	-	-	-	-	-	-	-	-	-	-
1a.4.3	Health physics supplies	-	604	-	-	-	-	-	151	755	755	-	-	-	-	-	-	-	-	-	-
1a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
1a.4.5	Disposal of DAW generated	-	-	12	5	-	49	-	14	80	80	-	-	-	597	-	-	-	11,944	19	-
1a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
1a.4.7	NRC Fees	-	-	-	-	-	-	516	52	567	567	-	-	-	-	-	-	-	-	-	-
1a.4.8	Emergency Planning Fees	-	-	-	-	-	-	2,174	217	2,392	-	2,392	-	-	-	-	-	-	-	-	-
1a.4.9	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
1a.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	422	63	486	-	486	-	-	-	-	-	-	-	-	-
1a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
1a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
1a.4.13	Security Staff Cost	-	-	-	-	-	-	8,328	1,249	9,577	9,577	-	-	-	-	-	-	-	-	-	122,720
1a.4.14	Utility Staff Cost	-	-	-	-	-	-	25,478	3,822	29,300	29,300	-	-	-	-	-	-	-	-	-	400,944
1a.4	Subtotal Period 1a Period-Dependent Costs	-	1,357	12	5	-	49	45,381	6,687	53,491	50,549	2,942	-	-	597	-	-	-	11,944	19	523,664
1a.0	TOTAL PERIOD 1a COST	-	1,357	12	5	-	49	59,209	8,636	69,267	63,547	5,720	-	-	597	-	-	-	11,944	19	542,645

Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
PERIOD 1b - SAFSTOR Limited DECON Activities																					
Period 1b Direct Decommissioning Activities																					
Decontamination of Site Buildings																					
1b.1.1.1	Reactor	1,199	-	-	-	-	-	-	599	1,798	1,798	-	-	-	-	-	-	-	-	17,003	-
1b.1.1.2	Auxiliary	1,244	-	-	-	-	-	-	622	1,866	1,866	-	-	-	-	-	-	-	-	17,950	-
1b.1.1.3	Drum Transfer & Truck Loading Enclosure	17	-	-	-	-	-	-	8	25	25	-	-	-	-	-	-	-	-	244	-
1b.1.1.4	LLRW Storage Enclosure	105	-	-	-	-	-	-	52	157	157	-	-	-	-	-	-	-	-	1,487	-
1b.1.1.5	Radwaste	47	-	-	-	-	-	-	23	70	70	-	-	-	-	-	-	-	-	669	-
1b.1.1.6	Resin Disposal	14	-	-	-	-	-	-	7	21	21	-	-	-	-	-	-	-	-	198	-
1b.1.1.7	Fuel Handling of Aux Building	911	-	-	-	-	-	-	455	1,366	1,366	-	-	-	-	-	-	-	-	12,414	-
1b.1.1	Totals	3,536	-	-	-	-	-	-	1,768	5,304	5,304	-	-	-	-	-	-	-	-	49,966	-
1b.1	Subtotal Period 1b Activity Costs	3,536	-	-	-	-	-	-	1,768	5,304	5,304	-	-	-	-	-	-	-	-	49,966	-
Period 1b Additional Costs																					
1b.2.1	Spent Fuel Pool Isolation	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
1b.2	Subtotal Period 1b Additional Costs	-	-	-	-	-	-	8,450	1,268	9,718	9,718	-	-	-	-	-	-	-	-	-	-
Period 1b Collateral Costs																					
1b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
1b.3.2	Process decommissioning water waste	107	-	71	128	-	288	-	152	746	746	-	-	-	661	-	-	-	39,639	129	-
1b.3.4	Small tool allowance	-	59	-	-	-	-	-	9	68	68	-	-	-	-	-	-	-	-	-	-
1b.3.5	Spent Fuel Capital and Transfer	-	-	-	-	-	-	309	46	356	-	356	-	-	-	-	-	-	-	-	-
1b.3.6	Retention and Severance	-	-	-	-	-	-	2,296	344	2,640	2,640	-	-	-	-	-	-	-	-	-	-
1b.3.7	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1b.3	Subtotal Period 1b Collateral Costs	1,162	59	71	128	-	288	2,917	710	5,334	4,667	667	-	-	661	-	-	-	39,639	129	-
Period 1b Period-Dependent Costs																					
1b.4.1	Decon supplies	1,334	-	-	-	-	-	-	333	1,667	1,667	-	-	-	-	-	-	-	-	-	-
1b.4.2	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1b.4.3	Property taxes	-	-	-	-	-	-	902	90	993	993	-	-	-	-	-	-	-	-	-	-
1b.4.4	Health physics supplies	-	438	-	-	-	-	-	109	547	547	-	-	-	-	-	-	-	-	-	-
1b.4.5	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1b.4.6	Disposal of DAW generated	-	-	13	5	-	52	-	15	85	85	-	-	-	634	-	-	-	12,677	21	-
1b.4.7	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-
1b.4.8	NRC Fees	-	-	-	-	-	-	98	10	108	108	-	-	-	-	-	-	-	-	-	-
1b.4.9	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1b.4.10	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1b.4.11	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1b.4.14	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1b.4.15	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1b.4	Subtotal Period 1b Period-Dependent Costs	1,334	626	13	5	-	52	11,645	2,135	15,809	15,076	733	-	-	634	-	-	-	12,677	21	135,867
1b.0	TOTAL PERIOD 1b COST	6,032	684	84	133	-	340	23,012	5,880	36,165	34,764	1,401	-	-	1,295	-	-	-	52,317	50,115	135,867
PERIOD 1c - Preparations for SAFSTOR Dormancy																					
Period 1c Direct Decommissioning Activities																					
1c.1.1	Prepare support equipment for storage	-	527	-	-	-	-	-	79	606	606	-	-	-	-	-	-	-	-	3,000	-
1c.1.2	Install containment pressure equal. lines	-	54	-	-	-	-	-	8	62	62	-	-	-	-	-	-	-	-	700	-
1c.1.3	Interim survey prior to dormancy	-	-	-	-	-	-	733	220	953	953	-	-	-	-	-	-	-	-	12,801	-
1c.1.4	Secure building accesses									a											
1c.1.5	Prepare & submit interim report	-	-	-	-	-	-	32	5	37	37	-	-	-	-	-	-	-	-	-	249
1c.1	Subtotal Period 1c Activity Costs	-	581	-	-	-	-	765	312	1,658	1,658	-	-	-	-	-	-	-	-	16,501	249
Period 1c Collateral Costs																					
1c.3.1	Process decommissioning water waste	91	-	60	109	-	245	-	129	634	634	-	-	-	561	-	-	-	33,685	109	-
1c.3.3	Small tool allowance	-	5	-	-	-	-	-	1	6	6	-	-	-	-	-	-	-	-	-	-
1c.3.4	Spent Fuel Capital and Transfer	-	-	-	-	-	-	90	13	103	-	103	-	-	-	-	-	-	-	-	-
1c.3.5	Retention and Severance	-	-	-	-	-	-	1,722	258	1,980	1,980	-	-	-	-	-	-	-	-	-	-
1c.3.6	Prairie Island Indian Community Payments	-	-	-	-	-	-	311	-	311	-	311	-	-	-	-	-	-	-	-	-
1c.3	Subtotal Period 1c Collateral Costs	91	5	60	109	-	245	2,123	401	3,034	2,619	415	-	-	561	-	-	-	33,685	109	-

Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 1c Period-Dependent Costs																					
1c.4.1	Insurance	-	-	-	-	-	-	414	41	455	455	-	-	-	-	-	-	-	-	-	-
1c.4.2	Property taxes	-	-	-	-	-	-	901	90	991	991	-	-	-	-	-	-	-	-	-	-
1c.4.3	Health physics supplies	-	248	-	-	-	-	-	62	309	309	-	-	-	-	-	-	-	-	-	-
1c.4.4	Heavy equipment rental	-	188	-	-	-	-	-	28	216	216	-	-	-	-	-	-	-	-	-	-
1c.4.5	Disposal of DAW generated	-	-	3	1	-	13	-	4	20	20	-	-	-	152	-	-	-	3,039	5	-
1c.4.6	Plant energy budget	-	-	-	-	-	-	404	61	465	465	-	-	-	-	-	-	-	-	-	-
1c.4.7	NRC Fees	-	-	-	-	-	-	98	10	108	108	-	-	-	-	-	-	-	-	-	-
1c.4.8	Emergency Planning Fees	-	-	-	-	-	-	542	54	596	-	596	-	-	-	-	-	-	-	-	-
1c.4.9	Fixed Overhead	-	-	-	-	-	-	359	54	413	413	-	-	-	-	-	-	-	-	-	-
1c.4.10	Spent Fuel Pool O&M	-	-	-	-	-	-	105	16	121	-	121	-	-	-	-	-	-	-	-	-
1c.4.11	ISFSI Operating Costs	-	-	-	-	-	-	14	2	16	-	16	-	-	-	-	-	-	-	-	-
1c.4.12	Railroad Track Maintenance	-	-	-	-	-	-	16	2	18	18	-	-	-	-	-	-	-	-	-	-
1c.4.13	Security Staff Cost	-	-	-	-	-	-	2,076	311	2,388	2,388	-	-	-	-	-	-	-	-	-	30,596
1c.4.14	Utility Staff Cost	-	-	-	-	-	-	6,714	1,007	7,722	7,722	-	-	-	-	-	-	-	-	-	105,271
1c.4	Subtotal Period 1c Period-Dependent Costs	-	435	3	1	-	13	11,643	1,742	13,838	13,104	733	-	-	152	-	-	-	3,039	5	135,867
1c.0	TOTAL PERIOD 1c COST	91	1,021	63	110	-	257	14,531	2,456	18,530	17,382	1,148	-	-	713	-	-	-	36,724	16,615	136,116
PERIOD 1 TOTALS		6,123	3,062	159	248	-	646	96,752	16,972	123,961	115,692	8,269	-	-	2,605	-	-	-	100,985	66,750	814,628
PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage																					
Period 2a Direct Decommissioning Activities																					
2a.1.1	Quarterly Inspection									a											
2a.1.2	Semi-annual environmental survey									a											
2a.1.3	Prepare reports									a											
2a.1.4	Bituminous roof replacement	-	-	-	-	-	-	223	33	256	256	-	-	-	-	-	-	-	-	-	-
2a.1.5	Maintenance supplies	-	-	-	-	-	-	349	87	437	437	-	-	-	-	-	-	-	-	-	-
2a.1	Subtotal Period 2a Activity Costs	-	-	-	-	-	-	572	121	693	693	-	-	-	-	-	-	-	-	-	-
Period 2a Additional Costs																					
2a.2.1	Security Modifications	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
2a.2	Subtotal Period 2a Additional Costs	-	-	-	-	-	-	4,348	652	5,000	5,000	-	-	-	-	-	-	-	-	-	-
Period 2a Collateral Costs																					
2a.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	64,672	9,701	74,373	-	74,373	-	-	-	-	-	-	-	-	-
2a.3.2	Retention and Severance	-	-	-	-	-	-	11,054	1,658	12,712	12,712	-	-	-	-	-	-	-	-	-	-
2a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	3,128	-	3,128	-	3,128	-	-	-	-	-	-	-	-	-
2a.3	Subtotal Period 2a Collateral Costs	-	-	-	-	-	-	78,854	11,359	90,213	12,712	77,501	-	-	-	-	-	-	-	-	-
Period 2a Period-Dependent Costs																					
2a.4.1	Insurance	-	-	-	-	-	-	1,213	121	1,334	1,334	-	-	-	-	-	-	-	-	-	-
2a.4.2	Property taxes	-	-	-	-	-	-	9,065	907	9,972	9,972	-	-	-	-	-	-	-	-	-	-
2a.4.3	Health physics supplies	-	617	-	-	-	-	-	154	771	771	-	-	-	-	-	-	-	-	-	-
2a.4.4	Disposal of DAW generated	-	-	11	5	-	47	-	14	77	77	-	-	-	576	-	-	-	11,523	19	-
2a.4.5	Plant energy budget	-	-	-	-	-	-	812	122	934	934	-	-	-	-	-	-	-	-	-	-
2a.4.6	NRC Fees	-	-	-	-	-	-	536	54	590	590	-	-	-	-	-	-	-	-	-	-
2a.4.7	Emergency Planning Fees	-	-	-	-	-	-	4,653	465	5,119	-	5,119	-	-	-	-	-	-	-	-	-
2a.4.8	Fixed Overhead	-	-	-	-	-	-	2,979	447	3,426	3,426	-	-	-	-	-	-	-	-	-	-
2a.4.9	Spent Fuel Pool O&M	-	-	-	-	-	-	1,057	159	1,216	-	1,216	-	-	-	-	-	-	-	-	-
2a.4.10	ISFSI Operating Costs	-	-	-	-	-	-	140	21	161	-	161	-	-	-	-	-	-	-	-	-
2a.4.11	Railroad Track Maintenance	-	-	-	-	-	-	385	58	443	443	-	-	-	-	-	-	-	-	-	-
2a.4.12	Security Staff Cost	-	-	-	-	-	-	19,158	2,874	22,032	15,863	6,169	-	-	-	-	-	-	-	-	281,262
2a.4.13	Utility Staff Cost	-	-	-	-	-	-	13,370	2,006	15,376	12,900	2,476	-	-	-	-	-	-	-	-	205,738
2a.4	Subtotal Period 2a Period-Dependent Costs	-	617	11	5	-	47	53,370	7,400	61,450	46,309	15,140	-	-	576	-	-	-	11,523	19	486,999
2a.0	TOTAL PERIOD 2a COST	-	617	11	5	-	47	137,143	19,532	157,355	64,714	92,641	-	-	576	-	-	-	11,523	19	486,999
PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage																					
Period 2b Direct Decommissioning Activities																					
2b.1.1	Quarterly Inspection									a											
2b.1.2	Semi-annual environmental survey									a											
2b.1.3	Prepare reports									a											
2b.1.4	Bituminous roof replacement	-	-	-	-	-	-	4,402	660	5,063	5,063	-	-	-	-	-	-	-	-	-	-
2b.1.5	Maintenance supplies	-	-	-	-	-	-	6,902	1,726	8,628	8,628	-	-	-	-	-	-	-	-	-	-
2b.1	Subtotal Period 2b Activity Costs	-	-	-	-	-	-	11,305	2,386	13,691	13,691	-	-	-	-	-	-	-	-	-	-

Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 2b Collateral Costs																					
2b.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	136,259	20,439	156,698	-	156,698	-	-	-	-	-	-	-	-	-
2b.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	61,783	-	61,783	-	61,783	-	-	-	-	-	-	-	-	-
2b.3	Subtotal Period 2b Collateral Costs	-	-	-	-	-	-	198,042	20,439	218,481	-	218,481	-	-	-	-	-	-	-	-	-
Period 2b Period-Dependent Costs																					
2b.4.1	Insurance	-	-	-	-	-	-	23,951	2,395	26,346	26,346	-	-	-	-	-	-	-	-	-	-
2b.4.2	Property taxes	-	-	-	-	-	-	179,063	17,906	196,969	196,969	-	-	-	-	-	-	-	-	-	-
2b.4.3	Health physics supplies	-	5,618	-	-	-	-	-	1,404	7,022	7,022	-	-	-	-	-	-	-	-	-	-
2b.4.4	Disposal of DAW generated	-	-	101	41	-	421	-	122	685	685	-	-	-	5,109	-	-	-	102,180	167	-
2b.4.5	Plant energy budget	-	-	-	-	-	-	8,019	1,203	9,222	9,222	-	-	-	-	-	-	-	-	-	-
2b.4.6	NRC Fees	-	-	-	-	-	-	10,191	1,019	11,211	11,211	-	-	-	-	-	-	-	-	-	-
2b.4.7	Emergency Planning Fees	-	-	-	-	-	-	3,667	367	4,033	-	4,033	-	-	-	-	-	-	-	-	-
2b.4.8	Fixed Overhead	-	-	-	-	-	-	8,059	1,209	9,268	9,268	-	-	-	-	-	-	-	-	-	-
2b.4.9	ISFSI Operating Costs	-	-	-	-	-	-	2,768	415	3,183	-	3,183	-	-	-	-	-	-	-	-	-
2b.4.10	Railroad Track Maintenance	-	-	-	-	-	-	3,092	464	3,556	3,556	-	-	-	-	-	-	-	-	-	-
2b.4.11	Security Staff Cost	-	-	-	-	-	-	138,043	20,706	158,749	34,925	123,825	-	-	-	-	-	-	-	-	1,851,793
2b.4.12	Utility Staff Cost	-	-	-	-	-	-	67,547	10,132	77,680	48,783	28,897	-	-	-	-	-	-	-	-	1,028,774
2b.4	Subtotal Period 2b Period-Dependent Costs	-	5,618	101	41	-	421	444,401	57,343	507,924	347,987	159,938	-	-	5,109	-	-	-	102,180	167	2,880,567
2b.0	TOTAL PERIOD 2b COST	-	5,618	101	41	-	421	653,748	80,167	740,096	361,678	378,419	-	-	5,109	-	-	-	102,180	167	2,880,567
PERIOD 2 TOTALS		-	6,235	113	46	-	468	790,891	99,699	897,452	426,392	471,060	-	-	5,685	-	-	-	113,703	185	3,367,566
PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy																					
Period 3a Direct Decommissioning Activities																					
3a.1.1	Prepare preliminary decommissioning cost	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
3a.1.2	Review plant dwgs & specs.	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
3a.1.3	Perform detailed rad survey									a											
3a.1.4	End product description	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3a.1.5	Detailed by-product inventory	-	-	-	-	-	-	71	11	82	82	-	-	-	-	-	-	-	-	-	556
3a.1.6	Define major work sequence	-	-	-	-	-	-	412	62	474	474	-	-	-	-	-	-	-	-	-	3,207
3a.1.7	Perform SER and EA	-	-	-	-	-	-	170	26	196	196	-	-	-	-	-	-	-	-	-	1,326
3a.1.8	Perform Site-Specific Cost Study	-	-	-	-	-	-	275	41	316	316	-	-	-	-	-	-	-	-	-	2,138
Activity Specifications																					
3a.1.9.1	Re-activate plant & temporary facilities	-	-	-	-	-	-	405	61	466	419	-	47	-	-	-	-	-	-	-	3,151
3a.1.9.2	Plant systems	-	-	-	-	-	-	229	34	263	237	-	26	-	-	-	-	-	-	-	1,782
3a.1.9.3	Reactor internals	-	-	-	-	-	-	390	59	449	449	-	-	-	-	-	-	-	-	-	3,036
3a.1.9.4	Reactor vessel	-	-	-	-	-	-	357	54	411	411	-	-	-	-	-	-	-	-	-	2,779
3a.1.9.5	Biological shield	-	-	-	-	-	-	27	4	32	32	-	-	-	-	-	-	-	-	-	214
3a.1.9.6	Steam generators	-	-	-	-	-	-	171	26	197	197	-	-	-	-	-	-	-	-	-	1,334
3a.1.9.7	Reinforced concrete	-	-	-	-	-	-	88	13	101	51	-	51	-	-	-	-	-	-	-	684
3a.1.9.8	Main Turbine	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
3a.1.9.9	Main Condensers	-	-	-	-	-	-	22	3	25	-	-	25	-	-	-	-	-	-	-	171
3a.1.9.10	Plant structures & buildings	-	-	-	-	-	-	171	26	197	99	-	99	-	-	-	-	-	-	-	1,334
3a.1.9.11	Waste management	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
3a.1.9.12	Facility & site closeout	-	-	-	-	-	-	49	7	57	28	-	28	-	-	-	-	-	-	-	385
3a.1.9	Total	-	-	-	-	-	-	2,186	328	2,514	2,213	-	301	-	-	-	-	-	-	-	17,009
Planning & Site Preparations																					
3a.1.10	Prepare dismantling sequence	-	-	-	-	-	-	132	20	152	152	-	-	-	-	-	-	-	-	-	1,026
3a.1.11	Plant prep. & temp. svces	-	-	-	-	-	-	3,500	525	4,025	4,025	-	-	-	-	-	-	-	-	-	-
3a.1.12	Design water clean-up system	-	-	-	-	-	-	77	12	88	88	-	-	-	-	-	-	-	-	-	599
3a.1.13	Rigging/Cont. Cntrl Envlps/tooling/etc.	-	-	-	-	-	-	2,400	360	2,760	2,760	-	-	-	-	-	-	-	-	-	-
3a.1.14	Procure casks/liners & containers	-	-	-	-	-	-	68	10	78	78	-	-	-	-	-	-	-	-	-	526
3a.1	Subtotal Period 3a Activity Costs	-	-	-	-	-	-	9,670	1,451	11,121	10,820	-	301	-	-	-	-	-	-	-	29,336
Period 3a Additional Costs																					
3a.2.1	Site Characterization	-	-	-	-	-	-	1,505	451	1,956	1,956	-	-	-	-	-	-	-	-	8,988	3,563
3a.2.2	Mixed/Hazardous Waste	-	-	353	94	178	-	-	76	702	702	-	-	6,132	-	-	-	-	351,977	2,348	-
3a.2.3	Asbestos Abatement	-	2,526	3	150	-	1,369	-	996	5,044	5,044	-	-	-	12,843	-	-	-	166,959	20,907	-
3a.2	Subtotal Period 3a Additional Costs	-	2,526	356	244	178	1,369	1,505	1,524	7,702	7,702	-	-	6,132	12,843	-	-	-	518,936	32,243	3,563

Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3a Collateral Costs																					
3a.3.1	Small tool allowance	-	34	-	-	-	-	-	5	39	39	-	-	-	-	-	-	-	-	-	-
3a.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	39,506	5,926	45,431	-	45,431	-	-	-	-	-	-	-	-	-
3a.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,249	-	1,249	-	1,249	-	-	-	-	-	-	-	-	-
3a.3	Subtotal Period 3a Collateral Costs	-	34	-	-	-	-	40,755	5,931	46,720	39	46,680	-	-	-	-	-	-	-	-	-
Period 3a Period-Dependent Costs																					
3a.4.1	Insurance	-	-	-	-	-	-	484	48	533	307	225	-	-	-	-	-	-	-	-	-
3a.4.2	Property taxes	-	-	-	-	-	-	3,546	355	3,900	2,500	1,400	-	-	-	-	-	-	-	-	-
3a.4.3	Health physics supplies	-	641	-	-	-	-	-	160	802	802	-	-	-	-	-	-	-	-	-	-
3a.4.4	Heavy equipment rental	-	753	-	-	-	-	-	113	866	866	-	-	-	-	-	-	-	-	-	-
3a.4.5	Disposal of DAW generated	-	-	10	4	-	40	-	11	64	64	-	-	-	481	-	-	-	9,613	16	-
3a.4.6	Plant energy budget	-	-	-	-	-	-	1,621	243	1,864	1,864	-	-	-	-	-	-	-	-	-	-
3a.4.7	NRC ISFSI Fees	-	-	-	-	-	-	42	4	46	-	46	-	-	-	-	-	-	-	-	-
3a.4.8	NRC Fees	-	-	-	-	-	-	260	26	286	286	-	-	-	-	-	-	-	-	-	-
3a.4.9	Emergency Planning Fees	-	-	-	-	-	-	74	7	82	-	82	-	-	-	-	-	-	-	-	-
3a.4.10	Fixed Overhead	-	-	-	-	-	-	1,440	216	1,656	1,656	-	-	-	-	-	-	-	-	-	-
3a.4.11	ISFSI Operating Costs	-	-	-	-	-	-	56	8	64	-	64	-	-	-	-	-	-	-	-	-
3a.4.12	Railroad Track Maintenance	-	-	-	-	-	-	63	9	72	72	-	-	-	-	-	-	-	-	-	-
3a.4.13	Security Staff Cost	-	-	-	-	-	-	368	55	424	424	-	-	-	-	-	-	-	-	-	6,240
3a.4.14	Utility Staff Cost	-	-	-	-	-	-	12,056	1,808	13,864	13,379	485	-	-	-	-	-	-	-	-	199,680
3a.4	Subtotal Period 3a Period-Dependent Costs	-	1,394	10	4	-	40	20,010	3,066	24,523	22,220	2,302	-	-	481	-	-	-	9,613	16	205,920
3a.0	TOTAL PERIOD 3a COST	-	3,954	366	248	178	1,409	71,939	11,971	90,065	40,781	48,983	301	6,132	13,324	-	-	-	528,549	32,259	238,819
PERIOD 3b - Decommissioning Preparations																					
Period 3b Direct Decommissioning Activities																					
Detailed Work Procedures																					
3b.1.1.1	Plant systems	-	-	-	-	-	-	260	39	299	269	-	30	-	-	-	-	-	-	-	2,024
3b.1.1.2	Reactor internals	-	-	-	-	-	-	137	21	158	158	-	-	-	-	-	-	-	-	-	1,069
3b.1.1.3	Remaining buildings	-	-	-	-	-	-	74	11	85	21	-	64	-	-	-	-	-	-	-	577
3b.1.1.4	CRD cooling assembly	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3b.1.1.5	CRD housings & ICI tubes	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3b.1.1.6	Incore instrumentation	-	-	-	-	-	-	55	8	63	63	-	-	-	-	-	-	-	-	-	428
3b.1.1.7	Reactor vessel	-	-	-	-	-	-	199	30	229	229	-	-	-	-	-	-	-	-	-	1,552
3b.1.1.8	Facility closeout	-	-	-	-	-	-	66	10	76	38	-	38	-	-	-	-	-	-	-	513
3b.1.1.9	Missile shields	-	-	-	-	-	-	25	4	28	28	-	-	-	-	-	-	-	-	-	192
3b.1.1.10	Biological shield	-	-	-	-	-	-	66	10	76	76	-	-	-	-	-	-	-	-	-	513
3b.1.1.11	Steam generators	-	-	-	-	-	-	253	38	291	291	-	-	-	-	-	-	-	-	-	1,967
3b.1.1.12	Reinforced concrete	-	-	-	-	-	-	55	8	63	32	-	32	-	-	-	-	-	-	-	428
3b.1.1.13	Main Turbine	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
3b.1.1.14	Main Condensers	-	-	-	-	-	-	86	13	99	-	-	99	-	-	-	-	-	-	-	667
3b.1.1.15	Auxiliary building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
3b.1.1.16	Reactor building	-	-	-	-	-	-	150	23	173	155	-	17	-	-	-	-	-	-	-	1,167
3b.1.1	Total	-	-	-	-	-	-	1,772	266	2,038	1,643	-	395	-	-	-	-	-	-	-	13,787
3b.1	Subtotal Period 3b Activity Costs	-	-	-	-	-	-	1,772	266	2,038	1,643	-	395	-	-	-	-	-	-	-	13,787
Period 3b Collateral Costs																					
3b.3.1	Decon equipment	1,055	-	-	-	-	-	-	158	1,213	1,213	-	-	-	-	-	-	-	-	-	-
3b.3.2	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
3b.3.3	Pipe cutting equipment	-	1,200	-	-	-	-	-	180	1,380	1,380	-	-	-	-	-	-	-	-	-	-
3b.3.4	Prairie Island Indian Community Payments	-	-	-	-	-	-	623	-	623	-	623	-	-	-	-	-	-	-	-	-
3b.3	Subtotal Period 3b Collateral Costs	1,055	1,200	-	-	-	-	1,887	528	4,669	4,047	623	-	-	-	-	-	-	-	-	-
Period 3b Period-Dependent Costs																					
3b.4.1	Decon supplies	38	-	-	-	-	-	-	9	47	47	-	-	-	-	-	-	-	-	-	-
3b.4.2	Insurance	-	-	-	-	-	-	241	24	266	266	-	-	-	-	-	-	-	-	-	-
3b.4.3	Property taxes	-	-	-	-	-	-	1,667	167	1,834	1,175	658	-	-	-	-	-	-	-	-	-
3b.4.4	Health physics supplies	-	274	-	-	-	-	-	68	342	342	-	-	-	-	-	-	-	-	-	-
3b.4.5	Heavy equipment rental	-	375	-	-	-	-	-	56	432	432	-	-	-	-	-	-	-	-	-	-
3b.4.6	Disposal of DAW generated	-	-	5	2	-	22	-	6	35	35	-	-	-	264	-	-	-	5,286	9	-
3b.4.7	Plant energy budget	-	-	-	-	-	-	808	121	930	930	-	-	-	-	-	-	-	-	-	-
3b.4.8	NRC ISFSI Fees	-	-	-	-	-	-	21	2	23	-	23	-	-	-	-	-	-	-	-	-
3b.4.9	NRC Fees	-	-	-	-	-	-	129	13	142	142	-	-	-	-	-	-	-	-	-	-
3b.4.10	Emergency Planning Fees	-	-	-	-	-	-	37	4	41	-	41	-	-	-	-	-	-	-	-	-
3b.4.11	Fixed Overhead	-	-	-	-	-	-	718	108	826	826	-	-	-	-	-	-	-	-	-	-

Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
Period 3b Period-Dependent Costs (continued)																					
3b.4.12	ISFSI Operating Costs	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
3b.4.13	Railroad Track Maintenance	-	-	-	-	-	-	31	5	36	36	-	-	-	-	-	-	-	-	-	-
3b.4.14	Security Staff Cost	-	-	-	-	-	-	184	28	211	211	-	-	-	-	-	-	-	-	-	3,111
3b.4.15	DOC Staff Cost	-	-	-	-	-	-	3,727	559	4,287	4,287	-	-	-	-	-	-	-	-	-	42,523
3b.4.16	Utility Staff Cost	-	-	-	-	-	-	6,011	902	6,913	6,671	242	-	-	-	-	-	-	-	-	99,566
3b.4	Subtotal Period 3b Period-Dependent Costs	38	649	5	2	-	22	13,604	2,076	16,396	15,400	996	-	-	264	-	-	-	5,286	9	145,201
3b.0	TOTAL PERIOD 3b COST	1,092	1,849	5	2	-	22	17,262	2,870	23,103	21,089	1,619	395	-	264	-	-	-	5,286	9	158,988
PERIOD 3 TOTALS		1,092	5,803	371	250	178	1,430	89,202	14,841	113,168	61,871	50,601	696	6,132	13,588	-	-	-	533,835	32,267	397,807
PERIOD 4a - Large Component Removal																					
Period 4a Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
4a.1.1.1	Reactor Coolant Piping	11	42	10	11	66	94	-	52	285	285	-	-	240	254	-	-	-	33,680	778	-
4a.1.1.2	Pressurizer Relief Tank	5	19	6	7	44	62	-	31	174	174	-	-	160	169	-	-	-	22,441	352	-
4a.1.1.3	Reactor Coolant Pumps & Motors	13	60	46	85	-	463	-	155	822	822	-	-	-	2,332	-	-	-	295,800	1,226	80
4a.1.1.4	Pressurizer	-	77	382	91	-	776	-	265	1,591	1,591	-	-	-	2,196	-	-	-	158,199	1,346	750
4a.1.1.5	Steam Generators	-	3,307	1,690	1,743	2,409	3,885	-	2,590	15,625	15,625	-	-	18,672	10,990	-	-	-	1,581,180	10,253	2,250
4a.1.1.6	CRDMs/ICIs/Service Structure Removal	63	248	205	44	326	454	-	283	1,623	1,623	-	-	2,138	2,146	-	-	-	165,025	4,449	-
4a.1.1.7	Reactor Vessel Internals	51	4,650	13,353	862	-	7,848	278	11,032	38,074	38,074	-	-	-	1,174	-	673	-	167,337	22,373	1,053
4a.1.1.8	Reactor Vessel	-	5,835	1,653	442	-	3,268	278	6,576	18,053	18,053	-	-	-	9,245	-	-	-	579,324	22,373	1,053
4a.1.1	Totals	144	14,237	17,346	3,284	2,845	16,851	556	20,984	76,247	76,247	-	-	21,210	28,505	-	673	-	3,002,986	63,151	5,187
Removal of Major Equipment																					
4a.1.2	Main Turbine/Generator	-	292	116	35	555	-	-	173	1,170	1,170	-	-	2,243	-	-	-	-	134,601	4,116	-
4a.1.3	Main Condensers	-	2,510	79	33	742	-	-	752	4,115	4,115	-	-	4,000	-	-	-	-	180,000	34,978	-
Cascading Costs from Clean Building Demolition																					
4a.1.4.1	Reactor	-	794	-	-	-	-	-	119	913	913	-	-	-	-	-	-	-	-	7,589	-
4a.1.4.2	Auxiliary	-	221	-	-	-	-	-	33	254	254	-	-	-	-	-	-	-	-	1,309	-
4a.1.4.3	Radwaste	-	9	-	-	-	-	-	1	10	10	-	-	-	-	-	-	-	-	65	-
4a.1.4	Totals	-	1,023	-	-	-	-	-	154	1,177	1,177	-	-	-	-	-	-	-	-	8,963	-
Disposal of Plant Systems																					
4a.1.5.1	Admin Bldg Ventilation	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	90	-
4a.1.5.2	Air Removal	-	29	-	-	-	-	-	4	33	-	-	33	-	-	-	-	-	-	422	-
4a.1.5.3	Auxiliary Feedwater	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	676	-
4a.1.5.4	Auxiliary Feedwater - RCA	-	38	0	1	30	-	-	14	84	84	-	-	178	-	-	-	-	7,214	486	-
4a.1.5.5	Bleed Steam	-	90	-	-	-	-	-	13	103	-	-	103	-	-	-	-	-	-	1,331	-
4a.1.5.6	Caustic Addition - RCA	-	40	0	2	40	-	-	16	99	99	-	-	240	-	-	-	-	9,761	468	-
4a.1.5.7	Chemical Feed	-	17	-	-	-	-	-	3	20	-	-	20	-	-	-	-	-	-	261	-
4a.1.5.8	Chemical Feed - RCA	-	3	0	0	3	-	-	1	7	7	-	-	16	-	-	-	-	634	31	-
4a.1.5.9	Circulating Water	-	27	-	-	-	-	-	4	32	-	-	32	-	-	-	-	-	-	401	-
4a.1.5.10	Condensate	-	525	-	-	-	-	-	79	603	-	-	603	-	-	-	-	-	-	7,537	-
4a.1.5.11	Condensate Polishing	-	208	-	-	-	-	-	31	239	-	-	239	-	-	-	-	-	-	2,987	-
4a.1.5.12	Condensate Polishing - RCA	-	38	1	4	81	-	-	22	145	145	-	-	483	-	-	-	-	19,616	493	-
4a.1.5.13	Electro-Hydraulic	-	10	-	-	-	-	-	1	11	-	-	11	-	-	-	-	-	-	143	-
4a.1.5.14	External Circulating Water	-	26	-	-	-	-	-	4	30	-	-	30	-	-	-	-	-	-	385	-
4a.1.5.15	External Circulating Water - RCA	-	72	1	5	121	-	-	37	237	237	-	-	721	-	-	-	-	29,284	938	-
4a.1.5.16	Feedwater	-	127	-	-	-	-	-	19	146	-	-	146	-	-	-	-	-	-	1,840	-
4a.1.5.17	Feedwater - RCA	-	248	8	31	694	-	-	171	1,152	1,152	-	-	4,147	-	-	-	-	168,414	3,377	-
4a.1.5.18	Gland Seal	-	34	-	-	-	-	-	5	39	-	-	39	-	-	-	-	-	-	504	-
4a.1.5.19	Heater Drain	-	384	-	-	-	-	-	58	441	-	-	441	-	-	-	-	-	-	5,638	-
4a.1.5.20	Hypobromous Acid Feed	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	86	-
4a.1.5.21	Hypobromous Acid Feed - RCA	-	1	0	0	0	-	-	0	2	2	-	-	2	-	-	-	-	100	12	-
4a.1.5.22	Internal Circ Water & CDSR	-	25	-	-	-	-	-	4	29	-	-	29	-	-	-	-	-	-	366	-
4a.1.5.23	Main Gen/Exciter/Transformer	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
4a.1.5.24	Main Steam	-	101	-	-	-	-	-	15	116	-	-	116	-	-	-	-	-	-	1,482	-
4a.1.5.25	Main Steam - RCA	-	380	11	38	864	-	-	231	1,525	1,525	-	-	5,166	-	-	-	-	209,799	5,146	-
4a.1.5.26	Repairable Spare Snubbers	-	6	0	0	2	-	-	2	10	10	-	-	12	-	-	-	-	490	82	-
4a.1.5.27	Steam Exclusion	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	32	-
4a.1.5.28	Steam Exclusion - RCA	-	4	0	0	4	-	-	2	10	10	-	-	24	-	-	-	-	966	47	-
4a.1.5.29	Steam Generator Blowdown	-	378	21	27	319	215	-	202	1,162	1,162	-	-	1,906	631	-	-	-	118,130	5,179	-
4a.1.5.30	Steam Generators	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-

Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4a.1.5.31	Turbine & Moisture Separators	-	377	-	-	-	-	-	57	434	-	-	434	-	-	-	-	-	-	5,472	-
4a.1.5.32	Turbine Oil Purification	-	53	-	-	-	-	-	8	61	-	-	61	-	-	-	-	-	-	757	-
4a.1.5.33	Water Treatment	-	453	-	-	-	-	-	68	521	-	-	521	-	-	-	-	-	-	6,677	-
4a.1.5.34	Water Treatment - RCA	-	20	0	1	19	-	-	8	49	49	-	-	115	-	-	-	-	4,652	252	-
4a.1.5	Totals	-	3,779	43	108	2,177	215	-	1,091	7,413	4,480	-	2,933	13,010	631	-	-	-	569,060	53,681	-
4a.1.6	Scaffolding in support of decommissioning	-	2,865	22	10	188	30	-	755	3,870	3,870	-	-	1,012	89	-	-	-	51,216	23,719	-
4a.1	Subtotal Period 4a Activity Costs	144	24,706	17,607	3,470	6,506	17,096	556	23,908	93,993	91,059	-	2,933	41,476	29,226	-	673	-	3,937,863	188,606	5,187
Period 4a Additional Costs																					
4a.2.1	Retired RPV Upper Internals Package	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
4a.2	Subtotal Period 4a Additional Costs	-	128	166	58	-	1,583	-	944	2,879	2,879	-	-	-	572	125	-	-	49,800	1,667	67
Period 4a Collateral Costs																					
4a.3.1	Process decommissioning water waste	3	-	4	8	-	17	-	7	39	39	-	-	-	40	-	-	-	2,408	8	-
4a.3.3	Small tool allowance	-	241	-	-	-	-	-	36	277	249	-	28	-	-	-	-	-	-	-	-
4a.3.4	Prairie Island Indian Community Payments	-	-	-	-	-	-	1,660	-	1,660	-	1,660	-	-	-	-	-	-	-	-	-
4a.3	Subtotal Period 4a Collateral Costs	3	241	4	8	-	17	1,660	43	1,976	288	1,660	28	-	40	-	-	-	2,408	8	-
Period 4a Period-Dependent Costs																					
4a.4.1	Decon supplies	100	-	-	-	-	-	-	25	125	125	-	-	-	-	-	-	-	-	-	-
4a.4.2	Insurance	-	-	-	-	-	-	643	64	708	708	-	-	-	-	-	-	-	-	-	-
4a.4.3	Property taxes	-	-	-	-	-	-	4,395	439	4,834	2,954	1,881	-	-	-	-	-	-	-	-	-
4a.4.4	Health physics supplies	-	1,882	-	-	-	-	-	470	2,352	2,352	-	-	-	-	-	-	-	-	-	-
4a.4.5	Heavy equipment rental	-	3,325	-	-	-	-	-	499	3,824	3,824	-	-	-	-	-	-	-	-	-	-
4a.4.6	Disposal of DAW generated	-	-	70	29	-	293	-	85	477	477	-	-	-	3,556	-	-	-	71,113	116	-
4a.4.7	Plant energy budget	-	-	-	-	-	-	2,047	307	2,354	2,354	-	-	-	-	-	-	-	-	-	-
4a.4.8	NRC ISFSI Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
4a.4.9	NRC Fees	-	-	-	-	-	-	420	42	461	461	-	-	-	-	-	-	-	-	-	-
4a.4.10	Emergency Planning Fees	-	-	-	-	-	-	99	10	108	-	108	-	-	-	-	-	-	-	-	-
4a.4.11	Fixed Overhead	-	-	-	-	-	-	1,581	237	1,818	1,818	-	-	-	-	-	-	-	-	-	-
4a.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	565	85	649	649	-	-	-	-	-	-	-	-	-	-
4a.4.13	ISFSI Operating Costs	-	-	-	-	-	-	74	11	86	-	86	-	-	-	-	-	-	-	-	-
4a.4.14	Railroad Track Maintenance	-	-	-	-	-	-	83	12	96	96	-	-	-	-	-	-	-	-	-	-
4a.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,489	223	1,712	1,712	-	-	-	-	-	-	-	-	-	-
4a.4.16	Security Staff Cost	-	-	-	-	-	-	5,911	887	6,798	5,159	1,638	-	-	-	-	-	-	-	-	91,140
4a.4.17	DOC Staff Cost	-	-	-	-	-	-	17,103	2,565	19,668	19,668	-	-	-	-	-	-	-	-	-	189,200
4a.4.18	Utility Staff Cost	-	-	-	-	-	-	21,408	3,211	24,619	23,856	763	-	-	-	-	-	-	-	-	337,712
4a.4	Subtotal Period 4a Period-Dependent Costs	100	5,207	70	29	-	293	55,871	9,179	70,749	66,212	4,537	-	-	3,556	-	-	-	71,113	116	618,052
4a.0	TOTAL PERIOD 4a COST	246	30,282	17,847	3,564	6,506	18,989	58,087	34,074	169,596	160,439	6,196	2,961	41,476	33,394	125	673	-	4,061,184	190,397	623,305
PERIOD 4b - Site Decontamination																					
Period 4b Direct Decommissioning Activities																					
4b.1.1	Remove spent fuel racks	314	35	86	41	-	703	-	356	1,535	1,535	-	-	-	2,092	-	-	-	132,919	576	-
Disposal of Plant Systems																					
4b.1.2.1	ADT & Misc Ventilation	-	22	1	1	26	3	-	10	63	63	-	-	153	9	-	-	-	6,803	325	-
4b.1.2.2	Aux Bldg Normal Ventilation	-	62	2	6	116	13	-	37	237	237	-	-	692	39	-	-	-	30,595	906	-
4b.1.2.3	Aux Bldg Special Ventilation	-	12	0	1	12	2	-	5	32	32	-	-	70	6	-	-	-	3,234	176	-
4b.1.2.4	Battery Rm Special Ventilation	-	2	-	-	-	-	-	0	2	-	-	2	-	-	-	-	-	-	24	-
4b.1.2.5	Boron Recycle	-	3	0	0	0	3	-	2	9	9	-	-	3	9	-	-	-	700	45	-
4b.1.2.6	Chemical & Volume Control	-	858	62	57	394	677	-	458	2,507	2,507	-	-	2,356	1,977	-	-	-	223,753	11,575	-
4b.1.2.7	Cold Chemical Lab Ventilation	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
4b.1.2.8	Component Cooling - RCA	-	647	25	88	2,007	-	-	479	3,246	3,246	-	-	11,996	-	-	-	-	487,169	8,583	-
4b.1.2.9	Containment Cooling	-	35	-	-	-	-	-	5	40	-	-	40	-	-	-	-	-	-	502	-
4b.1.2.10	Containment Cooling - RCA	-	302	6	20	459	-	-	148	934	934	-	-	2,743	-	-	-	-	111,390	3,949	-
4b.1.2.11	Containment Hydrogen Control - RCA	-	36	0	1	24	-	-	13	74	74	-	-	141	-	-	-	-	5,742	494	-
4b.1.2.12	Containment Spray - RCA	-	194	3	11	243	-	-	87	538	538	-	-	1,453	-	-	-	-	59,019	2,617	-
4b.1.2.13	Containment Ventilation	-	211	23	49	790	243	-	242	1,558	1,558	-	-	4,721	722	-	-	-	237,643	3,016	-
4b.1.2.14	Control/Relay/Cmptr Rm Vent	-	28	1	2	44	7	-	16	98	98	-	-	260	20	-	-	-	11,878	406	-
4b.1.2.15	Cooling Water	-	159	-	-	-	-	-	24	183	-	-	183	-	-	-	-	-	-	2,344	-
4b.1.2.16	Cooling Water - RCA	-	476	17	62	1,412	-	-	342	2,310	2,310	-	-	8,442	-	-	-	-	342,822	6,311	-
4b.1.2.17	Cranes/Hoists/Elevators - RCA	-	3	0	1	17	-	-	4	25	25	-	-	103	-	-	-	-	4,184	48	-
4b.1.2.18	D3 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-
4b.1.2.19	D4 Emergency Diesel	-	10	-	-	-	-	-	2	12	-	-	12	-	-	-	-	-	-	141	-

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Prairie Island SAFSTOR Unit 2
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(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Disposal of Plant Systems (continued)																					
4b.1.2.20	D5 Emergency Diesel	-	0	-	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-	5	-
4b.1.2.21	Electrical - Clean	-	1,714	-	-	-	-	-	257	1,972	-	-	1,972	-	-	-	-	-	-	24,276	-
4b.1.2.22	Electrical - Contaminated	-	430	5	16	334	25	-	167	978	978	-	-	1,997	75	-	-	-	85,887	5,813	-
4b.1.2.23	Electrical - Contaminated - Fuel Pool	-	184	2	7	145	11	-	72	421	421	-	-	864	33	-	-	-	37,167	2,488	-
4b.1.2.24	Electrical - Decontaminated	-	2,955	38	138	3,138	-	-	1,234	7,503	7,503	-	-	18,753	-	-	-	-	761,569	38,423	-
4b.1.2.25	Electrical - Decontaminated - Fuel Pool	-	1,269	17	59	1,350	-	-	530	3,225	3,225	-	-	8,069	-	-	-	-	327,668	16,495	-
4b.1.2.26	Filter Rm Ventilation	-	4	0	0	4	0	-	2	10	10	-	-	24	1	-	-	-	1,017	61	-
4b.1.2.27	Fire Protection & Detection	-	204	-	-	-	-	-	31	235	-	-	235	-	-	-	-	-	-	3,009	-
4b.1.2.28	Fire Protection & Detection - RCA	-	246	4	13	306	-	-	110	679	679	-	-	1,828	-	-	-	-	74,245	3,134	-
4b.1.2.29	Fire Protection & Detection - RCA Fuel P	-	37	1	2	48	-	-	17	105	105	-	-	286	-	-	-	-	11,622	476	-
4b.1.2.30	Fuel Handling	-	66	1	2	34	17	-	26	146	146	-	-	200	49	-	-	-	11,273	983	-
4b.1.2.31	Fuel Oil	-	1	-	-	-	-	-	0	1	-	-	1	-	-	-	-	-	-	9	-
4b.1.2.32	HVAC - Clean	-	151	-	-	-	-	-	23	174	-	-	174	-	-	-	-	-	-	2,373	-
4b.1.2.33	HVAC - Contaminated	-	1,112	29	87	1,798	136	-	598	3,759	3,759	-	-	10,745	405	-	-	-	462,103	14,282	-
4b.1.2.34	HVAC - Contaminated - Fuel Pool	-	499	13	39	808	61	-	268	1,689	1,689	-	-	4,828	182	-	-	-	207,612	6,417	-
4b.1.2.35	Heating	-	322	-	-	-	-	-	48	370	-	-	370	-	-	-	-	-	-	4,804	-
4b.1.2.36	Heating - RCA	-	337	4	14	319	-	-	135	809	809	-	-	1,907	-	-	-	-	77,458	4,086	-
4b.1.2.37	Hot Lab & Sample Rm Ventilation	-	17	0	1	18	1	-	8	46	46	-	-	107	4	-	-	-	4,622	255	-
4b.1.2.38	Incore Instrumentation	-	27	1	2	10	20	-	13	73	73	-	-	60	58	-	-	-	6,143	412	-
4b.1.2.39	Misc Drains & Vents	-	213	12	12	77	145	-	104	563	563	-	-	458	426	-	-	-	46,079	2,841	-
4b.1.2.40	Misc Lab & Service Areas Vent	-	118	8	8	62	84	-	62	342	342	-	-	370	244	-	-	-	30,899	1,537	-
4b.1.2.41	Miscellaneous Gas	-	72	-	-	-	-	-	11	83	-	-	83	-	-	-	-	-	-	1,073	-
4b.1.2.42	Miscellaneous Gas - RCA	-	134	1	4	100	-	-	49	289	289	-	-	600	-	-	-	-	24,378	1,636	-
4b.1.2.43	Radiation Monitoring	-	7	-	-	-	-	-	1	9	-	-	9	-	-	-	-	-	-	111	-
4b.1.2.44	Radiation Monitoring - RCA	-	65	1	2	53	-	-	25	145	145	-	-	316	-	-	-	-	12,826	782	-
4b.1.2.45	Reactor Coolant	-	216	20	16	38	249	-	126	666	666	-	-	229	730	-	-	-	56,440	2,891	-
4b.1.2.46	Reactor Hot Sampling	-	116	11	7	9	108	-	60	311	311	-	-	54	312	-	-	-	22,678	1,499	-
4b.1.2.47	Reactor Makeup	-	41	-	-	-	-	-	6	47	-	-	47	-	-	-	-	-	-	583	-
4b.1.2.48	Reactor Makeup - RCA	-	4	0	0	5	-	-	2	11	11	-	-	28	-	-	-	-	1,148	47	-
4b.1.2.49	Reactor Vessel	-	16	1	0	4	5	-	6	32	32	-	-	22	14	-	-	-	1,816	225	-
4b.1.2.50	Residual Heat Removal	-	354	84	86	477	1,102	-	457	2,562	2,562	-	-	2,853	3,244	-	-	-	324,232	5,039	-
4b.1.2.51	Safeguards Chilled Water	-	5	-	-	-	-	-	1	6	-	-	6	-	-	-	-	-	-	75	-
4b.1.2.52	Safeguards Chilled Water - RCA	-	5	0	0	4	-	-	2	11	11	-	-	26	-	-	-	-	1,045	51	-
4b.1.2.53	Safety Injection	-	793	42	72	1,117	395	-	479	2,898	2,898	-	-	6,676	1,161	-	-	-	345,708	11,029	-
4b.1.2.54	Sampling	-	48	3	2	6	32	-	22	113	113	-	-	37	93	-	-	-	7,628	645	-
4b.1.2.56	Shield Bldg Ventilation	-	108	13	25	339	163	-	124	771	771	-	-	2,028	484	-	-	-	113,139	1,555	-
4b.1.2.57	Spent Fuel Pool Cooling	-	33	3	2	6	37	-	19	101	101	-	-	39	107	-	-	-	8,481	427	-
4b.1.2.58	Spent Fuel Pool Normal Ventilation	-	24	1	2	44	4	-	14	90	90	-	-	265	12	-	-	-	11,505	352	-
4b.1.2.59	Station & Instrument Air	-	161	-	-	-	-	-	24	185	-	-	185	-	-	-	-	-	-	2,424	-
4b.1.2.60	Station & Instrument Air - RCA	-	299	3	12	272	-	-	118	704	704	-	-	1,625	-	-	-	-	65,986	3,638	-
4b.1.2.61	Turbine Bldg Traps & Drains	-	30	-	-	-	-	-	5	35	-	-	35	-	-	-	-	-	-	462	-
4b.1.2.62	Turbine Bldg Traps & Drains - RCA	-	30	0	1	30	-	-	12	73	73	-	-	180	-	-	-	-	7,321	344	-
4b.1.2.63	Turbine Bldg Ventilation	-	46	-	-	-	-	-	7	53	-	-	53	-	-	-	-	-	-	655	-
4b.1.2.64	Unit Coolers	-	23	-	-	-	-	-	3	26	-	-	26	-	-	-	-	-	-	332	-
4b.1.2.65	Unit Coolers - RCA	-	56	0	2	39	-	-	20	117	117	-	-	232	-	-	-	-	9,413	690	-
4b.1.2.66	Waste Gas Disposal	-	438	43	45	410	464	-	298	1,699	1,699	-	-	2,453	1,358	-	-	-	187,339	5,879	-
4b.1.2.67	Waste Liquid Disposal	-	1,642	116	100	612	1,234	-	837	4,541	4,541	-	-	3,655	3,594	-	-	-	381,754	22,011	-
4b.1.2.68	Waste Solid Disposal	-	132	12	11	65	134	-	79	433	433	-	-	389	393	-	-	-	41,177	1,781	-
4b.1.2	Totals	-	17,877	633	1,092	17,625	5,377	-	8,385	50,989	47,545	-	3,444	105,339	15,761	-	-	-	5,294,310	240,033	-
4b.1.3	Scaffolding in support of decommissioning	-	4,297	33	15	281	45	-	1,133	5,804	5,804	-	-	1,518	134	-	-	-	76,824	35,578	-
Decontamination of Site Buildings																					
4b.1.4.1	Reactor	1,096	2,528	240	1,236	373	7,080	-	3,215	15,768	15,768	-	-	2,230	67,331	-	-	-	3,286,725	45,740	-
4b.1.4.2	Auxiliary	1,168	375	23	117	177	648	-	886	3,395	3,395	-	-	1,060	6,118	-	-	-	332,495	21,235	-
4b.1.4.3	Backwash Waste Receiving Tank	-	25	3	17	-	97	-	33	175	175	-	-	-	929	-	-	-	43,896	266	-
4b.1.4.4	Drum Transfer & Truck Loading Enclosure	16	8	1	3	3	14	-	15	59	59	-	-	19	135	-	-	-	7,118	328	-
4b.1.4.5	LLRW Storage Enclosure	111	48	3	17	6	96	-	95	377	377	-	-	38	920	-	-	-	44,971	2,151	-
4b.1.4.6	Radwaste	50	21	1	8	7	43	-	43	174	174	-	-	42	412	-	-	-	21,136	964	-
4b.1.4.7	Resin Disposal	15	11	1	3	14	14	-	16	72	72	-	-	83	124	-	-	-	9,271	340	-
4b.1.4.8	Fuel Handling of Aux Building	924	1,015	13	45	404	195	-	833	3,430	3,430	-	-	2,417	1,652	-	-	-	177,755	27,145	-
4b.1.4	Totals	3,380	4,031	285	1,445	985	8,187	-	5,137	23,450	23,450	-	-	5,889	77,619	-	-	-	3,923,368	98,170	-
4b.1.5	Prepare/submit License Termination Plan	-	-	-	-	-	-	225	34	259	259	-	-	-	-	-	-	-	-	-	1,751
4b.1.6	Receive NRC approval of termination plan									a											
4b.1	Subtotal Period 4b Activity Costs	3,693	26,240	1,036	2,594	18,892	14,312	225	15,045	82,037	78,593	-	3,444	112,746	95,607	-	-	-	9,427,420	374,358	1,751

Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
Period 4b Additional Costs																					
4b.2.1	License Termination Survey Planning	-	-	-	-	-	-	1,037	311	1,348	1,348	-	-	-	-	-	-	-	-	-	6,240
4b.2.2	Excavation of Underground Services	-	1,175	-	-	-	-	225	328	1,728	1,728	-	-	-	-	-	-	-	-	7,411	-
4b.2.3	Operational Equipment	-	-	11	36	606	-	-	97	751	751	-	-	5,880	-	-	-	-	147,000	16	-
4b.2	Subtotal Period 4b Additional Costs	-	1,175	11	36	606	-	1,262	736	3,827	3,827	-	-	5,880	-	-	-	-	147,000	7,427	6,240
Period 4b Collateral Costs																					
4b.3.1	Process decommissioning water waste	7	-	12	21	-	48	-	20	107	107	-	-	-	109	-	-	-	6,547	21	-
4b.3.3	Small tool allowance	-	443	-	-	-	-	-	66	509	509	-	-	-	-	-	-	-	-	-	-
4b.3.4	Decommissioning Equipment Disposition	-	-	130	67	1,112	178	-	234	1,722	1,722	-	-	6,000	529	-	-	-	303,608	147	-
4b.3.5	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,225	-	2,225	-	2,225	-	-	-	-	-	-	-	-	-
4b.3	Subtotal Period 4b Collateral Costs	7	443	142	88	1,112	225	2,225	320	4,563	2,338	2,225	-	6,000	638	-	-	-	310,155	168	-
Period 4b Period-Dependent Costs																					
4b.4.1	Decon supplies	1,449	-	-	-	-	-	-	362	1,811	1,811	-	-	-	-	-	-	-	-	-	-
4b.4.2	Insurance	-	-	-	-	-	-	862	86	949	949	-	-	-	-	-	-	-	-	-	-
4b.4.3	Property taxes	-	-	-	-	-	-	5,715	572	6,287	3,785	2,502	-	-	-	-	-	-	-	-	-
4b.4.4	Health physics supplies	-	3,213	-	-	-	-	-	803	4,016	4,016	-	-	-	-	-	-	-	-	-	-
4b.4.5	Heavy equipment rental	-	4,577	-	-	-	-	-	687	5,263	5,263	-	-	-	-	-	-	-	-	-	-
4b.4.6	Disposal of DAW generated	-	-	116	47	-	482	-	139	784	784	-	-	-	5,851	-	-	-	117,027	191	-
4b.4.7	Plant energy budget	-	-	-	-	-	-	2,165	325	2,490	2,490	-	-	-	-	-	-	-	-	-	-
4b.4.8	NRC ISFSI Fees	-	-	-	-	-	-	74	7	81	-	81	-	-	-	-	-	-	-	-	-
4b.4.9	NRC Fees	-	-	-	-	-	-	562	56	618	618	-	-	-	-	-	-	-	-	-	-
4b.4.10	Emergency Planning Fees	-	-	-	-	-	-	132	13	145	-	145	-	-	-	-	-	-	-	-	-
4b.4.11	Fixed Overhead	-	-	-	-	-	-	2,118	318	2,436	2,436	-	-	-	-	-	-	-	-	-	-
4b.4.12	Liquid Radwaste Processing Equipment/Services	-	-	-	-	-	-	757	113	870	870	-	-	-	-	-	-	-	-	-	-
4b.4.13	ISFSI Operating Costs	-	-	-	-	-	-	100	15	115	-	115	-	-	-	-	-	-	-	-	-
4b.4.14	Railroad Track Maintenance	-	-	-	-	-	-	111	17	128	128	-	-	-	-	-	-	-	-	-	-
4b.4.15	Remedial Actions Surveys	-	-	-	-	-	-	1,995	299	2,294	2,294	-	-	-	-	-	-	-	-	-	-
4b.4.16	Security Staff Cost	-	-	-	-	-	-	10,435	1,565	12,000	8,988	3,012	-	-	-	-	-	-	-	-	160,203
4b.4.17	DOC Staff Cost	-	-	-	-	-	-	22,641	3,396	26,038	26,038	-	-	-	-	-	-	-	-	-	248,175
4b.4.18	Utility Staff Cost	-	-	-	-	-	-	28,347	4,252	32,600	31,361	1,239	-	-	-	-	-	-	-	-	440,789
4b.4	Subtotal Period 4b Period-Dependent Costs	1,449	7,790	116	47	-	482	76,016	13,026	98,926	91,832	7,094	-	-	5,851	-	-	-	117,027	191	849,167
4b.0	TOTAL PERIOD 4b COST	5,149	35,647	1,305	2,766	20,610	15,020	79,729	29,128	189,353	176,590	9,319	3,444	124,626	102,096	-	-	-	10,001,600	382,144	857,159
PERIOD 4f - License Termination																					
Period 4f Direct Decommissioning Activities																					
4f.1.1	ORISE confirmatory survey	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
4f.1.2	Terminate license									a											
4f.1	Subtotal Period 4f Activity Costs	-	-	-	-	-	-	166	50	216	216	-	-	-	-	-	-	-	-	-	-
Period 4f Additional Costs																					
4f.2.1	License Termination Survey	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
4f.2	Subtotal Period 4f Additional Costs	-	-	-	-	-	-	7,041	2,112	9,154	9,154	-	-	-	-	-	-	-	-	100,895	3,120
Period 4f Collateral Costs																					
4f.3.1	DOC staff relocation expenses	-	-	-	-	-	-	1,264	190	1,454	1,454	-	-	-	-	-	-	-	-	-	-
4f.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	934	-	934	-	934	-	-	-	-	-	-	-	-	-
4f.3	Subtotal Period 4f Collateral Costs	-	-	-	-	-	-	2,198	190	2,388	1,454	934	-	-	-	-	-	-	-	-	-
Period 4f Period-Dependent Costs																					
4f.4.1	Insurance	-	-	-	-	-	-	362	36	398	-	398	-	-	-	-	-	-	-	-	-
4f.4.2	Property taxes	-	-	-	-	-	-	2,306	231	2,537	1,469	1,068	-	-	-	-	-	-	-	-	-
4f.4.3	Health physics supplies	-	710	-	-	-	-	-	178	888	888	-	-	-	-	-	-	-	-	-	-
4f.4.4	Disposal of DAW generated	-	-	7	3	-	28	-	8	45	45	-	-	-	334	-	-	-	6,685	11	-
4f.4.5	Plant energy budget	-	-	-	-	-	-	243	36	279	279	-	-	-	-	-	-	-	-	-	-
4f.4.6	NRC ISFSI Fees	-	-	-	-	-	-	31	3	34	-	34	-	-	-	-	-	-	-	-	-
4f.4.7	NRC Fees	-	-	-	-	-	-	263	26	290	290	-	-	-	-	-	-	-	-	-	-
4f.4.8	Emergency Planning Fees	-	-	-	-	-	-	55	6	61	-	61	-	-	-	-	-	-	-	-	-
4f.4.9	Fixed Overhead	-	-	-	-	-	-	890	133	1,023	1,023	-	-	-	-	-	-	-	-	-	-
4f.4.10	ISFSI Operating Costs	-	-	-	-	-	-	42	6	48	-	48	-	-	-	-	-	-	-	-	-
4f.4.11	Railroad Track Maintenance	-	-	-	-	-	-	47	7	54	54	-	-	-	-	-	-	-	-	-	-
4f.4.12	Security Staff Cost	-	-	-	-	-	-	1,835	275	2,111	927	1,184	-	-	-	-	-	-	-	-	27,614
4f.4.13	DOC Staff Cost	-	-	-	-	-	-	4,238	636	4,874	4,874	-	-	-	-	-	-	-	-	-	46,283
4f.4.14	Utility Staff Cost	-	-	-	-	-	-	4,011	602	4,613	4,175	438	-	-	-	-	-	-	-	-	59,507
4f.4	Subtotal Period 4f Period-Dependent Costs	-	710	7	3	-	28	14,324	2,183	17,254	14,022	3,232	-	-	334	-	-	-	6,685	11	133,404

Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
4f.0	TOTAL PERIOD 4f COST	-	710	7	3	-	28	23,730	4,535	29,012	24,846	4,166	-	-	334	-	-	-	6,685	100,906	136,524
PERIOD 4 TOTALS		5,395	66,639	19,159	6,333	27,115	34,036	161,545	67,737	387,961	361,874	19,681	6,405	166,102	135,824	125	673	-	14,069,470	673,447	1,616,988
PERIOD 5b - Site Restoration																					
Period 5b Direct Decommissioning Activities																					
Demolition of Remaining Site Buildings																					
5b.1.1.1	Reactor	-	4,645	-	-	-	-	-	697	5,342	-	-	5,342	-	-	-	-	-	-	44,679	-
5b.1.1.2	Auxiliary	-	1,993	-	-	-	-	-	299	2,291	-	-	2,291	-	-	-	-	-	-	11,902	-
5b.1.1.3	Condensate Storage Tank Foundation	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	33	-
5b.1.1.4	Construction Warehouse & Fab Shop	-	130	-	-	-	-	-	19	149	-	-	149	-	-	-	-	-	-	1,405	-
5b.1.1.5	D3/D4 Emergency Generator	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	84	-
5b.1.1.6	Drum Transfer & Truck Loading Enclosure	-	20	-	-	-	-	-	3	24	-	-	24	-	-	-	-	-	-	221	-
5b.1.1.7	Hydrogen House	-	6	-	-	-	-	-	1	7	-	-	7	-	-	-	-	-	-	47	-
5b.1.1.8	LLRW Storage Enclosure	-	128	-	-	-	-	-	19	147	-	-	147	-	-	-	-	-	-	853	-
5b.1.1.9	Misc Structures 2017	-	2,617	-	-	-	-	-	393	3,009	-	-	3,009	-	-	-	-	-	-	22,582	-
5b.1.1.10	Radwaste	-	176	-	-	-	-	-	26	202	-	-	202	-	-	-	-	-	-	1,400	-
5b.1.1.11	Resin Disposal	-	14	-	-	-	-	-	2	16	-	-	16	-	-	-	-	-	-	120	-
5b.1.1.12	Structures below 3' below grade	-	1,785	-	-	-	-	-	268	2,052	-	-	2,052	-	-	-	-	-	-	9,238	-
5b.1.1.13	Sulfuric Acid Tank Enclosure	-	3	-	-	-	-	-	0	4	-	-	4	-	-	-	-	-	-	35	-
5b.1.1.14	Turbine	-	2,140	-	-	-	-	-	321	2,461	-	-	2,461	-	-	-	-	-	-	21,997	-
5b.1.1.15	Turbine Pedestal	-	365	-	-	-	-	-	55	420	-	-	420	-	-	-	-	-	-	1,857	-
5b.1.1.16	Warehouse #2	-	24	-	-	-	-	-	4	27	-	-	27	-	-	-	-	-	-	213	-
5b.1.1.17	Waste Neutralizing Tank House	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	56	-
5b.1.1.18	Waste Oil Storage	-	9	-	-	-	-	-	1	10	-	-	10	-	-	-	-	-	-	70	-
5b.1.1.19	Water Treatment	-	324	-	-	-	-	-	49	373	-	-	373	-	-	-	-	-	-	2,690	-
5b.1.1.20	Fuel Handling of Aux Building	-	1,095	-	-	-	-	-	164	1,259	-	-	1,259	-	-	-	-	-	-	8,240	-
5b.1.1	Totals	-	15,501	-	-	-	-	-	2,325	17,826	-	-	17,826	-	-	-	-	-	-	127,723	-
Site Closeout Activities																					
5b.1.2	Remove Rubble	-	1,517	-	-	-	-	-	228	1,745	-	-	1,745	-	-	-	-	-	-	7,408	-
5b.1.3	Grade & landscape site	-	448	-	-	-	-	-	67	515	-	-	515	-	-	-	-	-	-	921	-
5b.1.4	Final report to NRC	-	-	-	-	-	-	86	13	99	99	-	-	-	-	-	-	-	-	-	667
5b.1	Subtotal Period 5b Activity Costs	-	17,466	-	-	-	-	86	2,633	20,185	99	-	20,086	-	-	-	-	-	-	136,051	667
Period 5b Additional Costs																					
5b.2.1	Clean Concrete Disposal	-	4,912	-	-	-	-	10	738	5,660	-	-	5,660	-	-	-	-	-	-	18,372	-
5b.2.2	Intake Structure Cofferdam	-	442	-	-	-	-	-	66	508	-	-	508	-	-	-	-	-	-	3,552	-
5b.2.3	Construction Debris	-	-	-	-	-	-	2,150	323	2,473	-	-	2,473	-	-	-	-	-	-	-	-
5b.2.4	Backfill	-	9,257	-	-	-	-	-	1,388	10,645	-	-	10,645	-	-	-	-	-	-	9,327	-
5b.2.5	Disposition of Original Casks	-	24	80	418	-	2,390	-	728	3,640	3,640	-	-	-	8,929	-	-	-	1,059,612	146	-
5b.2	Subtotal Period 5b Additional Costs	-	14,634	80	418	-	2,390	2,160	3,244	22,926	3,640	-	19,286	-	8,929	-	-	-	1,059,612	31,397	-
Period 5b Collateral Costs																					
5b.3.1	Small tool allowance	-	213	-	-	-	-	-	32	245	-	-	245	-	-	-	-	-	-	-	-
5b.3.2	Spent Fuel Capital and Transfer	-	-	-	-	-	-	3,821	573	4,394	-	4,394	-	-	-	-	-	-	-	-	-
5b.3.3	Prairie Island Indian Community Payments	-	-	-	-	-	-	2,649	-	2,649	-	2,649	-	-	-	-	-	-	-	-	-
5b.3	Subtotal Period 5b Collateral Costs	-	213	-	-	-	-	6,470	605	7,288	-	7,043	245	-	-	-	-	-	-	-	-
Period 5b Period-Dependent Costs																					
5b.4.1	Insurance	-	-	-	-	-	-	513	51	565	-	565	-	-	-	-	-	-	-	-	-
5b.4.2	Property taxes	-	-	-	-	-	-	5,904	590	6,494	-	2,663	3,831	-	-	-	-	-	-	-	-
5b.4.3	Heavy equipment rental	-	7,144	-	-	-	-	-	1,072	8,215	-	-	8,215	-	-	-	-	-	-	-	-
5b.4.4	Plant energy budget	-	-	-	-	-	-	344	52	395	-	395	-	-	-	-	-	-	-	-	-
5b.4.5	NRC ISFSI Fees	-	-	-	-	-	-	243	24	268	-	268	-	-	-	-	-	-	-	-	-
5b.4.6	Emergency Planning Fees	-	-	-	-	-	-	157	16	173	-	173	-	-	-	-	-	-	-	-	-
5b.4.7	Fixed Overhead	-	-	-	-	-	-	1,024	154	1,178	-	781	397	-	-	-	-	-	-	-	-
5b.4.8	ISFSI Operating Costs	-	-	-	-	-	-	119	18	136	-	136	-	-	-	-	-	-	-	-	-
5b.4.9	Railroad Track Maintenance	-	-	-	-	-	-	133	20	152	(0)	97	56	-	-	-	-	-	-	-	-
5b.4.10	Security Staff Cost	-	-	-	-	-	-	4,976	746	5,722	0	5,310	412	-	-	-	-	-	-	-	74,431
5b.4.11	DOC Staff Cost	-	-	-	-	-	-	10,921	1,638	12,559	-	-	12,559	-	-	-	-	-	-	-	116,885
5b.4.12	Utility Staff Cost	-	-	-	-	-	-	5,170	776	5,946	-	1,278	4,668	-	-	-	-	-	-	-	76,637
5b.4	Subtotal Period 5b Period-Dependent Costs	-	7,144	-	-	-	-	29,504	5,156	41,804	0	11,666	30,139	-	-	-	-	-	-	-	267,952
5b.0	TOTAL PERIOD 5b COST	-	39,457	80	418	-	2,390	38,220	11,638	92,203	3,739	18,708	69,756	-	8,929	-	-	-	1,059,612	167,448	268,620

Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet	Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
PERIOD 5c - Fuel Storage Operations/Shipping																					
Period 5c Direct Decommissioning Activities																					
Period 5c Collateral Costs																					
5c.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	445,840	66,876	512,716	-	512,716	-	-	-	-	-	-	-	-	-
5c.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	152,793	-	152,793	-	152,793	-	-	-	-	-	-	-	-	-
5c.3	Subtotal Period 5c Collateral Costs	-	-	-	-	-	-	598,632	66,876	665,508	-	665,508	-	-	-	-	-	-	-	-	-
Period 5c Period-Dependent Costs																					
5c.4.1	Insurance	-	-	-	-	-	-	29,616	2,962	32,578	-	32,578	-	-	-	-	-	-	-	-	-
5c.4.2	Property taxes	-	-	-	-	-	-	169,412	16,941	186,354	-	186,354	-	-	-	-	-	-	-	-	-
5c.4.4	NRC ISFSI Fees	-	-	-	-	-	-	14,030	1,403	15,432	-	15,432	-	-	-	-	-	-	-	-	-
5c.4.5	Emergency Planning Fees	-	-	-	-	-	-	9,068	907	9,974	-	9,974	-	-	-	-	-	-	-	-	-
5c.4.6	Fixed Overhead	-	-	-	-	-	-	19,930	2,990	22,920	-	22,920	-	-	-	-	-	-	-	-	-
5c.4.7	ISFSI Operating Costs	-	-	-	-	-	-	6,845	1,027	7,872	-	7,872	-	-	-	-	-	-	-	-	-
5c.4.8	Railroad Track Maintenance	-	-	-	-	-	-	7,647	1,147	8,795	-	8,795	-	-	-	-	-	-	-	-	-
5c.4.9	Security Staff Cost	-	-	-	-	-	-	236,347	35,452	271,799	-	271,799	-	-	-	-	-	-	-	-	3,434,684
5c.4.10	DOC Staff Cost	-	-	-	-	-	-	18,749	2,812	21,561	-	21,561	-	-	-	-	-	-	-	-	127,211
5c.4.11	Utility Staff Cost	-	-	-	-	-	-	115,440	17,316	132,756	-	132,756	-	-	-	-	-	-	-	-	1,685,540
5c.4	Subtotal Period 5c Period-Dependent Costs	-	-	-	-	-	-	627,085	82,956	710,041	-	710,041	-	-	-	-	-	-	-	-	5,247,434
5c.0	TOTAL PERIOD 5c COST	-	-	-	-	-	-	1,225,717	149,832	1,375,549	-	1,375,549	-	-	-	-	-	-	-	-	5,247,434
PERIOD 5d - GTCC shipping																					
Period 5d Direct Decommissioning Activities																					
Nuclear Steam Supply System Removal																					
5d.1.1.1	Vessel & Internals GTCC Disposal	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
5d.1.1	Totals	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
5d.1	Subtotal Period 5d Activity Costs	-	-	1,444	-	-	8,680	-	1,663	11,787	11,787	-	-	-	-	-	-	1,773	344,823	-	-
Period 5d Collateral Costs																					
5d.3.1	Spent Fuel Capital and Transfer	-	-	-	-	-	-	28	4	32	-	32	-	-	-	-	-	-	-	-	-
5d.3.2	Prairie Island Indian Community Payments	-	-	-	-	-	-	48	-	48	-	48	-	-	-	-	-	-	-	-	-
5d.3	Subtotal Period 5d Collateral Costs	-	-	-	-	-	-	76	4	80	-	80	-	-	-	-	-	-	-	-	-
Period 5d Period-Dependent Costs																					
5d.4.1	Insurance	-	-	-	-	-	-	9	1	10	10	-	-	-	-	-	-	-	-	-	-
5d.4.2	Property taxes	-	-	-	-	-	-	53	5	58	58	-	-	-	-	-	-	-	-	-	-
5d.4.4	NRC ISFSI Fees	-	-	-	-	-	-	4	0	4	-	4	-	-	-	-	-	-	-	-	-
5d.4.5	Emergency Planning Fees	-	-	-	-	-	-	3	0	3	-	3	-	-	-	-	-	-	-	-	-
5d.4.6	Fixed Overhead	-	-	-	-	-	-	6	1	7	7	-	-	-	-	-	-	-	-	-	-
5d.4.7	Railroad Track Maintenance	-	-	-	-	-	-	2	0	3	3	-	-	-	-	-	-	-	-	-	-
5d.4.8	Security Staff Cost	-	-	-	-	-	-	74	11	85	85	-	-	-	-	-	-	-	-	-	1,077
5d.4.9	Utility Staff Cost	-	-	-	-	-	-	19	3	22	22	-	-	-	-	-	-	-	-	-	269
5d.4	Subtotal Period 5d Period-Dependent Costs	-	-	-	-	-	-	171	22	194	186	7	-	-	-	-	-	-	-	-	1,346
5d.0	TOTAL PERIOD 5d COST	-	-	1,444	-	-	8,680	247	1,689	12,060	11,973	87	-	-	-	-	-	1,773	344,823	-	1,346
PERIOD 5e - ISFSI Decontamination																					
Period 5e Direct Decommissioning Activities																					
Period 5e Additional Costs																					
5e.2.1	License Termination ISFSI	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161
5e.2	Subtotal Period 5e Additional Costs	-	0	2	17	-	142	1,197	339	1,696	1,696	-	-	-	424	-	-	-	65,754	5,882	1,161
Period 5e Period-Dependent Costs																					
5e.4.1	Insurance	-	-	-	-	-	-	93	23	116	116	-	-	-	-	-	-	-	-	-	-
5e.4.2	Property taxes	-	-	-	-	-	-	56	14	69	69	-	-	-	-	-	-	-	-	-	-
5e.4.3	Plant energy budget	-	-	-	-	-	-	11	3	13	13	-	-	-	-	-	-	-	-	-	-
5e.4.4	Fixed Overhead	-	-	-	-	-	-	54	14	68	68	-	-	-	-	-	-	-	-	-	-
5e.4.5	Railroad Track Maintenance	-	-	-	-	-	-	21	5	26	26	-	-	-	-	-	-	-	-	-	-
5e.4.6	Security Staff Cost	-	-	-	-	-	-	174	43	217	217	-	-	-	-	-	-	-	-	-	2,500
5e.4.7	Utility Staff Cost	-	-	-	-	-	-	129	32	161	161	-	-	-	-	-	-	-	-	-	1,896
5e.4	Subtotal Period 5e Period-Dependent Costs	-	-	-	-	-	-	536	134	670	670	-	-	-	-	-	-	-	-	-	4,396

Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)

Activity Index	Activity Description	Decon Cost	Removal Cost	Packaging Costs	Transport Costs	Off-Site Processing Costs	LLRW Disposal Costs	Other Costs	Total Contingency	Total Costs	NRC Lic. Term. Costs	Spent Fuel Management Costs	Site Restoration Costs	Processed Volume Cu. Feet	Burial Volumes				Burial / Processed Wt., Lbs.	Craft Manhours	Utility and Contractor Manhours
															Class A Cu. Feet	Class B Cu. Feet	Class C Cu. Feet	GTCC Cu. Feet			
5e.0	TOTAL PERIOD 5e COST	-	0	2	17	-	142	1,733	473	2,367	2,367	-	-	-	424	-	-	-	65,754	5,882	5,556
PERIOD 5f - ISFSI Site Restoration																					
Period 5f Direct Decommissioning Activities																					
Period 5f Additional Costs																					
5f.2.1	Demolition and Site Restoration of ISFSI	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
5f.2	Subtotal Period 5f Additional Costs	-	1,121	-	-	-	-	161	192	1,474	-	-	1,474	-	-	-	-	-	-	4,846	80
Period 5f Collateral Costs																					
5f.3.1	Small tool allowance	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
5f.3	Subtotal Period 5f Collateral Costs	-	7	-	-	-	-	-	1	8	-	-	8	-	-	-	-	-	-	-	-
Period 5f Period-Dependent Costs																					
5f.4.2	Property taxes	-	-	-	-	-	-	28	3	31	-	-	31	-	-	-	-	-	-	-	-
5f.4.3	Heavy equipment rental	-	59	-	-	-	-	-	9	68	-	-	68	-	-	-	-	-	-	-	-
5f.4.4	Plant energy budget	-	-	-	-	-	-	6	1	6	-	-	6	-	-	-	-	-	-	-	-
5f.4.5	Fixed Overhead	-	-	-	-	-	-	28	4	32	-	-	32	-	-	-	-	-	-	-	-
5f.4.6	Railroad Track Maintenance	-	-	-	-	-	-	11	2	12	-	-	12	-	-	-	-	-	-	-	-
5f.4.7	Security Staff Cost	-	-	-	-	-	-	89	13	102	-	-	102	-	-	-	-	-	-	-	1,281
5f.4.8	Utility Staff Cost	-	-	-	-	-	-	55	8	63	-	-	63	-	-	-	-	-	-	-	795
5f.4	Subtotal Period 5f Period-Dependent Costs	-	59	-	-	-	-	216	40	315	-	-	315	-	-	-	-	-	-	-	2,076
5f.0	TOTAL PERIOD 5f COST	-	1,187	-	-	-	-	377	233	1,798	-	-	1,798	-	-	-	-	-	-	4,846	2,156
PERIOD 5 TOTALS		-	40,644	1,525	435	-	11,212	1,266,294	163,866	1,483,976	18,078	1,394,345	71,553	-	9,353	-	-	1,773	1,470,189	178,175	5,525,112
TOTAL COST TO DECOMMISSION		12,610	122,384	21,327	7,312	27,293	47,794	2,404,684	363,115	3,006,518	983,908	1,943,956	78,655	172,234	167,056	125	673	1,773	16,288,180	950,825	11,722,100

TOTAL COST TO DECOMMISSION WITH 13.74% CONTINGENCY:	**$3,006,518**	**thousands of 2020 dollars**
TOTAL NRC LICENSE TERMINATION COST IS 32.73% OR:	**$983,908**	**thousands of 2020 dollars**
SPENT FUEL MANAGEMENT COST IS 64.66% OR:	**$1,943,956**	**thousands of 2020 dollars**
NON-NUCLEAR DEMOLITION COST IS 2.62% OR:	**$78,655**	**thousands of 2020 dollars**
TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):	**167,854**	**Cubic Feet**
TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED:	**1,773**	**Cubic Feet**
TOTAL SCRAP METAL REMOVED:	**42,406**	**Tons**
TOTAL CRAFT LABOR REQUIREMENTS:	**950,825**	**Man-hours**

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

APPENDIX K

ISFSI DECOMMISSIONING

Page

Prairie Island Nuclear Generating Plant – Scenarios 1, 2, 5, and 6 .....K-2

Prairie Island Nuclear Generating Plant – Scenarios 3, 4, 7, and 8 .....K-3

Table K-1
Prarie Island Nuclear Generating Plant
Scenarios 1, 2, 5, & 6
ISFSI Decommissioning Cost Estimate
(thousands of 2020 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	LLRW Disposal Costs	Other Costs	Total Costs	Burial Volume Class A (cubic feet)	Craft Manhours	Oversight and Contractor Manhours
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	189	189	-	-	976
Decontamination (activated disposition)	49	163	870	5,065	-	6,146	18,710	321	-
License Termination (radiological surveys)	-	-	-	-	1,020	1,020	-	7,203	-
Subtotal	**49**	**163**	**870**	**5,065**	**1,209**	**7,355**	**18,710**	**7,524**	**976**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	469	469	-	-	1,153
Insurance	-	-	-	-	185	185	-	-	-
Property taxes	-	-	-	-	111	111	-	-	-
Plant energy budget	-	-	-	-	21	21	-	-	-
Fixed Overhead	-	-	-	-	108	108	-	-	-
Railroad Track Maintenance	-	-	-	-	41	41	-	-	-
Security Staff Cost	-	-	-	-	348	348	-	-	4,999
Utility Staff Cost	-	-	-	-	258	258	-	-	3,792
Subtotal	-	-	-	-	**1,541**	**1,541**	-	-	**9,945**
Total (w/o contingency)	**49**	**163**	**870**	**5,065**	**2,751**	**8,896**	**18,710**	**7,524**	**10,921**
Total (w/25% contingency)	**61**	**204**	**1,087**	**6,331**	**3,438**	**11,121**			

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)

Table K-2
Prarie Island Nuclear Generating Plant
Scenarios 3, 4, 7, & 8
ISFSI Decommissioning Cost Estimate
(thousands of 2020 dollars)

Activity Description	Removal Costs	Packaging Costs	Transport Costs	LLRW Disposal Costs	Other Costs	Total Costs	Burial Volume Class A (cubic feet)	Craft Manhours	Oversight and Contractor Manhours
Decommissioning Contractor									
Planning (characterization, specs and procedures)	-	-	-	-	299	299	-	-	1,168
Decontamination (activated disposition)	0	3	33	283	-	320	848	29	-
License Termination (radiological surveys)	-	-	-	-	1,619	1,619	-	11,734	-
Subtotal	**0**	**3**	**33**	**283**	**1,918**	**2,238**	**848**	**11,763**	**1,168**
Supporting Costs									
NRC and NRC Contractor Fees and Costs	-	-	-	-	476	476	-	-	1,153
Insurance	-	-	-	-	185	185	-	-	-
Property taxes	-	-	-	-	111	111	-	-	-
Plant energy budget	-	-	-	-	21	21	-	-	-
Fixed Overhead	-	-	-	-	108	108	-	-	-
Railroad Track Maintenance	-	-	-	-	41	41	-	-	-
Security Staff Cost	-	-	-	-	348	348	-	-	4,999
Utility Staff Cost	-	-	-	-	258	258	-	-	3,792
Subtotal	-	-	-	-	**1,549**	**1,549**	-	-	**9,945**
Total (w/o contingency)	**0**	**3**	**33**	**283**	**3,467**	**3,787**	**848**	**11,763**	**11,113**
Total (w/25% contingency)	**0**	**4**	**41**	**354**	**4,333**	**4,733**			

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)